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# MASTER THESIS

**“Possible Effects of the 2003 Invasion of Iraq, on the Nuclear Programmes in Iran, North Korea and Libya”**

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## Preface

The spring of 2013 marked the 10 year anniversary for the invasion of Iraq in 2003. The invasion is interesting because the United States accused Iraq, Iran, North Korea and Libya for being part of an Axis of Evil in 2002, while laying out a formal doctrine of prevention of nuclear weapons proliferation. In March 2003 the United States applied the doctrine in Iraq, on the premise of Iraq's alleged clandestine nuclear weapons programme. Interestingly enough, within the same year as Iraq was invaded, North Korea decided to withdraw from the Treaty on the Non-Proliferation of Nuclear Weapons, Iran decided to halt parts of its nuclear programme, while Libya decided to cancel its nuclear programme. In the decade that has passed since 2003, North Korea has conducted three nuclear tests; Libya has no longer a nuclear programme, but experienced an attack from a United States led coalition; and uncertainty revolves around the purpose of Iran's nuclear programme.

Being allowed to write this thesis not only for the University of Nordland, but also for the Norwegian Defence Research Establishment (FFI) has been a privilege. As FFI has provided me with an office, I have been situated close to many of Norway's finest experts on the subjects of nuclear weapons programmes, and especially Iran's and North Korea's. I would firstly like to thank my great tutors Dr. Steinar Høibråten, Halvor Kippe, Hege Schultz Heireng, and Dr. Monica Endregard at FFI, for the close monitoring of this research. You have truly been an invaluable asset. Secondly I would like to thank Sébasien Miraglia and Michael Mayer at the Norwegian Institute for Defence Studies (IFS), and Sverre Lodgaard at the Norwegian Institute of International Affairs (NUPI) for their time and input. Thirdly I would like to thank my great tutor from the University of Nordland, Elisabeth Pettersen for all her feedback. Fourthly I would like to thank family and friends who have supported me through the past year, keeping my spirit up. In love and gratitude, thank you all.



## 1 Introduction

On 29 January 2002, United States President George W. Bush<sup>1</sup> named the Republic of Iraq (hereinafter referred to as Iraq), the Islamic Republic of Iran (hereinafter referred to as Iran) and the Democratic People's Republic of Korea (hereinafter referred to as North Korea) as members of "the Axis of Evil" (see Section 2.1) in his "State of the Union Address". On 6 May 2002 the Great Socialist People's Libyan Arab Jamahiriya (hereinafter referred to as Libya) was added to the list, in what Assistant Secretary for International Organization Affairs John Bolton referred to as "beyond the Axis of Evil". One year later, on 20 March 2003, Iraq was invaded based on accusations of harbouring and supporting terrorists, as well as the suspicion that Saddam Hussein was secretly developing weapons of mass destruction (see Section 1.2). Interestingly enough, within the same year as the invasion took place, the other members of the Axis of Evil all changed behaviour regarding their respective nuclear programmes: North Korea withdrew from the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) (see Section 2.2) on 10 January 2003, two months before the invasion; Iran halted some of its nuclear activities during the fall of 2003; while Libya made an official announcement on 19 December 2003, stating that it would dispose of all weapons of mass destruction and adhere to its commitments to the NPT (Arms Control Association 2013a).

It may seem that Iran, North Korea and Libya feared the same fate as Iraq, and changed behaviour because of this. This research aims at investigating other possible factors that could explain what caused the changes in the nuclear programmes in 2003, in order to determine if the invasion of Iraq was the determining factor.

### 1.1 Topic and Research Question

The topic of this research is the nuclear programmes in Iran, North Korea and Libya, and how each state's behaviour changed regarding their respective programmes. The research also concerns the ten years that have passed since the invasion of Iraq, and focuses on how the different nuclear programmes have turned out. Investigating and comparing the three nuclear programmes is interesting for many reasons: Firstly, Iran, North Korea and Libya chose different paths for their nuclear programmes: Iran may or may not be

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<sup>1</sup> George W. Bush, President of the United States 2001 to 2009

developing nuclear weapons; North Korea went all the way and acquired nuclear weapons; and Libya gave up its nuclear weapons ambitions in 2003. Secondly, all three states were labelled by the United States as “rogue states”<sup>2</sup> being part of the Axis of Evil (see Section 2.1). Thirdly, all three states traded with the Pakistani nuclear scientist Abdul Qadeer Khan and his network (see Footnote 7), which provided nuclear technology. Fourthly, Iran’s and North Korea’s nuclear programmes have continued to draw attention for the past ten years, and uncertainty still revolves around both programmes.

This research can be described as a dual investigation: Firstly, it investigates if the invasion of Iraq caused the noticeable change in the nuclear programmes of Iran, North Korea and Libya in 2003. Secondly, it investigates what other factors may have caused the nuclear programmes to turn out the way they did. As the title of this research is “Possible effects of the 2003 Iraq invasion on the nuclear programmes in Iran, North Korea and Libya”, it only suggests that the 2003 Iraq invasion might have affected these nuclear programmes. And so, the research question aims at addressing the duality mentioned above:

*To what degree did the 2003 invasion of Iraq affect Iran, North Korea and Libya to change behaviour regarding their nuclear programmes; and to what degree did the 2003 invasion of Iraq affect the outcome of the three nuclear programmes?*

As an investigation, the invasion of Iraq in March 2003 will be used as a timeline indicator to see if changes in behaviour regarding the respective nuclear programmes occurred before or after the invasion, and if these changes appear to have occurred as a direct effect of the invasion, or not. The invasion is interesting to use as an indicator, as Iraq was invaded based on accusations of the possession of weapons of mass destruction, and there is reason to believe that this may have caused Iran, North Korea and Libya to change their behaviour regarding their own nuclear programmes. With the invasion as an indicator, the timeline for this study need to start before 2003 and end after, in order to understand the outcome of the three different nuclear programmes. Therefore this research will focus on the period from 2000 to 2013, identifying the most important

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<sup>2</sup> “rogue states” are labelled as such because of their (anti-Western) foreign policy outlook. Rogue states are viewed as directly threatening international order and stability (Rogue State 2013).



events that took place, which could have affected the outcomes. Nonetheless, this research acknowledges the fact that all three nuclear programmes, and their possible military dimensions, go further back in time than 2000, but the analysis focuses on the last 13 years as these are the most interesting in terms of the behavioural change. Still, this research will give a brief historical review of each state's nuclear programme, as events prior to 2000 might have contributed to the outcomes. In order to analyse the rationale behind the changes, the research will also use the international relations theory realism as the theoretical framework, supported by liberalism and social constructivism in order to provide a better and more nuanced analysis.

This research has the following view on the three programmes: Libya had a clandestine nuclear weapons programme, without any ambitions for nuclear power; North Korea focused mainly on nuclear weapons, but had also (and still has) ambitions for nuclear power; while Iran has reached far in the field of nuclear power – with the Middle East's first nuclear power plant – and the development of fuel cycle technology, but also seems to have explored a nuclear weapons option, at least until late 2003. As a result, the analysis of Libya in this research will necessarily be shorter than the analysis of Iran and North Korea, given the shorter time frame in which Libya's nuclear programme existed.

## 1.2 Definitions

The topic and the research question require the use of certain terms and definitions in order to provide context and to define key principles that is important throughout this research:

- **Nuclear programme:** National programme to develop methods and technologies for peaceful or military use of nuclear energy.
- **Nuclear-weapon state (NWS):** According to the NPT, states which carried out a nuclear detonation before 1967 have a temporary right to possess such weapons. This right includes China, France, Russia, the United Kingdom and the United States, which are designated nuclear-weapon states.
- **Non-nuclear-weapon state (NNWS):** State not recognized by the NPT (see Section 2.2) as a legitimate nuclear-weapon state. NNWS are not allowed to

acquire nuclear weapons, and the states undertake to accept safeguards carried out by the International Atomic Energy Agency (IAEA) (see Section 2.3). This includes all signatories of the NPT, excluding the five recognised nuclear-weapon states. Both Norway and Iran are NNWS under the NPT (see Appendix B).

- **P5+1:** A group that in 2006 joined the diplomatic efforts on negotiating the Iranian nuclear programme. The group includes the five permanent members of the United Nations Security Council namely China, France, the United Kingdom, the United States and Russia, plus Germany. It is also known as the E3+3 (Henderson & Heinonen 2012).
- **The Six-Party talks:** A group of states that in 2003 joined their diplomatic efforts to find a peaceful resolution to the security concerns regarding the North Korean nuclear weapons programme. This group includes North Korea, South Korea, China, Japan, Russia and the United States (Høibråten et.al 2013, p.55)
- **Weapons of Mass Destruction (WMD):** Biological, chemical and nuclear weapons, capable of massive destruction (UNODA 2013).

### 1.3 Operationalization

This research aims to find variables, in addition to the invasion of Iraq, which could have led to the changes in the nuclear programs of Iran, North Korea and Libya. However, only Libya's nuclear programme ended in 2003, so in order to find out if the 2003 invasion of Iraq continued to affect Iran's and North Korea's nuclear programmes, the variables occurring from 2003 until today must be taken into account. The dependent variable is *changes in the nuclear programmes of Iran, North Korea and Libya*, while the independent variables are all other variables that could have affected the programmes.

In this type of study, it is difficult to assess the impact of the independent variables and how the variables may affect the result of the analysis (Hellevik 2002, p.239). Dealing with three nuclear programmes, with a number of independent variables influencing the dependent variable, is challenging. Unfortunately, some variables may not be accounted

for, and this could be a weakness of the analysis. Being aware of this challenge is important when carrying out the study.

### 1.3.1 Dependent variable

As mentioned above, the dependent variable in this analysis is *changes in the nuclear programmes of Iran, North Korea and Libya*. Firstly, the word *change* is difficult to measure because it is impossible to determine for sure that a change has occurred, and to what degree something has changed. However, arguing that a change might have occurred could be possible in this case, because all three nuclear programmes did indeed change within 2003, the same year that Iraq was invaded. Libya gave up their nuclear weapon program in 2003; North Korea withdrew from the NPT in 2003; while Iran halted some of its most sensitive nuclear activities in 2003. This raises the possibility that the Iraq invasion might have influenced the change in the programmes.

Secondly, the dependent variable contains the term *nuclear programmes*, which complexity should be further explained: All three states apparently had, to different degrees, activities relevant for nuclear weapons development before 2003, but uncertainties exist regarding what happened after 2003. Given this uncertainty, this research will not use the term *nuclear weapons programme* in the case of Iran, even though the international community is highly sceptical about Iran's nuclear intentions also today. This is because of a challenge within the topic, namely the dual-use aspect of nuclear programmes. The dual use of the nuclear technology enables both a peaceful and military option. A state with nuclear weapons ambitions can therefore use its right to peaceful nuclear technology to secretly develop nuclear weapons. The fact that Iran has a civilian nuclear programme, with possible military dimensions, makes the Iranian case especially interesting. Further, this research recognizes North Korea as a *de facto*<sup>3</sup> nuclear weapon state, as the regime has conducted several nuclear tests after 2003 (2006, 2009 and 2013), a fact that justifies the use of the term *nuclear weapons programme* when talking about the time prior to North Korea's "nuclear breakout". Still, the term *weapon* is somewhat misleading in this case, because North Korea most likely only

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<sup>3</sup> State not recognized by the NPT (see section 2.2) as a legitimate nuclear-weapon state, possessing nuclear weapons. States like India, Pakistan and North Korea are *de facto* nuclear-weapon states. Most likely Israel also possesses nuclear weapons, but this has never been publicly confirmed (Høibråten et. al. 2013).

possesses workable nuclear “devices”, which have not been “weaponized<sup>4</sup>” yet (Høibråten, Breivik, Enger, Schultz Heireng & Kippe 2013). The term *nuclear weapons programme* can also be used on Libya, although it never managed to acquire nuclear weapons before cancelling its programme. However, when all three states are mentioned together, the term *nuclear programmes* is best suited.

### 1.3.2 Independent variables

Acknowledging the fact that the list of variables may not be complete, the following variables are the most important. Further, through the analysis the variables that are most relevant for each specific case will be identified, as they might not be accounted for in advance.

The first, and most interesting variable in this analysis, is the effect of the *Iraq invasion* on the nuclear programmes. This variable will receive significantly more attention than the other independent variables, because it also addresses security, which is an important aspect of the theoretical framework in so many ways. Firstly the variable addresses security through fear of a military attack (primarily by the United States) as the variable assumes that all three states had a genuine fear of being “next on the list”. While Iran, North Korea and Libya witnessed a fellow state within the Axis of Evil being invaded, the variable assumes that the “bystander” states must have felt an increased pressure, which led them to conduct changes regarding their nuclear programmes, within 2003. Secondly, another important aspect of the *Iraq invasion* variable is the American regional presence and influence, understood as the presence in Iraq, Afghanistan and South Korea and the influencing ability to affect regional politics, which could lead the states to increase or decrease their efforts regarding the nuclear programmes. While the invasion of Iraq was a part of the War on Terror, this research operationalize the *Iraq invasion* to encompass the War on Terror as a part of the increasing counter-proliferation pressure on states deemed rogue by the United States, and thereby affecting the nuclear programmes. Thirdly, the variable encompasses how the United States removed the Taliban in Afghanistan, and Saddam Hussein in Iraq, improving security for Iran. Fourth and finally, the variable takes into account the fear of regime change, which could have affected the nuclear programmes in both ways. It is a challenge that this variable has certain

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<sup>4</sup> Weaponization: turning a nuclear explosive device into a weapon. This includes designing the device in such a manner that it fits and functions with the available delivery system (airplane, missile e.g.), thereby making the nuclear weapon operational (Kippe 2009, p.63).

similarities with the *Iraq invasion* variable, which makes it difficult to separate the influence of the two variables.

The second independent variable, which may have influenced the nuclear programmes, is *sanctions*. This could either be the fear of sanctions or the effect of already implemented sanctions. This variable assumes that the fear of sanctions would influence the state to not continue its nuclear programme, while the effect of sanctions would lead a state to negotiate its nuclear programme, or eventually giving up its nuclear programme.

The third independent variable is *nuclear technology options and activities*. This variable encompasses whether Iran, North Korea or Libya had a military programme, a nuclear power programme, or a programme covering both options. Further this variable will include the importance of access to the technology provided by the A.Q Khan network, but it will not go any further on describing the different states access to nuclear technology on general basis. This variable also assumes that some states will have more national expertise than others, which may affect the decision-making process. A disclosure of undeclared nuclear activities, like the disclosure of the Khan-network or an undeclared nuclear facility, could also contribute to increased cooperation from a state.

The fourth independent variable is *national strategy and foreign policy*, which takes into account that one or several changes within each state's foreign policy could have caused the nuclear programme to change; either towards further development or towards a stop in the development, as a measure taken to downscale the chance for international pressure. A national strategy may change as a result of a national election or a regime change. This could also influence the way each state look at negotiations. If the state perceives negotiations as beneficial, they could be willing to halt some aspects of its nuclear programme. However, if negotiations fail, this could lead states towards developing their respective nuclear programmes further. This variable also encompasses prestige and status as important driving forces within each state's foreign policy, and that these forces could affect decisions regarding the nuclear programmes.

#### **1.4 Relevance and value**

This analysis is important for several reasons: North Korea has been testing its nuclear weapons as late as the spring of 2013, making its nuclear programme continuously

relevant; throughout 2013 Iran's possible nuclear weapons programme has also received much attention, and it continues to reach international headlines; and Libya was attacked by coalition forces in 2011, an event that might not have happened if the regime had not given up its nuclear weapons programme in 2003, and also an event that might influence the decision-making of North Korea and Iran regarding their respective programmes.

Further, this research is important because it analyses how the attack on one "member" of the Axis of Evil affected three other states of the same category, based on changes to their respective nuclear programmes. It is challenging to provide a sufficient overview of three nuclear programmes; but it will make the analysis much more unique and relevant. It is unique because many studies are assessing the nuclear programmes of Iran, North Korea and Libya separately; however, few studies compare the three cases and point out differences and similarities between them, which means that this research covers a "missing piece" in the field of science. It is relevant to other members of the axis of evil like Syria, which has been suspected of having a clandestine nuclear weapons programme (Høybråten et.al. 2013, p.120).

### **1.5 Structure of the Research**

This research is divided into 6 chapters:

**Chapter 1** concerns the introduction; the topic and research question, as well as an operationalization of the variables for the research; and the relevance and value of the research.

**Chapter 2** will concern relevant background information, such as the reason for the 2003 invasion of Iraq, the importance of the NPT and the IAEA as well as a quick historical review of the three nuclear programmes.

**Chapter 3** will concern the methodological approach; and present how this research has been conducted as a document study, and how this research will retain its reliability and validity.

**Chapter 4** will concern the theoretical framework for this research, through the international relations theories realism, liberalism and social constructivism, as well as an explanation for why this research favours realism as the main framework, and the two others as substitutes.

**Chapter 5** will be divided into two main parts, where the first part concerns the individual analysis of what affected the three different nuclear programmes, while the second part concerns a comparative analysis of all three programmes together.

**Chapter 6** will concern the final conclusions for this research.

## **2 Background**

In order to understand why Iran's, North Korea's and Libya's nuclear programmes came under scrutiny, it is necessary to understand what caused the invasion of Iraq, why the United States increased its effort in countering proliferation, how the international non-proliferation regime as well as the IAEA affects the nuclear programmes in the selected states, as well as a quick historical review of the three nuclear programmes.

### **2.1 The Relevance of the 11 September 2001, and the 2003 Invasion of Iraq**

The attacks on 11 September 2001<sup>5</sup> paved the way for a new use-of-force doctrine, calling for preventive military action against rogue states seeking nuclear weapons. The new doctrine lacked confidence in nuclear deterrence, as deterrence was directed at states already armed with nuclear weapons and not at states seeking the acquisition of nuclear weapons (Record 2004). In his State of the Union Address in 2002, President George W. Bush talked about the new concern:

*States like these (Iran, Iraq and North Korea), and their terrorist allies, constitute an axis of evil, arming to threaten the peace of the world. By seeking weapons of mass destruction, these regimes pose a grave and growing danger. They could provide these arms to terrorists, giving them the means to match their hatred. They could attack our allies or attempt to blackmail the United States. In any of these cases, the price of indifference would be catastrophic (George W. Bush, State of the Union Address, 29 January 2002).*

This quote illustrates how the Bush-administration deemed both national and international security after 11 September, stressing the need to take comprehensive action in order to protect American and allied soil and interests.

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<sup>5</sup> The terrorist attacks on the United States, 11 September 2001.

In May 2002, Libya was added to the list of rogue states, when United States Assistant Secretary for International Organization Affairs John Bolton presented the nations “beyond the Axis of Evil” (Bolton 2002). Though it started out as a war on terrorism with the military operations in Afghanistan, it became as much a war of counter-proliferation. The line was drawn from terrorist organizations to states sponsoring terrorism that might also have WMD programmes. On 5 February 2003, the United States Secretary of State Colin Powell addressed the United Nations Security Council (UNSC), stating that Iraq had an active nuclear weapons programme:

*already possessing two out of three key components needed to build a bomb*

(Colin Powell, U.S Secretary of State’s Address to the United Nations Security Council 5 February 2003).

What Powell meant was probably that Iraq lacked fissile material (7Appendix A) but possessed weapons design and means of delivery. But the speech was more controversial than the one President Bush held on 29 January, and many analysts were sceptical about its contents.

Operation Iraqi Liberation (later named Operation Iraqi Freedom) was launched 20 March 2003, and within weeks Saddam Hussein’s regime was defeated. In the aftermath of the invasion, no nuclear weapons or other WMD were found, and no evidence of ties between the regime and al-Qaeda was found either. However, Washington continued the coercive counter-proliferation policy with a far more accusatory tone against Iran, North Korea and Libya. Now these states were compared with terrorist organisations as undifferentiated threats. As part of Washington D.C.’s sharpened tone, the term “preventive” – often combined with “military action” or military intervention” – were much used by the Bush administration, and also considered a good substitute in situations where traditional nuclear deterrence could not be used, and/or if dissuasion and coercive diplomacy had failed (Cox 2011).



On 31 May 2003 Washington D.C. stepped up the effort further by introducing the Proliferation Security Initiative (PSI)<sup>6</sup> as an effort to prevent the spread of weapons of mass destruction and their related components and materials on the black market. This voluntary regime (unanchored in international law) would later contribute to the exposure of the A.Q. Khan network<sup>7</sup>

Framed as members of the Axis of Evil before the war, Iran, North Korea and Libya (beyond the Axis of Evil) faced international pressure in general, and American pressure in particular, as their nuclear programmes came into question. The United States military forces were obviously stretched in 2003, participating in extensive campaigns in both Iraq and Afghanistan, but both wars were expected to have a short duration. Hence military confrontation with Iran, North Korea or Libya could not be excluded as a possibility. This may be one reason for why the year 2003 marked a change in all three programmes:

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<sup>6</sup> The Proliferation Security Initiative's origins trace back to December 2002, when legal gaps were revealed during the interdiction of a North Korean-flagged ship carrying missiles and conventional warheads. Although the ship was boarded by the Spanish navy (on request from American intelligence), there was no legal basis for seizing the cargo, which was eventually released. On 31 May 2003, President Bush introduced the Proliferation Security Initiative as an aim to use existing national authorities and international law to interdict shipments suspected of carrying WMD, their delivery systems and related material. As a product of the Bush administration's increased counter-proliferation effort, the initiative was "surfing" on the very same "counter-proliferation wave" as the Iraq war. Months later, in October 2003, the PSI revealed a shipment of weapons related technology, bound for Libya. This led to the disclosure of the A.Q. Khan network (Nikitin 2012).

<sup>7</sup> The Pakistani nuclear scientist and "father of the Pakistani bomb" Dr. Abdul Qadeer Khan stole sensitive technology while working at an enrichment facility in the Netherlands in the 1970s. Khan used the technology to assist Pakistan in the task of achieving nuclear weapons, while building a network of suppliers of nuclear technology. During the late 1980s or early 1990s, Khan used his network of suppliers to offer other states nuclear weapons related technology, and detailed designs for nuclear weapons. Khan's network was active until its disclosure in October 2003.

The disclosure of the Abdul Qadeer Khan network is interesting to this research because it revealed that Iran, Libya and North Korea were customers of the very same black market supply network trading nuclear weapons related technology. After his arrest in February 2004, Khan has admitted to have sold such technology to these countries. And while Iran and Libya have admitted their trade with the network, North Korea has refused to do so (Sanger 2004).

On 10 January, months before the invasion, North Korea withdrew from the NPT – no longer obliged to refrain from nuclear weapons; during the fall, Iran initiated diplomatic talks under which it agreed to certain concessions and temporary limitation of its nuclear fuel cycle development; and on 18 December, Libya gave up its nuclear weapons related programme (Record 2004).

## **2.2 The Treaty on the Non-Proliferation of Nuclear Weapons**

The Treaty on the Non-Proliferation of Nuclear Weapons (NPT) is fundamental in what is to be understood regarding the nuclear programmes of the three cases, as it strictly regulates all member states nuclear activities. It was initiated by the United States and the Soviet Union –the two first nuclear-weapon states (NWS) – in an attempt to stop any further spread of nuclear weapons, and introduced for signing in 1968, in which both Iran and Libya signed. The treaty is constructed around three interlocking pillars: nuclear non-proliferation; peaceful uses of nuclear energy; and nuclear disarmament, which is captured in eleven mandatory articles (see Appendix B) of which the key articles are the following (IAEA 1970):

- Article I: Nuclear-weapon states shall not assist other states in the pursuit of nuclear weapons, directly or indirectly.
- Article II: Non-nuclear weapon states shall refrain from acquiring nuclear weapons.
- Article III: Non-nuclear weapon states must accept safeguarding of nuclear activity.
- Article IV: Non-nuclear weapon states shall have access to peaceful uses of nuclear technology.
- Article VI: Nuclear weapon states are obliged to negotiate an agreement on complete disarmament.

The treaty divides the world’s states into the nuclear “haves” and “have-nots”, recognizing those states that conducted nuclear weapons tests before 1967 as legitimate nuclear-weapon states, with the commitment to disarm. It is worth noticing that the five recognized NWS also constitute the five permanent members of the United Nations Security Council. The rest of the world was placed in the category of non-nuclear-

weapon states (NNWS). Both India (1974, 1998) and Pakistan (1998) have tested nuclear weapons, but they are not members to the NPT. They are not recognized by the NPT as NWS, and cannot become members to the treaty unless they disarm (IAEA 1970). By these circumstances they are therefore often described as *de facto* nuclear-weapon states. Among the *de facto* states, there are two others: Israel, who has not signed the NPT, but is still commonly assumed to possess nuclear weapons; and North Korea, who signed the NPT in 1985, but withdrew from it in 2003 (as the only country in the world to have done so) and subsequently conducted nuclear weapons tests in 2006, 2009 and 2013. The withdrawal was justified through Article X (see Appendix B.10) of the NPT where North Korea stated that it faced threats to its national security. By doing so, the regime essentially allowed itself to develop nuclear weapons by using the article as a necessity (Cha & Kang 2004). Iran, who signed the treaty in 1968, has used Article IV-rights (see Appendix B.4) to come as close as possible to where Article II draws the line, while Libya was clearly breaking Article III, and were on the path of breaking Article II, when it clandestinely sought to acquire “assistance in the manufacture of nuclear weapons” (see Appendix B.2), as the *BBC China*<sup>8</sup> shipment was revealed. This shows a gap between how Iran, North Korea and Libya has chosen adhere its NPT commitments. Trying to leave the treaty already in 1993, the year after its accession, this shows that North never committed itself seriously to the NPT. However, North Korea remained in the treaty for ten years (till 2003), much due to the Agreed Framework, which will be discussed in Section 2.4.2. Further, North Korea chose to not commit to the NPT after 10 January 2003, while the two others chose to. And so, not signing or withdrawing from the treaty means that the state is not obliged by international law to refrain from developing nuclear weapons, and does not have to have a safeguards agreement with the International Atomic Energy Agency (IAEA) (see Section 2.3) the NPT’s enforcer (Bluth 2012).

Since its introduction in 1968, the NPT has become an increasingly robust agreement. Among the signatories are states like Argentina, Australia, Brazil, Canada, Egypt, Italy, Libya, Romania, South Korea, Sweden, Taiwan and former Yugoslavia that all were

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<sup>8</sup> A German ship bound for Libya in October 2003, which was intercepted by the German and Italian authorities. The cargo consisted of centrifuge components (which were under export control) and individual basic components (which were not under export control). The seizure of the ship also led to the disclosure of the A.Q.Khan network (see footnote 7) (Breivik & Toft 2007).

suspected of having nuclear weapons ambitions decades ago (Bluth 2012). Other signatories are states who “inherited” the weapons after the Soviet Union collapsed, but willingly abandoned them in 1995 (Kazakhstan) and 1996 (Ukraine and Belarus). South Africa had nuclear weapons from 1978 to 1993, but was pressured by the international community to give them up, which resulted in the signing of the NPT (Mærli 2009). When France and China finally signed the treaty in 1992, it gave further strength to the international cooperation, and so in 1995 it was decided to extend the original 25 years duration of the treaty to indefinite (Bluth 2012).

On the other hand, there are some who see signs of weakening of the NPT, especially in the cases where member states of the treaty appears to be developing nuclear weapons capabilities, either clandestinely such as Libya was suspected of and North Korea did, or under the disguise of a civilian programme, such as Iran is suspected of. Alongside the significant proliferation of the technology needed, and as a result of civil nuclear cooperation, the number of states capable of developing nuclear weapons is now greater than ever. Also, the nuclear-weapon states’ slow effort to disarm in favour of the NPT creates a cynicism about the treaty among the non-nuclear-weapon states who argues that the IAEA concentrates too much on the first three articles (non-proliferation) and too little on technical assistance related to (see Appendix B.4).

In the cases of the selected states, Libya was as a member of the NPT when it tried to develop nuclear weapons, hence undermining the treaty; Iran, as a member, may have been trying to develop nuclear weapons for a longer time, and if Iran develops a nuclear weapon it could make the signatories of the NPT lose faith in the agreement, or encourage further proliferation; North Korea laid the foundation for its nuclear weapons programme while being member of the NPT, a tactic some fear Iran is currently using. Later, North Korea withdrew and conducted a nuclear weapon test, an action which obviously undermines the treaty (Bluth 2012). The International Atomic Energy Agency (IAEA) has the authority to verify all nuclear activities in the NNWS to ensure that all member states comply with the NPT.

### **2.3 The International Atomic Energy Agency**

Like the NPT, the International Atomic Energy Agency has a vital role in the understanding of the nuclear programmes, as is it the world’s centre for cooperation in

the nuclear field. Since its foundation in 1957, as an independent part of the United Nations system, the agency has been guided by the interests and needs of its member states, which shapes the agency's mission, strategic plans and vision to be embodied in IAEA's statutes. Through these statutes, IAEA's three main pillars are defined as: safety and security; science and technology; and safeguards and verification (IAEA 2013a).

Combined with the task of promoting safe and secure use of peaceful nuclear technology, the IAEA is also tasked with monitoring and inspecting the nuclear facilities and material in non-nuclear-weapon states, based on safeguards agreements the member states have developed with the IAEA. Among many responsibilities, the IAEA is looking for violations and signs of nuclear weapon development (IAEA 2013a). In order to ensure that the signatory states are living up to their commitments, IAEA uses the Comprehensive Safeguards Agreements (CSA), Additional Protocols (AP) and also the Small Quantities Protocols (SQP) as basis for its work in the different countries.

The Comprehensive Safeguards Agreement was established in 1967 as a regime for verifying and declaring the peaceful use of special nuclear materials (see Appendix A) within a state through a so-called "physical inventory verification", for material accountancy. The CSA was first introduced under Prohibition of Nuclear Weapons in Latin America, and further used as framework when the NPT was initiated in 1968. Later this standard was reproduced with the name "Model Comprehensive Safeguards Agreement", suited to be applied to both simple cases of nuclear activities and more complex and advanced nuclear programmes. The basic obligation in a CSA is reflected through Article III.1 in the NPT:

*to accept safeguards...for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices (see Appendix B.3).*

This means that the IAEA takes account of all types of nuclear material relevant for the manufacturing of nuclear weapons; especially the isotopes plutonium-239, uranium-233 and uranium-235 (see Appendix A.1.1 ). Each member state has a CSA based on the model agreement, which is supplemented by the Subsidiary arrangement, which is a

document containing the technical and administrative procedures for implementing the CSA. The standard CSA was in Iran on 15 May 1974; in Libya on 8 July 1980, and in North Korea from January 1992. But while Iran and Libya commits to their CSA's, North Korea did not have to commit to any CSA after the withdrawal from the NPT in 2003. However, a central issue regarding Iran's nuclear programme in 2003 was the ratification<sup>9</sup> of an update to this agreement. While having ratified the model CSA in 1974, Iran had only signed, but not ratified the CSA's Subsidiary Arrangement from 1976. Within the Subsidiary Arrangement was the "code 3.1" which stated that Tehran was obliged to report any new facility no later than 180 days before the introduction of nuclear material. In 1992 the code was updated, saying that states should now report new facilities already in the planning phase, before any construction had begun. When Iran started negotiating with the so-called "EU-3" in the late summer of 2003 –which will be discussed in the analysis section 5.1.1.1– the EU-3 demanded that the code, should be updated to the 1992, but Iran refused, and stating that it only had to adhere to the 1974 terms in which it had ratified. Eventually Iran implemented the update in December 2003, but did not ratify it.

However, the CSA only provides the IAEA access to declared activities and materials. This means that the agency must believe what the state declares, which means that the IAEA cannot guarantee "completeness" but only "non-diversion of declared materials" and the "correctness of the declaration". This "hole" in the CSA is better addressed through the Additional Protocol.

The Additional Protocol is also central when it comes to Iran's nuclear programme, as it was signed in December 2003, but left in February 2006. The Protocol is a supplement meant to strengthen the CSA. If accepted by the state, the protocol provides the IAEA with broader rights, including: Access to inspect undeclared facilities; access to information about a state's full nuclear cycle, and any other site where nuclear material is present; short-notice inspections granting access to all buildings on a nuclear site; access to information regarding manufacture, exports of sensitive technologies and inspection mechanisms for manufacturing and import locations; and collection of environmental samples beyond declared locations, if deemed necessary by the IAEA. Although the AP

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<sup>9</sup> First when the agreement is ratified the state has an obligation to declare to the IAEA the current status on all nuclear materials and facilities regularly.

might not be 100 % sufficient, it works as a tool for verifying the “completeness” of a state’s nuclear activities. Meaning an “assurances of the non-existence of undeclared nuclear activities”. The AP was signed by Iran in 2003, and implemented until February 2006, when the IAEA reported Tehran’s noncompliance to the United Nations Security Council. In the case of Libya, the AP was ratified on 11 August 2006, three years after its decision to abandon the nuclear weapons programme.

As of 9 April 2013, 180 states have brought into force a comprehensive safeguards agreement with the IAEA. 137 of these states have an additional protocol, and 99 states follow a small quantities protocol. These measures are essential in order to determine noncompliance with the NPT (IAEA 2013b). However, the agency has its problems: IAEA has determined noncompliance with Iraq’s CSA in 1991, Libya’s CSA in 2004 and Iran’s AP in 2006, but it lacks an established definition of noncompliance. Apparently this could provide the agency with the necessary flexibility to deal with complex cases, but it comes with a cost: Since the IAEA also supports diplomatic and political processes in order to avoid nuclear proliferation, it is essential to be viewed as credible, accurate, reliable and independent. And so the lack of clarity and consistency could have adverse consequences for the integrity and credibility of the IAEA safeguards system (IAEA 2013a). This was also pointed out by the Deputy Director General and Head of the Department of Safeguards, Herman Nackaerts when he held the following address at the 52<sup>nd</sup> annual meeting of the Institute of Nuclear Materials Management (INMM) in 2011:

*Finally, the system was manifestly failing in its primary objective, namely, to detect activities that did raise potential compliance issues and proliferation concerns – such as those undertaken, for instance, in Iraq, Libya, Syria and Iran*  
(Herman Nackaerts. INMM Address, 18 July 2011).

As pointed out by Nackaerts, is ironical that the IAEA’s verification mandate is limited to ensuring the rest of the world that all nuclear material within a state are used strictly for peaceful purposes, but that even in states implementing the Additional Protocol, the agency has no explicit mandate to inspect facilities nor activities which do not involve the production of nuclear materials (Høibråten et.al. 2013, p.97).

## **2.4 The Drive for Nuclear Weapons in Iran, North Korea and Libya**

Although the time frame for which this research operates is set from 2000 to 2013 it is important to give a short historical review of the drive for each nuclear programme, because it supports the analysis with relevant information, that could have affected the behavioural change in 2003, and also the outcome of the three programmes.

### **2.4.1 Iran**

Iran has a remarkable history tracing back to the Persian Empire of 500 B.C. Given this past Iran therefore views itself as an important regional actor (Lodgaard 2012, p.60-63). The country's nuclear programme can be traced back to 1957, when Shah Reza Pahlavi, Iran's head of state before the Islamic revolution in 1979, signed an agreement on participation in the American-led Atoms for Peace programme. The Shah embarked on a prestigious civil nuclear programme, and Iran received a 5 megawatt (MW) research reactor by the United States in 1967 (Kippe 2009, p.14). Simultaneously, the Shah also pioneered the Middle East as a nuclear weapons free zone, and Iran was therefore one of the first countries in the world to sign the NPT in 1968. But during the mid-1970s the Shah seemingly told his chief atomic energy advisor, Akbar Etemad, that he wanted "all options" (Lodgaard 2012, p.60).

From 1967, Iran had been an ally of the United States, the United Kingdom, France and Germany, and received assistance in building civil nuclear infrastructure. But after the Islamic revolution of 1979, Iran distanced itself from the former allies, especially the United States. Within the same year, the United States embassy in Tehran was stormed by protesters, causing the break of all diplomatic ties with the United States. This affected the European states will to cooperate, and halted the unfinished Iranian programme, which included two reactors for electricity production in Bushehr (Kippe 2009, p.14-15). Further, the fact that Iraq used chemical weapons against Iran (Sherrill 2012; Lodgaard 2011; Kippe 2009) during the Iran-Iraq war (1980-1988), made Tehran draw two conclusions after the war was over:

- I. The lack of international action to prevent Iraq from using chemical weapons, led Iran to dismiss the efficacy of treaties, international law and norms opposing the use of such weapons (Sherrill 2012).



- II. As Iraq's nuclear weapons programme was exposed during the first Gulf War (1990-1991), Iran (amongst others) noticed that it was possible (see 2.3) to establish a clandestine nuclear weapons programme, even as a NPT signatory with IAEA inspections according to the safeguards agreement (Kippe 2009, p.10).

During the 1990s, Iran and Iraq were both suspected by the United States of having secret nuclear programmes, which led President George W.H. Bush to sign into law the Iran-Iraq Non-Proliferation Act of 23 October 1992. This marked an increase of the United States non-proliferation effort towards Iran and Iraq, and the suspicion towards both states lasted throughout the 1990s. Since the diplomatic break 1979, all American and European assistance for nuclear infrastructure had been cancelled, which led Iran to approach China and Russia in order to continue its nuclear programme. This led to further sanctions by the United States, trying to prevent Iranian access to what Washington D.C. deemed as sensitive technology. The United States successfully persuaded China to halt its assistance in building Iran's uranium conversion facility in Isfahan, and forced Russia to temporarily suspend its involvement in developing the Bushehr reactor in Iran (Carolyn 2000).

#### 2.4.2 North Korea

Although the North Korean nuclear programme emerged after the Korean War (1950-1953), North Korea's and South Korea's alliance with each superpower<sup>10</sup> has been an important factor regarding the emergence of the nuclear programme. In 1957, the United States deployed nuclear weapons in South Korea, and followed up with military exercises involving nuclear-capable artillery, fighter-bombers and carrier aircraft (Lodgaard 2011, p.154). In 1958, the Soviet Union agreed to help North Korea establish a training facility for nuclear physicists in the Soviet Union, and in 1965 the Soviet Union provided North Korea with an IRT-2000 light water moderated 2 MW research reactor (known as "Reactor One") in the newly established Yongbyon facility located northwest in the country. The Soviets knew that Reactor One was not well suited for the production of weapons usable plutonium, as the Soviet Union did not trust Pyongyang's intentions despite being an allied (Kippe 2003, p.8).

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<sup>10</sup> North Korea was an allied of the Soviet Union and China (although not a superpower at the time), and South Korea was an allied of the United States during the Korean War.

Throughout the 1960s and the 1970s, North Korea asked the Soviet Union to provide them with further light water reactors for research, but the Soviet Union required a North Korean ratification of the NPT. North Korea finally agreed to ratify the NPT in 1985, but the reactors were never delivered because the Soviet Union also demanded implementation of a comprehensive safeguards agreement, as well as a verification of the initial declaration. However, North Korea had started construction of its own reactor, commonly known as “Reactor Two”. Based on the same design as the first research reactors in the United Kingdom, this 20-25 MW research reactor was designed for nuclear power, but at the same time it was far more effective in the production of plutonium than Reactor One, making it central in the years to come (Kippe 2003, p.16).

The collapse of the Soviet Union brought several changes to the Korean peninsula: North Korea witnessed its strong ally China reorient itself towards the United States, Russia, Japan and South Korea, leaving North Korea essentially alone. This led head of state Kim Il-sung to seek improvement of international relations, by reducing the military threat to such a level that the United States decided to withdraw their tactical nuclear weapons from South Korea in December 1991 (Lodgaard 2013). In January 1992, North Korea signed a comprehensive safeguards agreement with the IAEA, as mentioned in Section 2.3, and later handed over a report presenting its past nuclear activities, including the reprocessing and extraction of a smaller amount<sup>11</sup> of plutonium (see Appendix A.1.2) (Kippe 2003, p.13). In February 1992, North Korea signed an agreement with South Korea with the intention to strive for a nuclear weapons free peninsula, but in early March 1993, the IAEA was suspecting that the regime had changed fuel rods (7Appendix A) in Reactor Two more times than declared. This means that North Korea in theory could have separated more plutonium than declared, an action that would have been noticed if the agency was granted access to the waste from the reprocessing facility. Additionally the IAEA also suspected a secret waste depot in connection with the reprocessing facility. In other words: Two waste depots, in which one was secret. It is likely that the secret waste depot would function as a source of which North Korea could extract plutonium in secrecy. The agency asked the United Nations Security Council to authorize special ad hoc inspections, and North Korea reacted by announcing its withdrawal from the NPT on 12 March 1993. A withdrawal from the NPT takes 90 days

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<sup>11</sup> American experts estimate that less than 4kg plutonium could have been extracted (Lodgaard 2013).

to effect after the notice is given, but after intense bilateral negotiations with the United States, North Korea suspended its withdrawal after 89 days had passed (NTI 2013). During mid-May in 1994, North Korea started replacing the fuel rods in Reactor Two. Although all reactors need fuel change once in a while, the circumstances around this situation led to suspicions of weapon ambitions (see Appendix A). The United States and the IAEA insisted that international monitors should be present to make sure that North Korea did not violate its safeguards agreement. On 13 June 1994 North Korea decided to withdraw from the IAEA as well. But, since North Korea had not managed to withdraw from the NPT, the NPT would still allow the IAEA inspections (to some degree). This is due to the fact that a non-compliance with the NPT did not affect the compliance of the independent CSA, regardless of North Korea's new position. Two days later, the United States President Jimmy Carter was able to negotiate a deal, commonly referred to as the "The Agreed Framework" (AF), with North Korea (Kippe 2003, p.10), in which the most important elements were the following:

- North Korea was to stop the construction of Reactor Two, and two large gaseous graphite reactors.
- North Korea was to stop the fuel production plant and the reprocessing facility.
- The international consortium *Korean Peninsula Energy Development* (KEDO) was tasked with building two 1000 MW (electric power) light water reactors replacing Reactor Two and Reactor Three, which subsequently were to be demolished when the new reactors were constructed.
- Safe and secure handling of spent nuclear fuel.
- IAEA must be allowed access to all nuclear facilities.
- North Korea was to receive 500 000 tons heavy oil a year, from the United States, to compensate for the lack of power production from the reactors, until the light water reactors were completed.
- North Korea and the United States were to cooperate on peace and security on the Korean Peninsula.
- Both states were to cooperate on normalizing their political and economic ties.

In short, the essence of the framework was to freeze the whole production line for plutonium. But for North Korea, the light water reactors (with a value of five billion

dollars) may have tipped the scale, making the agreement possible. Having first tried to acquire light water reactors through its partnership with the Soviet Union, the American offer was a welcome deal. Additionally the light water reactors would provide North Korea with a more credible peaceful rationale for its nuclear efforts. The rationale was credible in the sense that the old reactors could also provide power, but were less suitable for weapons related activities. It was possible for North Korea to build the old-fashioned reactors, as the design was publicly known and no enriched fuel was needed. In other words: The regime had somewhat of a peaceful alibi for these reactors, but not as good an alibi as for the light water reactors.

Towards the end of the 1990s, the AF began to disintegrate for several reasons: The U.S. Congress was reluctant because the regime was expected to collapse soon; the oil shipments were delayed as a result of this reluctance; and on top of it all, North Korea demanded salary for its workers as well as an American label on the reactor South Korea was building for them (Kippe2003, p.10-16).

#### 2.4.3 Libya

The origin of Libya's nuclear weapons ambitions traces back to the *coup d'état* in 1969 when Colonel Muammar al-Qadhafi and a group of officers overthrew and exiled the ruling King Idris I. al-Qadhafi had a pan-Arabic vision in which the "Arabic bomb" played a central role. He believed that by taking upon itself the nuclear weapons project, Libya would not secure itself from Israel, but also obtaining a leading regional role in the conflict with the Israelis, while at the same time replace Egypt as the leading Arab state. Thus, the acquirement could provide Libya a "shortcut" to regional leadership (Braut-Hegghammer 2008). But the new regime also adopted an anti-colonial and increasingly radical foreign policy, supporting anti-colonial movements by using terrorist and guerrilla tactics, which it financed and facilitated (Rieker & Braut-Hegghammer 2012, p.41). This radical policy may explain why the other Middle Eastern countries were less inclined to support Libya's ambitions of pan-Arabic leadership during the 1980s, and may also explain why Libya changed its foreign policy ambitions driving the nuclear weapons pursuit (Braut-Hegghammer 2008). The shifting ambitions for becoming a nuclear-weapon state changed naturally for Libya, as the desire for a leading regional role had to yield to the emerging need for security as a result of the state's sponsorship of international terrorism, anti-Israeli activities and attempts to destabilize neighbouring

states in the 1970s and 1980s. All these activities had made Libya an unpopular regional and international actor, making security of the regime, especially from external threats, one of the principal interests of the al-Qadhafi government.

Among the external threats Libya faced in this period, Israel's alleged nuclear weapons and Israel's bombing of the Osiraq<sup>12</sup> reactor in Iraq was posing as obvious threats. The radical foreign policy of al-Qadhafi's regime had also earned Libya a place on the United States list of states sponsoring terrorism, making Libya subject to American sanctions from 1979 (Arms Control Association 2013b). During the 1980s, the bilateral relationship between the United States and Libya deteriorated as the United States imposed additional sanctions in response to Libya's terror funding. Towards the middle of the decade, the situation culminated in the American bombing of Tripoli and Benghazi in 1986. Two years later, Pan Am flight 103 exploded over Lockerbie in Scotland killing 270 people. The fact that 178 of the passengers were Americans and that Libya was the prime suspect, made an already grave bilateral relationship ice cold. And so, when President Ronald Reagan characterized al-Qadhafi as the "Mad Dog" of the Middle East, and defined Libyan regime change as a United States policy objective (Rieker & Braut-Hegghammer 2012, p.42), the regime started to realize the security concerns their "revolutionary" foreign policy had created (Braut-Hegghammer 2009).

For the regime, this gave additional support to the deterrence motive. This change of rationale was notably mirrored in the cessation of Libya's terror financing in the 1990s (Braut-Hegghammer 2009). Amongst the events that occurred during the 1980s, the Lockerbie bombing in 1988 would eventually become a contributing factor to the decision that led Libya to reverse its nuclear programme in 2003. In 1991, the investigation of the bombing led to two Libyan nationals, which Libya refused to extradite. As a result, the United Nations Security Council imposed resolution 748 from 31 March 1992, placing an embargo, air travel restrictions and sanctions on the Libyan oil industry (Rieker & Braut-Hegghammer 2012, p.42). In 1993, the Security Council also adopted resolution 883 which included the freezing of Libyan assets and a ban on exports of oil equipment to Libya (Arms Control Association 2013a).

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<sup>12</sup> Osiraq was an Iraqi nuclear reactor under construction, when bombed by an Israeli air strike on 7 June 1981.

During the 1990s, Libya began to suffer from both the sanctions and the low oil prices. Suddenly the regime was unable to provide the basic needs for the population, as the domestic market declined and costs of import rose, while salaries of Libyan workers remained at the same level as in 1981. Medical and educational infrastructure suffered due to decreasing public funds, and even cultural institutions like that of marriage were negatively affected, as the rise in the price of gold created difficulties for couples to afford the bride's dowry. And by 1994, the economy had reached an inflation rate of 50 %. The terrible condition of the state led to a significant anger and resentment towards the government, allowing home-grown Islamist opposition groups such as the Muslim Brotherhood and others to get a foothold in big cities like Benghazi. The fact that the opposition groups remained undefeated for three years demonstrated the regime's weakness, and posed as a warning signal. By 1998, pressure on the regime was mounting both economically and politically, as unemployment remained high at 27 %, and losses from sanctions reached approximately \$33 billion (Shamir 2013). Realising that improved relations with the outside world was necessary to secure his position, fix the economy and calm the rising opposition, al-Qadhafi began to take steps towards lifting the sanctions (Braut-Hegghammer 2009).

The beginning of what eventually would lead to the end of Libya's nuclear programme came in early 1999, when Libya initiated secret talks with the United States and the United Kingdom. As the purpose of the dialogue was to normalize relations (ending the United Nations and the United States sanctions) Libya had to take the first step. And so, on 5 April 1999 Libya handed over the two suspects of the Lockerbie bombing to Dutch authorities for trial in Holland, under Scottish law. Immediately after the handover, as well as France's acknowledgement that Tripoli had cooperated with French officials investigating the UTA bombing<sup>13</sup>, the United Nations Security Council suspended its sanctions from 1992. In the one year long trial to follow, one of the Libyan suspects, Abdelbaset al-Megrahi, was convicted of murder on 31 January 2001, and as a result the United States demanded that Libya took full responsibility for the Lockerbie bombing, including economic compensation to all the victims' families.

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<sup>13</sup> In 1989 an explosion caused flight 772 of the French UTA (Union des Transports Aériens) to break up over the Sahara Desert, killing all 155 passengers and 15 crew members. Charges were brought against six Libyans.

### 3 Methodological Approach

This chapter will provide the reader with information on how this research has been conducted, the methods that have been used and how data has been collected and analysed. The purpose of this procedure is to provide the reader with a clear and logical understanding of how this research has collected the data that will be used analysing the three nuclear programmes.

In any scientific research, the investigation should be verifiable in retrospect to confirm the validity of the research. According to Hellevik (2002, p.15), transparency in all aspects of the scientific method is essential to assure that other scientists can (ideally) achieve the very same results, when answering the same empirical question. Further, according to Jacobsen (2000, p.222) it is essential to the reader that the scientist accounts for the method and how the use of the method may have affected the results, so that the reader is able to criticize the result. In order to ensure that this research has high level of transparency, the empirical material for this research consists exclusively of documentation accessible to anyone. This research assumed from an early stage that it would be nearly impossible to get in contact with people with first-hand knowledge of the nuclear programmes in Iran, North Korea or Libya in order to conduct interviews. It was also the assessment of this research that interviewing representatives from any of the regimes, if actually possible, could decrease the reliability of the research if these individuals answered according to a political agenda. Instead, document studies were preferred as a method, as it would make it possible for any reader of this research to look for data that could disprove the findings, or if possible, generalize the results.

#### 3.1 What is a Method?

The word method has several meanings: according to Oxford Dictionaries the noun *method* means a *particular procedure for accomplishing or approaching something, especially a systematic or established one* (Oxford 2013); or according to Hellevik (2002, p.16) *a method is an approach or a tool suited to embark on a challenge or problem, where solving the challenge or problem leads to new knowledge*. For this research the method represents the gathering of data that could provide the investigation with the most sufficient empirical evidence in order to solve the problem; to what degree did the invasion of Iraq in 2003 affect the nuclear programmes in Iran, North Korea and Libya?

Any means serving the purpose of solving the challenge or problem is therefore to be considered as a method, and in the field of social sciences it is common to distinguish between *quantitative* and *qualitative* methods. This division of methods refers to the characteristics of the collected research data: Quantitative research is based on quantifiable data, where the researcher systematically acquires comparable data regarding several subjects of a specific kind, represented by numbers. An analysis of the numbers will provide the researcher with a pattern. In qualitative research, the use of data is less extensive, and instead the researcher seeks to explain a phenomenon through words and text. In order to shed a light on the chosen issue, the researcher needs to choose how to find and analyse relevant information. The issue itself decides what method is best suited, thus making a method more like a recipe in a research project. As for this research, the issue to be solved would seemingly have a far more interesting approach through a qualitative method, as this would enable the investigation to go beyond numbers and provide a closer look at each nuclear programme and the independent variables affecting them. This research is not looking for a pattern, but rather the degree of influence from independent variables.

When it comes to the general purpose of research, it can be divided into two categories: either describing today's situation in order to understand the daily challenges, or measuring the effect of a certain action. The purpose of this research is to see if the 2003 invasion of Iraq possibly affected the nuclear programmes in Iran, North Korea and Libya, placing this research in the latter of the two categories. However, this research also describes today's situation in Iran and North Korea, which still have nuclear programmes, because it is hard to determine when the invasion in 2003 may have stopped affecting their programmes. On the basis of this research issue, the choice between the qualitative and quantitative approach was clear: The qualitative approach is best suited because it enables this research to analyse a number of independent variables: *Iraq invasion*, *sanctions*, *nuclear technology options and activities*, and *national strategy and foreign policy* affecting the dependent variable: *changes in the nuclear programmes of Iran, North Korea and Libya*, in order to see how they interacted, instead of measuring interaction and effect by numbers. Further, this research assesses that the best way to understand today's situation, is through a detailed investigation of all relevant variables, as the qualitative method is best suited to reveal several shades regarding an issue such as this (Jacobsen 2000, p.222-227).



### 3.2 Qualitative Method

It is the opinion of this research that the qualitative method will enable the reader to gain sufficient knowledge about the three nuclear programmes without having to go through the same amount of data that has been generated during this project. Further, when embarking on this investigation, it seemed obvious that the project would need a more detailed plan on how to take full advantage of the preferred method. Therefore this research also needed a design. According to Ringdal (2007, p.22-23), a design or a research plan is a rough sketch on how to conduct a specific investigation. Four types of design exist within qualitative analysis: a cross section at one given time; longitudinal, at several points in time; case study consisting of one case; and comparative study of multiple cases. Given the topic of investigation, it is the assessment of this research that the latter design would fit best, as the research compares three different states. It could have been possible to use a longitudinal type of design, measuring at several times, and by that being able to say something about a “trend”. However, this research aims to establish a more firm reasoning rather than to report if the trend changed after the 2003 Iraqi war. Also, this research aims to explain if changes occurred after 2003, and if so, what caused the situation to change, and what has been the effect of the changes.

#### 3.2.1 Advantages and Disadvantages to the Qualitative Method

The qualitative method gives the investigation an exploratory design, which means that many of the route choices are made during the investigation, as new insight is gained. This has also been the case for this investigation, where the discovery of new nuances within all of the nuclear programmes has contributed to strengthen the analysis. This is because new information has continued to prove relevant throughout the research, and helped shape the analysis on each state. It has been a strategy of this research to be flexible when such findings occur, and this ability is one of the foremost advantages of the different qualitative approaches, enabling the researcher to implement new findings in a relatively quick and easy way. However, in this research, it is hard to draw a timeline from 2000 and until today, because it is possible that factors occurring before 2000 affected the outcome of the nuclear programmes, and in that case the preferred method has a disadvantage that could ignore important factors that occurred prior to 2000. In order to ensure significant background information on each nuclear programme, this research has therefore chosen to present the historical development of each nuclear programme prior to 2000 in a chapter before the analysis. It is the assessment of this

investigation that this strategy will support the analysis by saving space that can be used for a firm analysis rather than having to account for every variable in the analysis. Further, conducting a qualitative analysis where two of the cases (Iran and North Korea) continue to develop possible independent variables, as their nuclear programmes are not yet concluded, is challenging and can be a disadvantage because it is hard to determine for how long the 2003 invasion of Iraq may have affected the nuclear programmes. Still, drawing lines from 2003 to 2013 will strengthen the research, giving it a ten year perspective on how the invasion of Iraq has affected the cases. Finally, another major advantage using a qualitative research method is that it may open up new and unexpected knowledge, which in turn may form the basis for new issues. Using qualitative methods as a tool, this research uses an unexplored way of analysing all three programmes together based on the effects of the 2003 invasion of Iraq on each nuclear programme.

### **3.3 Research Design**

According to Ringdal (2007), selecting a research design has significant consequences for both validity and reliability, subjects this chapter will review later. The very intensive design of qualitative methods enables the researcher to go in depth with a selected few cases. Going deep into a subject such as this is, according to Jacobsen (2000), an attempt to gain a complete understanding of the relationship between the subject of investigation (the nuclear programmes), and the context (international) the subject operates within. Another important measure is the “width” of the investigation, where the width is referring to how many cases the investigation will include. Together both depth and width are preserved when this research conducts a comparative study of three cases.

According to Ringdal (2007), an important strategic consideration is the relationship between the number of cases and the number of variables. The product of the two provides a rough indication of the workload associated with the data collection. In this research the limit was set to three states, in order to manage the workload. Still, the research is complex because it seeks to explain three cases linked to one war, instead of one case linked to one war, with three times the independent variables. And, although selecting one nuclear programme would have been a simpler task, with fewer independent variables to account for, all the different independent variables provide similarities and differences between the three selected cases, opening for exciting comparisons, and a much more interesting result. It was therefore the assessment of this

research that instead of providing an “expert” analysis of just one of the states, this research would provide a thorough analysis on all three states, including a comparative analysis, which would give a more complex and comprehensive result.

### 3.3.1 Comparative Study of Three Cases

According to Lijphart (1975, p.164), the comparative method is a *method of testing hypothesized empirical relationships between variables...in which cases are selected in such a way as to maximize the variance of the independent variables and to minimize the variance of the control variables*. It was the assumption of this research that the three selected cases were not only ideal but also interesting to compare, as all states had nuclear programmes with possible military dimensions prior to the 2003 invasion of Iraq; all states had a hostile relationship with the United States; all states traded with the A.Q. Khan network, and all states changed behaviour regarding their programmes in 2003. It is further the assessment that these similarities will minimize the use of control variables, set to four, while the geographical, political and historical differences will most likely maximize the variance of the independent variables. Following a diachronic timeline, this research will treat each state separately in the first part of the analysis. The findings from each case will be compared in the second part of the analysis in order to see the differences and similarities, enabling this research to make general conclusions based on all three cases. This is interesting because it could possibly provide a new way of seeing the nuclear programmes, especially in the case of the on-going nuclear programmes in Iran and North Korea.

### 3.4 Collecting Data

The data collection in this research is purely based on document studies and the review of published literature on the selected cases. To conduct field observation would be impossible because most of the events referred to in this research belong to the past, and important nuclear events of the present (regarding Iran and North Korea) are kept secret and conducted in restricted areas. Nor would it be possible to conduct interviews with the policymakers in either Iran or North Korea. It could have been possible to conduct interviews with international experts with knowledge about decision-making processes and the importance of the 2003 Iraq war, but instead the theme for this research has been discussed informally with selected national experts who have provided access to documents and published literature on the subjects. The reason why is because possible

misunderstandings or quotation mistakes during an interview could have affected the result of this research, and were therefore deemed a risk not taking. Further, the informal conversations with the national experts have often led to tips about specific documents worth investigating. Further, being able to study several documents regarding the very same issue also opens for a quick and easy comparison if findings vary, and this is a clear strength when collecting data. According to Hellevik (2002), the use of literature from several different sources is a strength when conducting a study. This research has used reports from the Norwegian Defence Research Establishment (FFI), the Norwegian Institute of International Affairs (NUPI), the Norwegian Institute for Defence Studies (IFS), the IAEA, as well as several reports from different political think tanks and official documents from different government institutions, which all have contributed to a strengthening of the theoretical basis.

According to Hellevik (2002, p.88), the costs (time and money) constitute a momentum that highly favours data that already exist. The fact that different data exist on the nuclear programmes in all three cases, has been crucial to this research. At FFI, the expertise covers mainly Iran and North Korea, but through the collection of documents from other sources, such as IFS publications, the Libya part is also well covered. It is important to notice that the Libya part is textually shorter than the Iran and North Korea parts, but this is due to the significantly shorter history of Libya's nuclear programme, which ended in 2003.

### **3.5 Reliability**

According to Hellevik (2002), any scientific research must be reliable. Conducting the same research over again, to see if it is possible to achieve the very same results, first and foremost tests the reliability. This research is a document study only, as mentioned above. A substantial amount of these documents were downloaded from internet during the period from September 2012 to November 2013. Most of the documents are found on public websites, making it easy for anybody to trace the sources. Some reports from FFI, IFS and NUPI are not available on internet, but none of the reports used in this research contains classified information at any level. The reports are based on open sources and information available to anybody, a fact that maintains the reliability at a constant high level. Further, the IAEA base its existence on its independence from other formal bodies. The agency relies on the trustworthiness of all the worlds' nations in order to do its job. It

is therefore likely to assume that using reports from the IAEA in this research will further ensure its reliability.

### **3.6 Validity**

Within research, validity means that the results from the investigation answers the questions asked prior to the investigation. The most important assurance for high validity is that the research is grounded in other relevant research, and is conducted within the framework of the approach. One argument is that this makes research conservative, which is correct: research takes small steps forward. But these small steps ensure that research is based on other research, in order to achieve high validity (Tjora 2010).

Sources of error will always occur. In this research, it is not certain that all interpretation of the findings is correct, but according to Jacobsen (2000), the more people agreeing on the findings, the more likely they are correct. In this research, national experts from FFI, IFS and NUPI have been used as “sparring partners”, reading through the empirical chapters and the analysis. This has contributed to ensure the correctness of the historical events, as well as the reasoning for the arguments, giving this research a higher validity.

## **4 Theoretical Framework**

In order to understand the rationale behind the decisions that led Iran to the changes in the nuclear programmes, the analysis needs a theoretical framework fitting the context of this research. Therefore, in this chapter, the three most common international relations theories capable of explaining the behaviour of the three selected cases will be presented and discussed. The best suited theory will be selected as the main theoretical framework, while the remaining two will serve as substitutes, in order to provide the best possible explanation for why possible changes within the programmes occurred.

The most basic problem facing anyone who tries to understand the contemporary world politics is to know which things matter and which do not, as there is much material to look at. Where should one start if one wanted to explain the behaviour related to Libya’s former aspiring nuclear weapons programme, Iran’s current nuclear weapons latency, or North Korea’s *de facto* nuclear weapons programme? Naturally each case has several explanations, and no definite answer to it. Facing such a problem one must resort to theory. In political science, theory is used to navigate through the facts in order to find

the right pieces for the “puzzle” that offers an explanation. According to Baylis, Smith & Owens (2011, p.3), theory is best explained as a framework, but what is a theoretical framework?

In political science a theoretical framework could be described as a pair of sunglasses, allowing the wearer to see only the salient events related to the theory. Each framework is set to answer questions like: What are the basic foundations in International Relations? Is it individuals and their properties? Decisions and relations? Is it states and their political regimes and foreign policy? Or should the whole world be viewed as a social system with a global pattern as base for an analysis of international relations? Through the choice of a framework three levels/perspectives are dividing according to Østerud (2007, p.232): the individual, the state and the international system.

The aim of this master research is to investigate if and how Libya, Iran and North Korea changed behaviour regarding their respective nuclear programmes after the invasion of Iraq in 2003. Given this aim, the research appears with an international approach, necessitating the use of international relations theory. Such theories provide a framework where international relations can be analysed. These frameworks are not described best as a single theory, but rather as a family of theories – a “paradigm” or a “school of thought” (Legro & Moravcsik 1999). The main rivalling schools of thought describing world politics are known as realism, liberalism, social constructivism, Marxism, poststructuralism and postcolonialism. The three latter schools of thought could have served as framework for this research, but will not. Marxist theory explains world politics as taking place within a capitalist world economy, focusing on social classes rather than states, making this school of thought unfitting for the research. Poststructuralism is deemed unfitting because it is difficult to define the school. Postcolonialism focuses on the relationship between former colonial powers and colonies, which is also unfitting for this research. Finally, it is important to point out that the three schools above have been less historically influential than the more recognized schools of realism, liberalism and social constructivism. Each of these schools of thought utilizes various terms and approaches, and can be used singularly or combined in order to explain the selected states’ motives, intentions and behaviour regarding nuclear weapons as part of their foreign policy.

Presumably, none of these schools gives a perfect description of the real world, as the schools are more or less predictable in their explanation of international affairs. But how does one choose between theoretical frameworks and ensure the use of a suitable theory? According to Østerud (2007, p.244), the following three factors are important in selecting the appropriate framework:

- I. Which validity/scope does the framework have?
- II. What explanatory strength does the framework have?
- III. How simple is the explanation given by the framework?

Firstly, a framework is considered valid and with the right type of scope if it can explain why states attempt to obtain nuclear weapons, and if two frameworks both are valid and provide the right scope, both can be recognized as alternatives. Two frameworks can also have partially the same scope if they explain the same set of phenomena while one at the same time also describes other phenomena. When selecting between frameworks, the international phenomenon subject to investigation must be declared first. In this research, nuclear weapon programmes are the subject of the investigation; thus a suitable framework which can provide a perspective on nuclear weapon programmes must be selected. Secondly, the explanatory strength: Which school of thought seemingly penetrates the subject of nuclear programmes best? It is worth noticing that both the scope and the explanatory strength could increase if elements from other theories are added. Using more than one theory is not uncommon in the study of international relations. Thirdly, how simple is the explanation? What is the sufficient condition explaining the phenomena? If the scopes are similar and the explanatory strength is the same, the best choice will be the theory providing the simplest explanation.

Given this deliberate scientific approach, and the scope of this research, the one theory best capable of serving as an explanatory framework extending the empirical observations, will be used to explain the behaviour regarding Libya's, Iran's and North Korea's nuclear programmes after the 2003 invasion of Iraq. The two remaining theories will be used as substitute and/or critique when needed, thereby possibly increasing both the scope and the explanatory strength according to Østerud (2007, p.244). Following are the presentations and critiques of liberalism, social constructivism and realism:

#### 4.1 The Realist Perspective

Thucydides and Thomas Hobbes are often viewed as the intellectual forefathers of international relations realism, through their respective works *History of the Peloponnesian War* and *The Leviathan*, addressing security dilemmas and balance of power. Following the two forefathers were writers like Edward Hallett Carr, Hans J. Morgenthau and Reinhold Niebuhr who focused their attention on understanding the cause of war so as to find a remedy for its existence, during the inter-war period (1919-1939). Their approach to the problem was seeing the world as it “really is” rather than how they would like it to be, and so by these standards the world was not a very pleasant place (Lamy 2011, p.117).

From the realist perspective, the actors are the states. Emphasizing the ubiquity of power and the competitive nature of politics in the international arena, the realistic worldview is described as static, survival and self-help based, set in a condition of anarchy. By anarchy, realists mean that international politics takes place in an arena without any central authority or form of control. In this arena, each state considers itself to be its own highest authority, not recognizing anything higher. The essential logic for realists is drawing a sharp distinction between anarchy among actors and hierarchy within them (Legro & Moravcsik 1999). Given these conditions, the first priority of a state leader is to ensure the survival of the state. In order to do so, a leader must follow the doctrine of *raison d'état* (reason of state), which means following a set of maxims on how to conduct their foreign affairs in order to ensure the security of the state. With security as a means of survival, realists also acknowledge that some states survive on behalf of others. The fact that Poland has lost its existence four times in the past three centuries (Dunne & Schmidt 2011, p.86) is an example of how other states used Poland to increase their own security and survivability, while it also illustrates how realism can be a game of “eat or be eaten”.

Together with classical realism, the rest of the realist family consists of neoclassical realism, offensive realism and neorealism. Neoclassical realism acknowledges the same structural influences as classical realism, but stresses the importance of how both the government and individual characteristics impact the state's behaviour towards the international balance of power, and how the state can utilize its power. Alternatively,



neorealism is an often-used term describing today's realism. Neorealism stresses that states that claim sovereignty will be forced to develop offensive military capabilities in order to protect themselves, while extending its power. As such, actors pose a threat to each other. Uncertainty, leading to a lack of trust, is also defining for the neorealist view, as cooperation amongst actors is possible, but always deemed risky. A realist will only cooperate as long as it is beneficiary, and non-threatening to the sovereignty (Sagan 1996-1997). Also neorealists stress the importance of the structure (so called "structural realists") in the international political system, which affects the behaviour of all states. Thus, during the Cold War, the two main actors (the United States and the Soviet Union) who dominated the international system, imposed certain rules of behaviour on the other states. Now that the Cold War is over, the structure of international politics is said to be moving towards multipolarity, after a phase of unipolarity during the 1990s according to Baylis, Smith & Owens (2011, p.5).

When it comes to nuclear weapons, realists are divided into defensive and offensive realists. Combined, the two emphasize that nuclear weapons both serve as a defensive deterrent component and an offensive coercive component. Hence, nuclear weapons are deemed defensive when protecting a state from another state's aggressive actions, and offensive by the threat of first use and/or retaliation. This is illustrated when neorealists like Kenneth Waltz and John Mearsheimer (Roth 2007) argue that nuclear weapons enable weaker states to balance stronger states, as the weapons deter and prevent aggression and conflict, guaranteeing the security of the possessor state. This correlates with the basic principle of survival, as realists see nuclear weapons as a security guarantee for the survival of the state (Sagan and Waltz 2003).

#### 4.1.1 Selecting Realism

Applying Østeruds (2007) criteria for choosing a framework, the scope of realism is generally fitting very well when it comes to international relations. The school focuses on the international arena where each state acts according to its own interests. When it comes to the explanatory strength, the theory has only one level – the state level – which means it mostly ignores the national level and the individual level. But at the same time realist Scott D. Sagan argues that:

*the best theories are those that explain the largest number of cases and that the largest number of positive nuclear weapons decisions in the past (the United States, the Soviet Union, China, Israel, Pakistan) and the majority of the most pressing proliferation cases today (Iraq, Libya, and possibly North Korea and Iran) appear to be best explained by the security model (Scott D. Sagan 1996-1997, p.85).*

Further, the simplicity of the explanation: All three states (Iran, North Korea and Libya) had a nuclear programme before the invasion of Iraq in 2003, and realism could contribute in describing the change in these programmes based on terms of security and self-help. By fulfilling the required criteria for choosing a theory, realism as a framework seems to be the best alternative, a decision that is also backed by following two arguments: Firstly, since the Second World War, the pendulum swung towards liberalism after the creation of the United Nations, then towards realism during the Cold War, then back to liberalism during the New World Order of the 1990s, and now one could argue that we have been moving back towards realism after 9/11, as the United States and its allies have sought to consolidate their power and punish those whom they define as terrorists and the states that provide the terrorists with shelter (Dunne 2011, p.103). Secondly, realism is assumed to be the easiest way to explain North Korea's nuclear behaviour, since the inside of the regime is essentially sealed off for data collection for liberalism or social constructivism. However, realism does not look inside the state. This is often referred to by critics of realism as the "black box" example, emphasising that a state is not a "black box", and that there may be other influences on foreign policy decisions.

#### **4.2 The Liberal Perspective**

Focusing on multinational cooperation and international organizations, liberals question the idea of the state as the main actor in international politics. In those areas in which the state acts, they tend to think of the state not as a uniform actor but a set of bureaucracies, each with its own interests. By these standards, liberalism addresses both the individual level and the international level, stressing the importance of bureaucrats' interests inside a state, and the possibility of international cooperation outside the state. Although the ideas of liberalism are old, the rise of liberalism as an international relations theory stems from Europe in the 1980s, and gained increasing popularity at the end of the Cold War, resulting in a democratic wave. According to liberalist theory, democracies do

not go to war against other democracies (Sagan 1996-1997), so the belief in international cooperation, with a trust in global institutions, leads to an approach within liberalism often called neoliberalism or liberal institutionalism. This form of liberalism emphasizes how international institutions have a positive impact on the world community. The reason is because international institutions are autonomous actors able to facilitate cooperation between states. Hence, the more autonomous institutions and higher resolution level they have, the more institutionally linked the world, and the smaller states' need to fear each other's actions (Baylies, Smith & Owens 2011, p.4; Mayer 2013).

Liberalism also provides a settlement with the realist paradigm, assuming that international relations may concern dialogue instead of conflict. However, supporters of liberalist ideas accept many of the same assumptions of realism about the continuing relevance of military power in international relations, but highlight the importance of institutions as a framework for cooperation, which could enable actors to overcome dangers such as security competition between states, according to Baylis (2011, p.237). The international cooperation regarding the NPT and the Global Zero movement – fronted by Norway amongst others – are examples of international law and multilateralism that fit the tenets of international relations liberalism (Mayer 2013).

When it comes to nuclear weapons, liberalists view bureaucratic struggles and the competition for power inside a state as crucial. Liberalists contend that a state will seek nuclear arms as a means to accomplish some domestic end. They can either be used as an effort to gain popularity, like the Indian nuclear test in 1998, which was viewed by some as Prime Minister Atal Bihari Vajpayee's effort to generate domestic public support for his nationalist Bharatiya Party; or they can be used to justify economic problems as a sacrifice made by the people to permit the state's technological progress (Mayer 2013). Some liberals also argue that inward-looking regimes located in the neighbourhood of other inward-looking regimes are more prone to pursue nuclear weapons than outward-looking regimes (Sherrill 2012).

#### 4.2.1 Critique

Applying Østerud's (2007) criteria for choosing theory, the scope of liberalism covers two levels, both the international and the individual actor's level. However, liberalism often has an optimistic and idealistic approach to international relations, outweighing

important factors as self-interest and pursuit of power and status, and thereby reducing its explanatory strength. As an example, liberalism fails to explain the Cold War, where two allegedly rational opponents chose an arms race with Mutual Assured Destruction instead of diplomacy (Mayer 2013; Sherrill 2012). And so, how would liberalism as an international relations theory explain the following: North Korea's withdraw from the NPT; or Iran's refusal to ratify the Additional Protocol?

This leads to the conclusion that liberalism in this research will only serve as a substitute and critique of the main theory, on subjects the main theory does not cover completely.

### **4.3 The Social Constructivist Perspective**

Social constructivism had its beginning in the 1980s, when critics drew from realism and liberalism, arguing that liberalism and realism was ignoring social forces such as identity, ideas, knowledge, interests, norms and rules. Social constructivists stress that these factors should also be considered influential on states' identities and interests, as well as the very structure of global politics. Pioneers of this school of thought, such as John Ruggie, Richard Ashley, Nicholas Onuf and Alexander Wendt all challenged the former critical and sociological theories by demonstrating the effect of normative structures on world politics (Baylies, Smith & Owens 2011, p.5-8). The end of the Cold War –in 1989 created a new intellectual space for scholars keen to challenge the existing theories– which the constructivists did, demonstrating how attention to norms and states' identities could help uncover important issues neglected by realism and liberalism. By identity, social constructivists see knowledge, symbols, rules, concepts and categories as the constructing elements that determine how actors interpret their world (Mayer 2013). Reality is therefore not given, but is to be constructed through historically produced and culturally bound knowledge. This affects the view on the use of power: not only the ability of one actor to get another actor to do what it does not want to do otherwise, but also as the production of identities, interests and meanings that limit the ability of actors to control their own fate (Barnett 2011).

When it comes to nuclear weapons, constructivists emphasize the symbolic importance leaders tend to attach to nuclear weapons, which are acquired in order to establish the identity of an independent state capable of technically advanced prestige projects, deserving special recognition (Mayer 2013). From a sociological perspective, the identity

and prestige linked to nuclear weapons serve as a projector of national pride, in the sense that the weapons become a symbol of progress and modernity for the people.

Paradoxically the international community tries to diminish the pride and prestige of having nuclear weapons through the NPT – a treaty initiated by some of the five “legal” nuclear-weapon states, who also happen to be the five permanent members of the United Nations Security Council. Needless to say, this fact does not escape notice (Sherrill 2012).

#### 4.3.1 Critique

Applying Østerud’s (2007) criteria for choosing theory, social constructivism fulfils the requirement on the scope of the perspective, as the theory is capable of explaining why states would seek to acquire nuclear weapons. However, the problem with constructivism is its explanatory strength, since there are aspects of the empirical record that constructivism cannot account for. The symbolic, strategic and political effect of nuclear weapons may be based upon widespread and accepted social opinions, but that does not take away the very realness of this symbol, as it has been used in actual warfare, twice. This draws a thin line between what is socially constructed, and what is a very powerful weapon. According to Mayer (2013) the social constructivist argument rests on shared complex social meanings of nuclear weapons – from their power status to the taboo associated with their use – that cut across states and cultures is a proposition that may be difficult to prove. This is undermined by empirical evidence such as the continued existence of North Korea’s regime while Gadhafi’s has disappeared, which is weakening the constructivist explanation. Further, empirical evidence undermines the constructivist explanation, such as Russia’s response to the emergence of the United States as a nuclear-weapon state. And how can norms and values explain why states like South Africa, Ukraine, Kazakhstan and Libya gave up their nuclear weapons, while the same norms and values influences Iran’s nuclear ambitions, and influenced North Korea to become a *de facto* nuclear-weapon state? Checkel (1998) emphasizes that constructivism sometimes fail in explaining how the importance of social structures may vary across nations, as demonstrated above. In addition, he argues that constructivism faces challenges in explaining how social structures are created, and how they change over time. Constructivism also has a problem explaining why states that acquire nuclear weapons, increase and renew their arsenals and develop multiple ways of deployment and delivery systems? This indicates a more strategic and adaptable ambition beyond that of

symbolism (Mayer 2013). By these arguments, the third criterion for choosing a theory makes the social constructivist explanation slightly superficial.

This leads to the conclusion that, for this research, social constructivism provides neither the explanatory strength nor the simplicity of the explanation required to fulfil the criteria of choice. It will therefore be used as a substitute and/or critique on subjects the main theory (realism) does not cover completely. It is also worth noticing that social constructivism is not always accepted as an equal international relations theory in academic forum, as many scholars see the theory as less realistic (Mayer 2013).

## 5 Analysis

This chapter is divided into two parts, where the first part presents the individual analysis of the three nuclear programmes, while the second part presents the comparative analysis.

### 5.1 Analysis of Iran's, North Korea's and Libya's Nuclear Programmes

#### 5.1.1 Analysis of Iran's Nuclear Programme

The case of Iran differs from that of Libya and North Korea, as Iran halted the alleged nuclear weapons related activities in the fall of 2003. Although no definite evidence exists, the United States National Intelligence Estimate (NIE) issued a report in 2007, claiming with “high confidence” that Iran had a nuclear weapons programme prior to the fall of 2003/early 2004. Further, the estimate concluded with “moderate confidence” that no such activities had resurrected in 2007 (NIE 2007). The IAEA followed suit in a report from 2011, claiming with “overall credibility” that evidence did exist, and that Iran had nuclear weapons ambitions prior to 2003 (IAEA 2011). Iran on the other hand has never admitted any such activities. However, Iran suddenly changed behaviour regarding its nuclear programme in 2003, the same year as neighbouring Iraq was invaded based on allegations of nuclear weapons possession. It is therefore tempting to suggest that Iran's sudden change could have been influenced by the invasion. This analysis will argue that the *Iraq invasion*-variable had a strong influence on the behavioural change in 2003 together with the *sanctions*-variable. Further, this analysis will discuss the factors that made the Iranian nuclear dispute continue after 2003 and until today. That could be explained through the *Iraq invasion* variable and the *national strategy and foreign policy* variable.

#### 5.1.1.1 What Caused Iran to Halt?

At the beginning of the new millennium, Mohammad Khatami was in his first term as President (1997-2001). Described as a “constructive idealist”, Khatami sought to better Iran’s regional and international reputation (Wastnidge 2011). This diplomatic rebranding of the national strategy and foreign policy was also an important step in improving the relationship with the United States and the European Union, which had been in a poor condition since 1979. Khatami’s idealist policy and diplomatic approach continued through his second presidential period (2001-2005) and it is reasonable to believe that it was the fear of sanctions that contributed to the step towards improved relations during Khatami’s first term. However, in Khatami’s second term it is more likely that the fear of an attack, given the American military presence in Afghanistan and Iraq, affected the Iranian behaviour. Either way, both reasons were based on the fear that the lack of will to cooperate could have consequences, and that cooperation was beneficiary. According to realism, states cooperate only when forced to, or when it is beneficiary for the security of the state. Further, it is important to notice that even though Iran had a nuclear weapons programme during the presidency of the idealistic Khatami; it does not mean that Khatami had any final say on the nuclear weapons issue. It is possible that the President did not favour nuclear weapons, while the Supreme Leader Ali Hosseini Khamenei did.

Perhaps a more tangible factor that could help explain the 2003 halt, are the events in the aftermath of the 11 September 2001 terror attacks, where the risk of nuclear weapons pursuit for states deemed as rogue states by the United States, was highlighted. Termed such a state, the pressure on Iran increased during the “War on Terror” that followed, and even more when President George W. Bush referred to Iran as part of the Axis of Evil in his State of the Union Address on 29 January 2002. Already labelled as an enemy of the United States, Iran was taken out of the frying pan and into the fire by the disclosure on 14 August 2002, when the National Council of Resistance of Iran (NCRI) held a press conference in Washington D.C. claiming that the Iranian regime was building secret nuclear facilities near the cities of Natanz and Arak. Although the NCRI, at that time, did not know what they had revealed in Natanz, the facility was later identified as a large-scale uranium enrichment facility. Arak was later confirmed as a facility for a heavy water production plant and a heavy water research reactor. Both facilities may have peaceful applications, but could also be relevant in a military nuclear programme (see

Appendix A). This got IAEA's attention, since Iran had not declared these activities under its Safeguards Agreement. In order to reduce the mounting pressure, Iran followed up by issuing a statement on 16 September 2002 claiming that the activities were for civil purposes, and further referred to its right to do so according to NPT's Article IV (see Appendix A). Furthermore, the regime referred to its subsidiary arrangement (from 1976) which did not require Iran to inform the agency of future nuclear facilities until 180 days before nuclear material was to be introduced into each specific facility, as mentioned in Section 2.3. Iran could therefore legally continue its activities, because it had not accepted nor ratified any update of code 3.1 and was still following the "six months clause" from 1976 (Kippe 2009; as mentioned in Section 2.3). As mentioned earlier, the NIE from 2007 claimed that Iran had a nuclear weapons programme in this period. It is therefore possible that the fear of sanctions or a military attack was outweighed by the tempting technological achievements Iran could gain, if this extra "window of time" was preserved. According to realism, Iran would interpret the agreement by the old rules because this was more beneficial, demonstrating that the first priority was its own interest, which is also an element in realism. Further, if Iran were developing a clandestine nuclear weapons programme, the 180 days clause would be of great strategic importance, in order to buy time. If this was the case, Iran would also here be following realism through the *raison d'état*, in order to ensure the security of the state.

However, in October 2002 Iran decided to let the IAEA inspect Natanz and Arak. It seems likely that pressure building across the border (in Iraq) could have spooked the Iranian regime towards this decision, while Iran also must have kept in mind that restraint regarding its nuclear facilities could potentially lead to sanctions. Once again, Iran acted according to realism, cooperating based on the fact that it was necessary and beneficial. The inspection did not take place until March 2003, but during their visit the Director General of IAEA (at that time), Dr. Mohamed ElBaradei, and his team of inspectors concluded that the underreporting was in obvious violation of the safeguards agreement, but not necessarily of the NPT (Lodgaard 2012). The alleged underreporting referred to violations of the Safeguards Agreement such as: the use of uranium in test-centrifuges; import of various types of uranium; and tests on separating small amounts of plutonium. Iran should have reported such activities to the IAEA (see Appendix A) (Høibråten et.al. 2013). Still, Iran claimed no violation and continued to refer to Article IV (see Appendix A) saying it was for peaceful intentions only. It is likely that Iran must have felt the



pressure of the agency's conclusions regarding Natanz and Arak, because Iran sought to negotiate. Given the non-existing diplomatic connections between Tehran and Washington D.C, the Swiss ambassador<sup>14</sup> to Tehran, Tim Guldemann received a letter from the government of Iran on 2 May 2003, issuing a bilateral proposal to the United States. Among the key points were:

- Relief of all U.S. sanctions on Iran
- Cooperation to stabilize Iraq
- Full transparency of Iran's nuclear programme, including the Additional Protocol
- Cooperation against terrorist organizations, particularly the Mujahedin-e Khalq and al-Qaeda
- Iran's acceptance of the Arab League's 2002 "land for peace" declaration on Israel and Palestine
- Iran's full access to peaceful nuclear technology, as well as chemical technology and biotechnology

Obviously the Iranian regime felt the need to be as transparent as possible to avoid sanctions from the UNSC, or even worse; military action from the United States. The fear of the United States makes it possible to link the Iranian offer to the invasion of Iraq: It took the United States only weeks to beat the same Iraqi army that Iran had used eight years (1980-1988) to fight, a fact that must have been noticed in Tehran. Nevertheless, the letter did not say anything about suspending uranium enrichment (Arms Control Association 2003). It is possible that Iran refrained from addressing this issue because the Iranian nuclear programme was a prestige project, where the national strategy seemed to withhold its right to enrichment through Article IV (see Appendix B.4). The will to negotiate in order to improve bilateral relations is an element of liberalism, which could have provided a theoretical explanation for the Iranian offer, however both realism and social constructivism undermines any liberalist explanation for why Iran came forward with this offer. In terms of realism, Iran felt threatened by the United States and/or sanctions, and sought to reduce the threat by improving relations; and in terms of social constructivism, the theory stresses the fact that the Iranian offer included no suspension of the uranium enrichment, as Iran maintained its right to do so by Article IV. Iranian

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<sup>14</sup> Since the Iran hostage crisis of 1979, the Embassy of Switzerland in Tehran has represented the United States government in Iran.

seemed to follow national strategy and foreign policy where prestige and status was seemingly unwavering. It appears that by these standards, Iranian national pride weighed more than the country's fear of an invasion, at this point. The Iranian proposal did however include an acceptance of the Additional Protocol (Arms Control Association 2003), which indicated Iran's willingness to cooperate substantially with the IAEA on nuclear issues. The reason why, might be that Iran viewed the acceptance of the AP as a way of avoiding sanctions. Still, because the proposal did not address the enrichment issue, Washington D.C. dismissed it, because the Bush administration did not want to allow Iran any right to enrichment (Arms Control 2013b). Finally, it is worth noticing that the 2 May 2003 letter marked the first effect on the Iranian nuclear programme after the invasion of Iraq had started, making Iran more eager to negotiate its programme.

Ever since the inspections in February 2003, the IAEA had received information from the NCRI that the regime was possibly conducting enrichment activities at the Kalaye Electric Company in Tehran, and wanted access to the sites to conduct environmental samples. Iranian authorities acknowledged that the Kalaye facility was used for the production of centrifuge components, but that no enrichment involving nuclear material had taken place, also stating that they would not allow full access or environmental samples until the Additional Protocol was in force. The reason for denying IAEA access at first may be to avoid any linking technical activities to possible military dimensions. If Iran was conducting activities related to military use of nuclear technology, it would seem natural to deny the agency access. However, the Iraq invasion, and the increased pressure which the invasion brought with it, combined with continuing concern of sanctions, seems to have convinced Iran to allow IAEA access, thereby weighing heavier than the national pride and prestige. Once again, Iranian actions were driven by the fear of negative consequences, and according to realism, all states seek to minimize the consequences in order to secure the state. On 18 August 2003 IAEA was allowed to take samples at Kalaye. The samples showed traces of enriched uranium in the installations, and samples from other places, including the Natanz facility, also revealed evidence of highly enriched uranium. This was a major blow for the Iranian regime, having denied the existence of such activities. Iran's atomic energy organisation suggested that the traces of highly enriched uranium could have been from second-hand imported centrifuges that had been contaminated before the transport to Iran, and that the traces

were probably from another country's nuclear weapons programme<sup>15</sup> (Mousavian 2012, p.112-113). This led the Board of Governors to issue a resolution on 12 September 2003 calling on Iran to "suspend all further uranium enrichment-related activities", as well as giving Iran till the end of October 2003 to "come clean" with the failures identified by the agency, as well as to cooperate fully (IAEA 2003).

Meanwhile, in the absence of an American will to negotiate the implementation of the Additional Protocol with Iran, the effort was picked up by the EU-3 (representatives from the United Kingdom, Germany and France). The European countries had a softer and more preferred tone towards Iran than that of the Bush administration, which mantra was: *you don't talk to evil, you take action against it* (Lodgaard 2012, p.61). And at this point the EU-3 was Iran's only real option given the fact that they could prevent the United States from conducting military action against Iran directly or indirectly through a United Nations Security Council resolution which would allow the same. Iran also wanted to cooperate with the European countries because this potentially could prevent or delay UNSC sanctions against Iran. This indicated that the cooperation with the EU-3 might be an influential variable. Further, the disclosure of the A.Q. Khan network, as mentioned in Footnote 7, in the same period, might also be a variable contributing to the cooperation, because the illegal trade could be interpreted as a violation of Article II in the NPT. However, the unfolding of the A.Q.Khan network had not revealed any Iranian violations by the time the talks between Iran and the EU-3 started on 21 October 2003. This strengthens the argument that it was the fear of American military presence, and perhaps also sanctions, that convinced Iran to negotiate, while the disclosure of the Khan network could be seen as a less influencing variable.

Prior to the 21 October meeting, the head of the Atomic Energy Organization of Iran (AEOI), Gohlam Reza Aghazade, Iran's Chief Nuclear Negotiator (current President of Iran) Hassan Rouhani and the Director General of the IAEA at that time, ElBaradei, met in Iran on 16 October. The main topic discussed was the IAEA's Board of Governors' request from 12 September, calling for "suspension". ElBaradei made it clear that if Iran avoided the introduction of uranium hexafluoride (see Appendix A) gas into the

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<sup>15</sup> Pakistan's nuclear weapons programme

centrifuges, it would be considered to have suspended its enrichment activities (Mousavian 2012, p.101).

And so, when Iran met with the EU-3 foreign ministers on 21 October 2003, it was a surprise when the EU-3 insisted on a far more extensive definition than the one ElBaradei had projected to Iran prior to the meeting. Fearing the breakdown of the negotiations, chief negotiator Rouhani called the President and the Office of the Supreme Leader and explained the status. They agreed that Iran would temporarily and voluntarily suspend enrichment, based on ElBaradei's definition, and nothing further (Mousavian 2012, p.102). This led to the signing of the "Tehran Statement". The basis for the statement was that the EU-3 was to prevent Iran's nuclear programme from becoming an issue for UNSC sanctions, if Iran implemented the Additional Protocol and accounted for all aspects of the nuclear programme to the IAEA. This facilitated cooperation between Iran and the IAEA, and marked the beginning of a confidence building process, unlike the relationship prior to the agreement. The effect of the Tehran Agreement also appears to have been that Iran was led to believe that a temporarily suspension of gas was sufficient, thereby making an agreement much more acceptable for Iran. In the wake of the 12 September 2003 resolution, Iran had seemingly faced two options, both of which led to the UNSC. After getting out of this quandary, Iran decided to respond immediately to one of the main requests of the IAEA Board of Governors, by presenting a complete report of its nuclear programme. Arguably the fear of sanctions and/or worse had trumped Iran's need for prestige, from months before.

On 23 October 2003 the report was released, where Iran admitted carrying out undeclared tests on centrifuges. This was controversial based on previous Iranian statements in general and the statement in February 2003 in special, given that these activities were in no violation of the Safeguards Agreement (Mousavian 2012, p.111). Now the new report admitted that the activities in fact were in violation of the Safeguards Agreement. It appears that, the invasion of Iraq might be a reason for why these activities were refused in the early months of 2003, because the pressure was mounting on Iran's neighbour state and Iran feared to be drawn into the conflict. This rationale behind refusing right before the invasion can be interpreted through realism, where security and survival could be ensured through denying the existence of such activities. Further, admitting such actions in

the October 2003 report could also be seen as an effort to avoid the very same threat to security, but it is more likely that the fear of sanctions contributed equally at this point.

However, problems occurred soon after the Tehran Statement. On 17 November 2003 Iran confronted the EU-3 ministers, because the definition of suspension had begun to diverge from ElBaradei's original definition<sup>16</sup>. It seemed to Iran that the technical definition of suspension was replaced by a more political agenda. Complaining about this, Iran received the answer that "ElBaradei is not the IAEA". However, the Tehran Statement was a mutual victory for Iran and the EU-3, taking the "wind out of the sails" of the American push for international convergence against Tehran's interests, which could have ended in a repetition of Iraq's experience (Mousavian 2012, p.106-107). Eventually Iran suspended the enrichment on 8 December, and signed and implemented the Additional Protocol on 18 December 2003.

According to realism the decision to suspend the enrichment activities and sign the Additional Protocol may be explained by the threat of war contemplated by an American administration in a mental state of hubris, which means that the invasion of Iraq had an effect on Iranian decision-making even at the end of 2003. However, it is also possible to view Iran's month-long reluctance to make any decision by arguing that Iran's strategy was to not give up its right to enrich, because of the prestige and status within the nuclear programme. If that was the case, the decision could be interpreted as acting in favour of social constructivism. However, the fact that Iran eventually halted the enrichment, and signed the AP makes it likely that that security concerns were taken more into account than prestige.

Finally, a more speculative factor that could have caused Iran to halt its enrichment is the United States invasion of Afghanistan and later Iraq, arguably removing two of Iran's major regional adversaries in the shape of the Taliban and Saddam Hussein. Saddam's WMD programme and his use of chemical agents during the 1980-1988 war was arguably one of the driving factors for Iran's nuclear weapons programme from the end of the 1980s and through the 1990s. Not until Saddam Hussein was removed and no

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<sup>16</sup> In his 2011 memoir, ElBaradei explains that there is a distinction between a purely technical definition and political demands. Technically, suspension required only halting the introduction of gas into centrifuges.

nuclear weapons were found, could the Iranian regime be sure that Iraq did not possess any nuclear weapons. One could argue that the absence of regional enemies must have contributed towards the decision to halt the nuclear programme in 2003 –a logic that may well have been reinforced by the presence of American troops on “the doorstep”– but this is a rather speculative argument without any documentation. Another theory is that Iran had already made so much progress on the non-nuclear components of the nuclear weapons that halting the programme would be of little importance (Lodgaard 2012). This theory is also supported by the IAEA’s Director General Report from 2011, which renders circumstantial evidence that Iran was conducting research on non-nuclear weapon-components as early as 1996 (IAEA 2011). If this is correct, it means that Iran could have succeeded in the most essential factors, enabling the design of a nuclear warhead to a modified version of the *Shahab-3*<sup>17</sup> missile, already in 2002/2003.

#### 5.1.1.2 What Causes Iran to Continue?

The Iranian decision to suspend uranium enrichment in 2003 could have been a major step towards an abortion of the country’s nuclear programme, and thereby the possible military dimensions. Instead, several factors prevented such an outcome, making the Iranian nuclear dispute unresolved until this day. The negotiations continued in 2004, with the Brussels Agreement in February, where Iran agreed to extend suspension of the enrichment process, as well as suspending the manufacture of parts and assembly of centrifuges, while the EU-3 agreed to push the IAEA for a closure of the Iran case by June 2004. The cooperation indicates that Iran probably was affected by the fear of sanctions, while at the same time convinced by an optimistic hope that these activities could be restarted soon, to halt some aspects of its nuclear programme. But problems occurred on the side-line. In January 2004 Dr. A.Q. Khan (see footnote 7) admitted export of sensitive nuclear technology to Iran through the A.Q. Khan network, and in May 2004 satellite photos of a facility in Lavizan-Shian in Tehran, allegedly a centre for nuclear weapons-design development, brought suspicion; If Iran had nothing to hide, why would the facility exist in November 2003, but be razed by May 2004 (Kippe 2009), before the IAEA was allowed access? According to NIE (2007) Iran’s nuclear programme might have had possible military dimensions at the end of 2003 or even the beginning of 2004. If all military aspects of the programme were halted in late 2003, the

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<sup>17</sup> Medium-range ballistic missile (MRBM), based on North Korean technology. The modified version may allow a nuclear warhead to be implemented in the nose section (Høibråten et.al., p.105).

termination of the facility could be seen as an attempt to adhere to its NPT commitments. But, if Iran still pursued a clandestine nuclear weapons programme by May 2004, chances are the facility was razed in order to avoid further suspicion. Because of the satellite photos Iran's nuclear programme was still on IAEA's agenda by June 2004 because there were doubts about Iran's compliance with the Brussels Agreement, and the agency issued a resolution on 18 June expressing its concern (IAEA 2004). Disappointed and angered by the lack of trust from the IAEA, Iran protested by stating withdrawal from the Brussels Agreement, and continued the manufacture of parts and the assembly of centrifuges (but not the introduction of gas into the centrifuges) (Mousavian 2012, p.136-138).

However, the parties managed to reach a new agreement in Paris – known as the “Paris Agreement” – on 14 November 2004 where the statements of 21 September 2003 were reaffirmed, the Additional Protocol was implemented, and Iran agreed to continue the suspension and to stop the uranium conversion facility in Isfahan (Mousavian 2012, p.145-151). The fact that Iran decided to continue cooperating could mean that the effect of the Iraq invasion still affected the Iranian decision-makers, but it could also be based on the fear of sanctions, the disclosure of Lavizan-Shian, or the hope of gaining the right to enrich through negotiations. It is therefore difficult to decide what argument weighs the most, and if Iran's behaviour could be explained through realism or social constructivism. Meanwhile, negotiations continued after the Paris Agreement, and on 25 March 2005 Iran presented a framework for the EU-3 on how Iran could return to enrichment activities under monitoring from the IAEA. The EU-3 (probably under pressure from the United States and the United Kingdom) declined the Iranian offer. According to former British ambassador to the IAEA Peter Jenkins, this refusal made Iran's Supreme Leader Ayatollah Khamenei understand that in reality the EU-3 wanted an unlimited suspension of the whole programme, which was unacceptable for Iran (Heldal & Heireng 2013).

During the summer of 2005 the United States presented for the IAEA a laptop computer containing documents in Farsi (Persian) on how to construct the nose of the Iranian *Shahab-3* missile in such a manner that it would fit “something round” – implying a nuclear implosion warhead (ISIS 2008). Based on this evidence it could appear that Iran sought nuclear deterrence. Allegedly the computer had been handed over to American

intelligence officials by an Iranian national in Turkey one year earlier, and the content suggested that Iran had a secret agenda even after the 2003 agreement. It is possible that the evidence was presented in order to affect the scheduled negotiations between the EU-3 and Iran set to August 2005. The negotiations were initiated by the EU-3, after Iran had announced the restart of the conversion activities at the Isfahan facility. However, this time Iran declined, and there are five possible reasons for why Iran would do so: Firstly Iran would not accept the incentives because the EU-3 could use them against Iran, affecting its independence. According to realism, no states accept any authority higher than themselves. Secondly Iran's newly elected president; Mahmoud Ahmadinejad was inserted in August 2005. Being a conservative hardliner, Ahmadinejad refused cooperation that did not serve Iranian interests, which is also an element in realism. Thirdly, Iran's tougher line towards the EU-3 directly, and the United States indirectly, showed that the effect of the Iraq invasion in 2003 probably began to decline, and that Iran did not have to compromise so much on behalf of the nuclear programme as before, giving the decline its third realist argument. Fourthly, Iran seemed to have reached a point where it would not give up on any more rights, as it was affecting the possibility for Iran to raise its status. The fifth argument is a bit contradictory to the third, and also a bit more speculative. It is possible that the American military presence in both Afghanistan and Iraq represented a threat to Iran as the *de facto* regional power. This could have been viewed as an obstacle for Iran's ambitions of regional power and status, which are elements from both realism and social constructivism. And so, if Iran willingly gave up its right under the NPT to enrich uranium while the United States continued its hostile attitude, this would leave Iran both embarrassed and defenceless. Thus the Iranian decision not to give up its enrichment programme seems to be explained by a combination of regime change, pride and fear of being defenceless. The decline in August 2005 therefore marks a distinct effect on the Iranian nuclear programme; going from the will to cooperate during Khatami, to the lack of will to cooperate under Ahmadinejad.

As a result of the Iranian decline, EU-3 was forced to withdraw from negotiations, as halting the enrichment activities was a requirement from the EU-3 for continued negotiations. This led the EU-3 to support IAEA's next resolution, which opened the case for the UNSC. In February 2006 the IAEA took the Iran-case to the UNSC (IAEA 2006), and the chance for a constructive solution through the Tehran Statement and the Paris Agreement was thereby over.



Iran responded by cancelling the implementation of the Additional Protocol (which it had agreed upon on 18 December 2003) reducing IAEA's access to only declared facilities (Høibråten et.al. 2013). From this point on, the IAEA's ability to guarantee a full overview of Iran's nuclear programme deteriorated. With only the Safeguards Agreement as a framework, the agency could no longer monitor the "absence of undeclared nuclear activities". Meanwhile, Iran returned to the 180 days interpretation of code 3.1 and resumed its uranium enrichment. In November 2007, the United States National Intelligence Estimate stated with "high confidence" that Iran had a nuclear weapons programme until the fall of 2003, but that Iran had not restarted the programme by mid-2007, and with "moderate-to-high confidence" that Iran had no nuclear weapons by 2007 (NIE 2007).

Iran's decision to continue its nuclear programme could be explained through both social constructivism and realism, because of the dual use technology within the programme, meaning that the production of fissile material could be used for both civil and military purposes. It is important to note that no reports suggest that the regime has actually developed nuclear weapons or decided to produce weapons grade uranium (over 90%), nor separated plutonium (see Appendix A), thus the programme could best be categorized as "latent" or "not operational" (Høibråten et.al. 2013, p.95). According to social constructivism the nuclear programme plays an important role in the way Iran sees itself: the Bushehr nuclear power plant is the first operative nuclear power plant in the Middle East, and it signals both independence and prestige. But while Iran builds on a proud civilisation that wants to become a legitimate actor in international affairs, it is a significant gap between how Iran sees itself and how others treat Iran. This gap was especially evident from the fall of 2003 and till the summer of 2005. Iran received very little in return for its transparency and cooperation with the EU-3, and this was blamed on Khatami. As a result the conservative Ahmadinejad was elected president, in what can be described as a line shift. From this point Iran was less willing to compromise on the nuclear issue, because the Iranians were tired of the treatment from the European states, and were unwilling to give up their right to peaceful nuclear technology (Lodgaard 2012, p.66-71). Analysing through social constructivism, Iran will not give up its right to enrich uranium, because that would mean the end of the nuclear programme that plays such an

important role when it comes to prestige, self-esteem, status and independence, and also the need for electricity (Høibråten et.al. 2013, p.98; Lodgaard 2013).

Although speculative, realism would suggest that Iran withdrew from the negotiations in 2005 because a permanent suspension of enrichment would halt the production of fissile materials for nuclear weapons, or simply because Iran did not trust any agreements with Western powers. The suspicion towards possible military dimensions regarding the programme is not without reason: On 21 September 2009 the Fordow Fuel Enrichment Plant (FFEP) near the city of Qom was revealed. The FFEP brought further suspicion because the enrichment plant was constructed inside a mountain hall belonging to the Iranian Revolutionary Guard Corps (IRGC). With a potential for holding no more than 3000 centrifuges, the site is unfit for commercial enrichment. In October 2009, the so-called TRR-agreement (Tehran Research Reactor) was established as a cooperation where Iran could deliver 1200 kg of low enriched uranium hexafluoride ( $LEUF_6$ ) (see Appendix A) (enriched to 19,75%) to Russia, and receive 120 kg of uranium reactor fuel (also low enriched) for the TRR. The purpose was to take away the most sensitive enriched uranium from Iran, but at the same time enable Iran to use the uranium to alleged civilian purposes such as medical isotope production<sup>18</sup>. Through Iran's chief negotiator Ali Larijani, the country agreed to the terms and was only weeks away from signing the agreement when problems occurred. While Larijani was able to get agreement on the international level, he was unable at the national level, as the Iranian political system was bogged down in institutional rivalries (Lodgaard 2012). Ultimately this made the Supreme Leader Ali Khamenei criticise the deal, which in turn resulted in a negative Iranian response. Interestingly enough, domestic politics might have contributed to the break-down of the TRR-deal. The fact that the TRR-deal failed, could be a possible reason for why Iran decided to continue its nuclear programme.

From May 2010 Iran allowed IAEA to conduct inspections in the enrichment facility in Natanz twice a month, including one unannounced inspection. The inspectors have had access to both the Fuel Enrichment Plant (FEP) and the Pilot Fuel Enrichment Plant (PFEP) at Natanz. From May 2010, Iran allowed an additional unannounced visit a month as well as a Design Information Verification (DVI) and an Interim Inventory Verification

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<sup>18</sup> Medical isotopes are produced using a lower power, low cost nuclear reactor which permits the use of all the fission products produced in the reactor

(IV). The Inspection frequency in the Iranian enrichment facilities is far higher than the production rates would normally imply (Høibråten et.al. 2013, p.98). Although the Iranian cooperation could be explained through liberalism, reality may be that Iran does so out of fear, or in case of a secret nuclear weapons programme: keeping IAEA's attention away from clandestine sites. However, Iran would not try to conduct illegal activities in facilities inspected regularly. But if a clandestine programme is evident, Iran cooperates purely on intentions based on realist theory. The latter view is supported by the fact that Iran had refused several of the agency's inspectors' access to Iran in recent years, forcing IAEA to use inspectors without the desired experience in Iran. This could be a strategy to sabotage IAEA's work, which would be natural if Iran had a clandestine nuclear weapons programme, but it could also be explained with Iran's fear of IAEA leaking sensitive information about its prestigious nuclear programme. Regardless, Iran's protective behaviour regarding its nuclear facilities has similarities with the North Korean behaviour towards the agency and international inspectors. The IAEA reports quarterly on Iran's technological developments relevant to its implementation of NPT safeguards and United Nations Security Council resolutions, addressed from the Director General to the Board of Governors. Most member states appreciate these updates; however Iran has continuously criticized the IAEA for leaking sensitive information about Iran's nuclear programme. IAEA's fear is that Iran may have other secret facilities (Høibråten et.al. 2013, p.98).

In November 2011 the agency issued a report on the implementation of the NPT Safeguards Agreement in Iran, containing details on so-called Possible Military Dimensions (PMD) to Iran's nuclear programme (IAEA 2011). Basically the issues were the same as in 2005, but this time they were described in much more detail. The nuclear facility in Parchin (already suspected in 2004) was revealed as a possible site for testing of nuclear weapons related technology. International experts' fear that Iran at some point will use an excuse to produce highly enrich uranium, and in 2012 a high-ranking Iranian naval officer announced that Iran plans to build nuclear submarines, which would be a perfect reason to enrich uranium up to 60-90 %. But this might also be a scare tactic to achieve a better "hand" at the next round of negotiations (Høibråten et.al. 2013, p.103). The ambition of possessing nuclear submarines has not been confirmed by the Supreme Leader or the President.

It seems as if Iran in the period after 2005 and until today, has acted more in its own interest. This is in contrast to the period after the invasion of Iraq, from 2003 till 2005, when Iran acted across its own- interests in order to please the United States. Iran's newfound independence in the time after 2005 could mean that the "Iraq effect" has lost its grip, which again could mean that Iran does not fear the United States the same way in 2013 as it did 10 years ago in 2003. Through the 2013 election of the more reformist president Hassan Rouhani, Iran has turned over a new leaf. While the presidency of Ahmadinejad was popular for refusing to give up the right to enrichment, the former president caused several sanctions on Iran. Under Rouhani Iran wants to end the sanctions, but will not drop its nuclear programme until it knows how the "endplay" turns out, causing Iran to delay the ratification of the Additional Protocol (Lodgaard 2013). Even though Rouhani wants to cooperate with the P5+1 and increase the transparency in Iran's nuclear programme, the new president has expressed that he will not halt Iran's enrichment activities, and this indicates that Iran has not departed from a national strategy based on prestige and status.

#### 5.1.2 Analysis of North Korea's Nuclear Programme

Amongst the three states, North Korea is the only one who has taken the full step and actually developed nuclear weapons, although there is still no proof that North Korea has successfully managed to fit a nuclear device on to a missile, thereby making it a "weapon" in the true sense of the word (see Appendix A.2). In reference to the 2003 invasion of Iraq, the case of North Korea also differs from Iran and Libya, as North Korea had a change of behaviour three months before the invasion. North Korea's withdrawal from the NPT as early as 10 January 2003 suggests that factors other than the invasion have played a vital role regarding its nuclear weapon programme. This analysis will argue that the *Iraq invasion* variable in fact did play an important role, along with North Korea's *national strategy and foreign policy*. Further, this analysis will also argue that the fear of an invasion was later replaced by a strategy of using the nuclear weapons programme as leverage for incentives.

##### 5.1.2.1 What Caused North Korea to Withdraw From the NPT?

One important factor that appears to have had an effect on the North Korean nuclear programme was the new era in Washington D.C.: In 2000 the bilateral relationship with the United States, solidified through the Agreed Framework, was improving, but the new

Bush administration entering office in January 2001 viewed the agreement inherited from former President Bill Clinton with scepticism. The scepticism was due to two factors: The administration's determination to pressure North Korea to give up its nuclear weapon related activities, also preventing Iraq, Iran and Libya from acquiring nuclear weapons; and the administration's general expectancy of regime collapse, which had been the case for many states left to themselves after the fall of the Soviet Union. As a result of this scepticism, the Bush administration ended the common negotiations held with allied South Korea, but did not replace them with any new strategy. The combination of the new Bush administration, and the terrorist strikes on 11 September 2001 pushed North Korea further down on the United States agenda. In the absence of multilateral talks, and with an American administration with hostility towards any states supporting terrorism or proliferating nuclear weapons, North Korea faced an adversary who seemed to have lost its interest in improving the bilateral relationship.

A solid proof of that came in what can be described as a year of hardened critique and insults towards North Korea. First the Axis of Evil speech, followed by President Bush's highly personalized criticism of Kim Jong-Il<sup>19</sup>, and then the public disclosure of North Korea's procurement of equipment and materials for an industrial-scale uranium enrichment programme in the summer of 2002 (Kippe 2003; Pollack 2011, p.132). The disclosure was similar to the one in Iran (Natanz and Arak), just weeks later. It is likely that this convinced the regime that the United States did not want an agreement, but rather a regime change. During the fall of 2002 the critique and accusations became tougher, as United States Vice Secretary of State James Kelly held diplomatic talks with North Korea on 3 to 5 October 2002, presenting proof that the regime had continued its enrichment programme. This was seen as a violation of the 1992 agreement, requiring no nuclear weapons on the Korean peninsula, as mentioned in Section 2.4.2, which in turn was one of the points in the Agreed Framework. Pyongyang denied, and claimed that the United States had failed to produce any evidence such as satellite photos. Furthermore, the regime stated the following on 25 October 2002:

- The development of nuclear weapons would be in violation of the AF.
- The United States had “massively stockpiled nuclear weapons in South Korea”.

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<sup>19</sup> In 2002, President Bush referred to Kim Jong-Il as a “pygmy” and compared him to a “spoiled child at a dinner table” during a meeting with Republican senators, according to news reports at the time.

- Article I of the AF obliged the United States to provide light water reactors to North Korea by 2003, but only site preparations for the reactor had been made even though eight years had passed since North Korea froze its nuclear facilities. (KCNA 25 October 2002).

Whether the accusations against North Korea were correct or not, the regime was right in criticizing the United States for not carrying out the terms of the AF. Also, the conditions for the agreement were skewed, as North Korea had to accept inspections of their nuclear facilities, but were not allowed to conduct inspections in South Korea to dispel their suspicions about American nuclear weapons. Assuming that Pyongyang firmly believed that the threat existed, the regime would be living in uncertainty. The fact that uncertainty is recognized as an element of realism, where the lack of trust undermines cooperation amongst actors, could mean that even though North Korea had cooperated, the cooperation had always been considered risky. In the same statement Pyongyang also addressed the Axis of Evil phrase:

*The Bush administration listed the DPRK as part of the “axis of evil” and a target of the U.S. preemptive nuclear strikes. This was a clear declaration of a war against the DPRK as it totally nullified the DPRK-U.S. joint statement and agreed framework. [...] That was why the DPRK made itself very clear to the special envoy of the U.S. President that the DPRK was entitled to possess not only nuclear weapons, but any type of weapon more powerful than that so as to defend its sovereignty and right to existence from the ever-growing nuclear threat by the U.S. (KCNA 25 October 2002).*

So why would North Korea respond in such a manner? Firstly, North Korea did not benefit from the Agreed Framework, and was willing to nullify it for this reason. This behaviour strongly correlated with the self-interest realism claims states act according to, where states only cooperate if it is vital for security or if it is beneficiary. Clearly it was neither. Secondly, North Korea was sufficiently worried about American military presence in South Korea, and the unfriendly attitude of the Bush administration, that it deemed nuclear weapons as a necessary means of protection. This is a reason in perfect sense with neorealist theory, which argues that nuclear weapons are securing the possessor from the aggressors and making it possible for weaker states to balance the

stronger states. In more general terms it is possible to conclude that both American pressure and North Korean national strategy caused the outcome. The fear of sanctions or the disclosure of undeclared nuclear activities does not seem to have had any effect in this particular case

Although the Bush administration viewed the Agreed Framework with scepticism, as mentioned earlier, the complete lack of a dialogue was certainly not preferable. However, Washington D.C.'s effort to enable talks consisted once again of using the stick rather than the carrot, another factor moving North Korea towards a withdrawal from the NPT. And so, in November 2002 the consortium Korean Peninsula Energy Development (KEDO) stopped shipments of oil bound for the North, in an attempt to force North Korea to comply with the existing non-proliferation agreements under the Agreed Framework. Before the regime had responded, a North Korean ship carrying missiles to Yemen (a possible transit on the way to Iran or Libya) was intercepted, not making the situation any better. By the end of December 2002 the regime responded by denying IAEA access to the nuclear facilities in Yongbyon, and removing the agency's monitoring equipment: Reactor Two was reopened (allegedly due to power shortage); the seals on spent fuel rods containing plutonium were removed; 1000 out of a total of 8000 stored fuel rods were sent to the reprocessing facility in Yongbyon from other facilities; and finally the agency's inspectors were evicted from North Korea on 31 December 2002 (Kippe 2003). In this case, it appears that North Korea decided to further develop its nuclear programme based on a new foreign policy strategy, rather than the fear of United States military presence.

On 10 January 2003 North Korea withdrew from the NPT. Having already addressed concerns for its national security and the existence of the state in October 2002, the only difference this time was the regime's reference to NPT's Article X (see Appendix B.8), when stating that the United States posed a nuclear threat to the regime:

*Under the grave situation where our state's supreme interests are most seriously threatened, the DPRK Government adopts the following decisions to protect the sovereignty of the country and the nation and the right to existence and dignity: Firstly, the DPRK Government declares an automatic and immediate effectuation of its withdrawal from the NPT, on which "it unilaterally announced a moratorium as long as*

*it deemed necessary" according to the June 11, 1993, DPRK-U.S. joint statement, now that the U.S. has unilaterally abandoned its commitments to stop nuclear threat and renounce hostility towards the DPRK in line with the same statement. [...] Though we pull out of the NPT, we have no intention to produce nuclear weapons and our nuclear activities at this stage will be confined only to peaceful purposes such as the production of electricity (KCNA 10 January 2003).*

As the first member state to ever do so, North Korea withdrew from the NPT in a highly controversial manner, ignoring the 90 days' notice. According to Pyongyang, the first 89 days were already accounted for in 1993, thus North Korea could now withdraw with only one day's notice. Although controversial, this tactic allowed the regime to withdraw from an agreement they clearly deemed unfavourable for themselves, before anybody could prevent it. The fact that the regime in October 2002 claimed the right to possess nuclear weapons, and then months later removed the only legally binding agreement hindering this acquirement, paints a grim picture of the path North Korea was heading down. And so, claiming no intention to produce nuclear weapons, when at the same time admitting a genuine fear of the state's security, while having a nuclear programme with possible military dimensions, is at best contradictory. Yet another argument used by the North Koreans to justify their withdrawal was that the IAEA was too strongly influenced by the United States and thereby not acting objectively, according to the following statement:

*IAEA still remains a servant and a spokesman for the U.S. and the NPT is being used as a tool for implementing the U.S. hostile policy towards the DPRK aimed to disarm it and destroy its system by force (KCNA 10 January 2003).*

The statement shows that the regime had no faith in neutral international organisations like the United Nations and the IAEA, which is normal for states that have a realistic world-view. The scepticism and trust issue is an element in realism, where an actor can only trust and rely on itself. It is also worth noticing that North Korea, ever since it reluctantly signed the NPT in 1985, has never cooperated completely with the IAEA. Further, North Korea's will to cooperate in multilateral forums like the Six-Party talks, where the incentives have been quite immediate and concrete, contra the NPT, United Nations Security Council and the IAEA shows that North Korea is governed more by



self-interest than respect for international agreements, which are both elements recognized from realism.

The United States' accusations towards North Korea seemed to have marked a crossroad in Pyongyang's policy, and by December 2002 the regimes' patience with peaceful cooperation was definitely over. Factors like the failing of the Agreed Framework and the Bush administration's approach caused North Korea to change its foreign policy, and thereby also its nuclear programme. Additionally the distrust in international cooperation also contributed to the change. North Korea saw that fellow members of the Axis of Evil like Iraq, Iran and also Libya, all in compliance with the NPT, were facing massive pressure from the United States. *Summa summarum*: the cost of leaving both the Agreed Framework and the NPT was tolerable, clearly thinking in realist terms of costs and benefits.

#### 5.1.2.2 What Caused North Korea to Develop Nuclear Weapons?

During the early months of 2003, the bilateral relationship between North Korea and the United States was ice cold, and the Bush administration persuaded China to calm down North Korea while the United States prepared the invasion of Iraq. China briefly curtailed oil shipments to Pyongyang in the beginning, but soon deliveries were resumed, and then increased (Pollack 2011, p.132). China also had a strong incentive to involve itself in the shuttle diplomacy between Washington and Pyongyang, as China feared that an escalation of the conflict could bring the United States to their "doorstep" (Pollack 2001, p.144). On 12 April 2003, a North Korean official announced that Pyongyang was willing to consider any form of dialogue with the United States regarding their alleged nuclear weapons programme. There are different possibilities for why the regime would initiate such dialogue at this time: Firstly, it is likely that North Korea found itself in a hopeless and isolated situation –much like the situation Libya found itself in in early 2000–, and were seemingly willing to adjust its foreign policy. If this was the case, then the will to cooperate can be explained through liberalism, as openness and dialogue could bring North Korea out of isolation. However, the practice of cooperating when Washington D.C. cooperates and retaliating when Washington D.C. reneges undermines liberalism, and strengthens realism as a possible explanation (Lodgaard 2011, p.152). Secondly, the fear of being "next on the list" after Iraq could have caused North Korea to initiate talks in order to cool down the situation, and thereby improve its security. This is also a

situation quite similar to Libya's, as will be addressed in section 5.1.3.2. Given the period this initiative was presented indicates that the driving force behind the dialogue initiative was the Iraq invasion, rather than a change in foreign policy, fear of sanctions or acting in terms of liberalism in general. Although speculative, another explanation could be that North Korea initiated the negotiations as a strategy to buy time for the development of its nuclear weapons programme (a strategy Iran also has been suspected of following). If this was the North Korean strategy indeed, the fact that North Korea possessed significantly greater conventional forces than Iraq, and was located in the interest sphere of both Russia and China could have helped outweigh the fear of an American action (Kippe 2003).

The North Korean incentive for dialogue was met on 23 April 2003 when talks were held in Beijing between the United States, North Korea and China, but no agreement was made. In August 2003 another dialogue forum was introduced: the Six-Party talks, (as mentioned in Section 1.2). However, divergence between the United States and North Korea was evident from the outset, and no agreement was made this time either (Lodgaard 2011, p.158). In February 2005 North Korea declared its withdrawal from the Six-Party talks, after the United States had applied financial sanctions over the North Korean currency (Art 2009). The withdrawal was followed up by a claim that North Korea had manufactured nuclear weapons for "self-defence" (Pollack 2011, p.145). This indicates that North Korean policy was not affected by the threat and/or use of sanctions, but rather that the state used its nuclear weapons programme as a tool for achieving incentives; every time negotiations failed, North Korea would take its programme one step further.

On 4-5 July 2006 North Korea test-fired seven ballistic<sup>20</sup> missiles, and thereby violated a self-imposed missile test moratorium tracing back to 1999. The United Nations Security Council reacted by adopting Resolution 1695 which criticized North Korea's behaviour; called for multinational sanctions; and for North Korea to return to the Six-Party talks and the moratorium. From a North Korean point of view this was discrimination, as states like Iran and South Korea could test long-range missiles without interference from the UNSC. And so, the counter reaction came three months later on 9 October 2006, when

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<sup>20</sup> <http://www.armscontrol.org/factsheets/missiles>

North Korea conducted its first nuclear test. This pattern suggests that North Korea sought to improve bilateral relations with the United States two times after the invasion of Iraq. Both times negotiations failed because the North Koreans would not agree on the terms, and this clarifies three important points: Firstly, each time negotiations had failed, North Korea had sharpened its rhetoric and taken further steps (statements, missiles, nuclear test) towards the development of nuclear weapons. This could be seen as a warning signal to the United States that Washington D.C. needed to provide a better offer. Secondly, the regime viewed the nuclear weapons programme as too valuable a bargaining chip to consider giving it up. And thirdly, the invasion of Iraq had not scared the regime to such a level that they were willing to blindly accept all demands posed by the United States. Seemingly, the regime was following a dual strategy where the goal was to negotiate its way out of isolation, while at the same time secretly developing nuclear weapons as a bargaining chip to assure the initiative whenever it felt like. This is a move quite similar to the one Libya tried to make in 2003 (see Section 5.1.3.3) except that North Korea's nuclear weapons programme was far more successful, thus improving the strategy.

All in all, the factors above suggest that North Korea's decision to develop nuclear weapons was due to the collapse of the Agreed Framework, failed attempts to negotiate with the new administration in Washington D.C., and the general fear for state security. Another interesting fact is that North Korea allegedly sold uranium hexafluoride (see Appendix A) to Libya in 2001. At this time North Korea was denying the existence of an enrichment programme, but that does not rhyme with its ability to produce and export. If this is correct, it serves as another factor undermining the Iraq war's effect on the North Korean decision to develop nuclear weapons. And so, viewed alone the 2003 invasion of Iraq does not seem to have had a direct effect on the decision to develop nuclear weapons, but the war is indirectly connected to the fear for security, as North Korea witnessed what the United States could do to a state in the same situation. Further it is worth noticing that the disclosure of the A.Q. Khan network in the fall of 2003 does not seem to have affected the North Korean decision as it did with Libya (see Section 5.1.3.2), and perhaps Iran, as mentioned in Section 5.1.1.1, because the plutonium programme was continued without any interruptions, until 2005.

But if North Korea had nuclear weapons ambitions already from its nuclear programme started in the 1960s, how come the reprocessing of plutonium stopped in 1991 and was not resumed until 2003? Or that it stopped in 2007 and was restarted in 2009? – To answer these questions it is worth noticing that there are indications that nuclear power ambitions have been present since the beginning. This includes the development regarding enrichment, given the desire to provide a new research reactor called Experimental Light Water Reactor (ELWR) in Yongbyon, for nuclear power fuel. Maybe some of the decisions regarding nuclear weapons, especially the Agreed Framework, have been partially motivated by the belief in a more efficient establishment of nuclear power; in this case the two light water reactors. Finally it is likely that international dynamics have dictated the weight ratio between nuclear power and nuclear weapons ambitions.

#### 5.1.2.3 What Does North Korea Want With its Nuclear Weapons?

North Korea has a complex agenda for its nuclear weapons, where the following can be described as the core motives: to deter attack; to build bargaining leverage; to inflate crises in order to raise the compensation for defusing them; and to obtain hard currency and material favours by exporting nuclear and missile technology (Lodgaard 2011, p.156).

North Korea's first nuclear test in 2006 might be due to two of the motives above: A demonstration to possible aggressors (the United States) that the regime was now in possession of a deterrent; and the creation of a crisis which the regime could use to raise the compensation for defusing, which was what it did when it accepted an agreement<sup>21</sup> through the Six-Party talks in February 2007. One central condition in this agreement was the disablement<sup>22</sup> of the plutonium-related facilities at the Yongbyon site. While this agreement could seem like a liberalist step towards improving international relations, the regime probably agreed to disable because it already had produced enough weapons grade plutonium to make a small arsenal of nuclear weapons. Also, the potential cost of halting the plutonium production was thus outweighed by the newly verified deterrence,

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<sup>21</sup> The agreement was essentially the same as in 2005.

<sup>22</sup> The important difference between *disablement* and *dismantlement* is that a disablement means that the facilities were put out of service in such a manner that it would take time to make them operational again, making sure that North Korea would not produce any more plutonium while the talks lasted, while dismantlement means destruction, as in irreversible.

clearly giving the decision a realist undertone. The test could also have been used to turn the United States focus from the Middle East (especially Iraq and Iran) towards the Korean peninsula. In other words, North Korea's new weapon was of such a character that it could force the rest of the world to give the regime the wanted attention, enabling North Korea to improve international relations in general (breaking out of its isolation), and its bilateral relationship towards the United States in special (a security guarantee).

By the fall of 2008 North Korea's Foreign Ministry issued a statement, denying that they had allowed inspectors to carry out samplings at their nuclear facilities, stating that inspections are limited to field visits, confirmation of documents, and interviews with technicians. When the Six-Party talks failed to solve the verification issue, the United States halted the heavy fuel oil shipments bound for North Korea. On 5 April 2009 North Korea again violated its ballistic missile moratorium, when the three-stage<sup>23</sup> space launch vehicle *Unha-2* was launched. Claiming that the purpose of the missile was of civilian character (putting a satellite into orbit), the launch was still in violation of the moratorium because the *Unha-2* and *Unha-3* are carrier rockets utilizing the same technology as in a *Taepo-dong-2* ballistic missile. The launch indirectly led to condemnation from the United Nations Security Council, because the launch was a violation of resolutions 1695 and 1718. Further, this led to the final "nail in the coffin" for the Six-Party talks, when North Korea withdrew from the diplomatic efforts.

In terms of politics, North Korea's missile and nuclear tests serve different motives. They inflate crises that North Korea can solve, if offered better conditions. But on the other hand, if the nuclear devices are to serve as a real deterrent (a weapon in realist terms), it is important that the missiles and the devices are developed in such a way that the missile can deliver the nuclear device. The missile launches also provide the regime with hard currency and material favours when the technology is exported to states like Iran, Myanmar and Pakistan. So does the export of nuclear technology to Libya also (Høibråten et.al. 2013, p.48-54).

Since the first nuclear test in 2006, North Korea has tested on 25 May 2009 and on 12 February 2013, and the dates are never chosen randomly: The test in 2006 was on

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<sup>23</sup> A missile with three stages, each with separate engine and propellant.

“Columbus Day”, the day Christopher Columbus reached America; the test in 2009 came on “Memorial Day”, when the Americans remember their fallen; and the one in 2013 came hours before President Barack Obama was due to hold his State of the Union Address. Clearly the addressee is the United States, because it poses as the greatest threat to North Korean security. By using the missile and nuclear programme as a leverage, the United States must reluctantly go along with negotiations. During the George W. Bush presidency the United States viewed bilateral talks as a way of rewarding the regime, and refused to expose itself to “nuclear blackmail” by offering economic or political benefits for North Korea to end its nuclear programme. This was one of the reasons why the Agreed Framework failed during the Bush administration. The United States did not want to reward North Korea for its behaviour, but saw that without negotiations the problem grew. For North Korea the situation is challenging: Initially the regime wants to get out of the isolation and gain economic assistance just like Libya wanted, but at the same time North Korea also wants a security guarantee through diplomatic solutions, as security is one of the primary objectives for a state according to realism. But as long as negotiations fail, North Korea seeks security through nuclear deterrence. And yet the deterrence serves another purpose; nuclear weapons can enable the regime to reduce the costly conventional forces so that more money can be spent on the civilian sector. Therefore the North Korean leadership seems to have an ambivalent relationship to their nuclear weapons, as they clearly function as excellent deterrence and bargaining chips, but at the same time keep the country isolated. The 2009 withdrawal from the Six-Party talks, where North Korea announced it would never go back, may have had the Agreed Framework in mind, as North Korea prefer bilateral talks with the United States, instead of multilateral talks where other issues like Japan’s demand for economic compensation and return of kidnapped nationals disrupt the process. Additionally the Agreed Framework offered much higher economic gains than the Six-Party talks ever offered (Lodgaard 2011, p.160). This suggests that the North Korean behaviour regarding its nuclear weapons programme is not driven by the same amount of fear of an invasion as it was ten years ago, but rather driven by a foreign policy strategy of using the programme as leverage for improving conditions.

#### 5.1.3 Analysis of Libya’s Programme

The case of Libya marks a distinction from the cases of Iran and North Korea, as Libya was the only state to do a nuclear reversal after the 2003 invasion of Iraq. But even

though all three states must have felt pressured, Libya's behaviour cannot be solely explained as motivated by the invasion. 19 December 2003 marks the end of the Libyan nuclear weapons programme, but the question still remains: How much did the 2003 invasion of Iraq affect the Libyan nuclear weapons programme? This analysis argues that the *Iraq invasion* itself had a smaller effect on the programme, and that Libya's rollback was affected more by *sanctions* and *nuclear technology and activities*.

#### 5.1.3.1 What Caused Libya's Nuclear Programme to Fail?

First of all there was an ambivalence towards the pursuit of nuclear weapons nationally after al-Qadhafi's pan-Arabic vision crumbled as Israel started peace talks with the Palestinians in the 1990s (Shamir 2013). This situation left the programme without political direction. Further, Libya lacked necessary infrastructure as well as indigenous expertise in key areas of science and technology. This lack of human resources distinguishes Libya's nuclear programme from Iran's, and its oil wealth distinguishes it from North Korea's. The combination of money and lack of resources led to attempts to simply buy nuclear weapons "off the shelf", but this failed because no country was willing to provide Libya with the finished product or key facilities (Braut-Hegghammer 2008). Admittedly the connection with the A.Q. Khan network during the mid-1990s could have played a pivotal role for the development of the programme as the network was supplying technology related to centrifuge enrichment as well as instruction manuals on weapons design (Bowen 2008, p.337). Nevertheless, the A.Q. Khan network did not turn out to be a reliable partner; it only provided 1.5 of the 20 metric tons of uranium hexafluoride (UF<sub>6</sub>) (see Appendix A) Libya had requested; the centrifuges ordered were not in an operable condition; and important information regarding weapons design lacked (Bowen 2008, p. 342). It is therefore possible to argue that the lack of sufficient nuclear technology, combined with an unreliable partner and a poorly planned and managed programme would eventually lead Libya to a crossroads by 2003 when a decision had to be made; was the regime aiming to intensify the effort of manufacturing a nuclear weapon, or to end an increasingly expensive project? (Braut-Hegghammer 2008).

#### 5.1.3.2 What Made Libya Willing to Negotiate the Nuclear Weapons Programme?

Another central factor to the Libyan rollback was the regime's realisation that the sanctions, which effectively isolated Libya from the rest of the world, caused an increasing public dissatisfaction. The sanctions weakened the regime politically,

strategically and economically, which eventually forced the regime to abandon its nuclear weapons programme in return for re-engagement with the outside world (Braut-Hegghammer 2008). Attempts to approach the United States were taken already during President Bill Clinton's first term (1993-1997) through various Arab interlocutors, but this failed (Art 2009). An important first step first came when then assistant secretary of State Martin Indyk, met Libyan representatives in May 1999 in Geneva. According to Indyk the Libyan representatives officially conveyed the offer to surrender Libya's WMD, but the Clinton administration was more concerned about settling the Lockerbie issue, as mentioned in Section 2.4.3, and stopping Libya's support of terrorism, than it was about Libya's weapons of mass destruction. This was because the chemical and biological weapons programmes were not deemed an imminent threat, and the nuclear programme had barely begun (Indyk 2004). Between May 1999 and early 2000 there were five secret meetings between officials from Libya, the United States and the United Kingdom regarding the Lockerbie bombing. These trilateral negotiations created a framework and a golden opportunity for Libya to resolve its several decades' long conflict with the United States, which constituted the root cause of the regime's security concerns (Braut-Hegghammer 2009). Given the fact that the Libyan negotiations appears to be driven by the work of sanctions, as well as the military threat posed by the United States, Libya negotiated because it had no better option, and in that case realism offers the best explanation.

When it comes to the United States' actions after 11 September 2001, it is stressed by several authors (Shamir 2013; Braut-Hegghammer 2008; Bowen 2008) as vital to the rollback, because the actual and potential costs of nuclear weapons pursuit mounted for states that were not on good terms with the United States. This is partially true. Just months after the events of 11 September 2001 occurred, Libyan diplomats were suddenly eager to conduct talks with the United States. The regime may have seen a chance to rebrand itself, by sharing intelligence information with the United States and thereby potentially improve bilateral relations, but the move was not solely opportunistic, as radical Islamitic terrorism was threatening the regime from the inside (Rieker & Braut-Hegghammer 2012, p.45). Meanwhile, Libya did not abort its nuclear programme; instead cascades of 9, 19 and 64 centrifuges installed in the Al Hashan facility were moved to the Al Fallah facility for security reasons in the spring of 2002 (Bowen 2008, p.341). Given the small cascade sizes, this facility was better suited for a clandestine



nuclear weapons programme, and pointless for commercial production of electricity which typically would require at least tens of thousands of centrifuges to make a difference. The fact that Libya was continuing the nuclear weapons programme undermines the relevance of the war on terror, the fear of sanctions and the lack of sufficient technical expertise, at this point, and indicates that variables occurring later had more decisive effects on the outcome.

But in the same period intelligence services in the United States and the United Kingdom had started to intercept the link between the A.Q. Khan network and Libya, and met Libya's proposal with the following demands: Sanctions would not be removed until Libya aborted all WMD programmes and the United Nations sanctions, that were removed after Libya handed over the two suspects of the Lockerbie bombing, as mentioned in Section 2.4.3, could be re-imposed (Braut-Hegghammer 2008). To emphasize this demand, on 2 August 2002 former President George W. Bush extended the Iran and Libya Sanctions Act<sup>24</sup> of 1996 for an additional five years after it expired in 2001. The extension of the act lowered the \$40 million investment threshold for possible imposition of sanctions to \$20 million. As the War on Terror unfolded and Libya was placed in the company of rogue states such as Iraq, North Korea, Iran, Syria and Cuba, it appears that the work of sanctions and the threat of war started to affect the Libyan decision making. The fact that Libya now stepped up the effort to negotiate, may be due to threats to national security.

Having first played a vital role in the Lockerbie negotiations, the United Kingdom was also a key factor in the trilateral nuclear weapons negotiations that followed in the spring of 2003. Amongst the Libyan negotiators that met with British intelligence in March 2003 trying to re-establish Libya's international relations was also al-Qadhafi's son Saef al-Islam, who was assumed to have a moderating influence on al-Qadhafi (Bowen 2008, p.346). Although the decision on the nuclear weapons issue would probably have been inevitable, as it was an American requirement, the timing of the Libyan initiative is interesting. It suggests that the invasion of Iraq was a final nail in the Libyan nuclear weapons coffin, but also that it was not the sole or most salient reason for the outcome.

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<sup>24</sup> In 1996 The Iran and Libya Sanctions Act (ILSA) was a United States Congressional act that imposed economic sanctions on firms doing business with Iran and Libya, for five years at a time: 1996-2001-2006 (Shamir 2013).

Instead, it appears that the work of sanctions might have contributed the most. In the beginning of 2003, the unemployment level was at 30 % due to decades of internal mismanagement and sanctions affecting especially the highly dependable oil industry. Albeit United Nations and some European sanctions were lifted after the Lockerbie resolution, the increasingly influential Saef al-Islam and other reform friendly technocrats made al-Qadhafi realize that American investments were needed to help revitalize and modernize the oil industry, in order to reach target levels. The fact that Libya's oil production was halved from the 1970 level, that it accounted for 95 % of exports and 70-80 % of government revenues tell what an "Achilles heel" the oil industry was for the al-Qadhafi regime (Shamir 2013).

#### 5.1.3.3 What Caused Libya to Conduct a Nuclear Rollback?

The trilateral negotiations in late 2003 ultimately became a success because it involved the same small number of individuals in all talks from 1999 to 2003, rather than large bureaucracies and international organizations. These negotiators were therefore able to separate the people from the problem, building trust through diplomacy and personal relationships. Under these circumstances the negotiators were able to identify interests, to which they presented mutually acceptable criteria, creating a win-win solution rather than a one-way street (Rieker & Braut-Hegghammer 2012, p.47). A factor of particular importance for al-Qadhafi and his inner circle was the realization that Washington did not pursue regime change, thus providing a face-saving way out of the nuclear weapons project. Trust and diplomacy are elements from Liberalism, where dialogue is assumed to improve international relations, which means that the regime was not only motivated by terms of realism.

According to Shamir (2013), Bowen (2008, p.352) and Braut-Hegghammer (2009), the combination of sticks and carrots was essential to the success of the trilateral negotiations. Although this may be correct, it is important to notice that the turnaround came when the peak of the sanctions had already passed, in a period of systemic continuity (Lodgaard 2011, p.125). The *BBC China* incident in October 2003, as mentioned in Footnote 8, undermines both the importance of the invasion of Iraq and the sanctions, as it happened during negotiations months later. It is therefore likely that Libya by October 2003, was either still pursuing nuclear weapons, or at least ensuring a strong bargaining hand. The fact that Libya managed to develop a uranium conversion facility,

successfully test its centrifuges and acquire ballistic missiles from North Korea before the disarmament, could potentially back both theories. However, the seizure of *BBC China*, seems to have drawn the line for both a real nuclear weapons option and a strong bargaining hand. Firstly, it demonstrated for the al-Qadhafi regime that American and European intelligence had detailed knowledge about Libya's nuclear procurement activities (Bowen 2008, p.347). Secondly, during the search through the cargo of the *BBC China* it appears that investigators overlooked and failed to remove one crate of centrifuge parts before the ship was allowed to sail on to Libya. Whether this was to test Libya's honesty or simply a mistake made by the inspectors, it worked. The fact that Libya instantly alerted the United States and the United Kingdom about the forgotten centrifuges (Breivik & Toft 2007), and also invited inspectors over to visit the sites associated with its WMD programmes shows that Libya was fully committed to comply. Apparently the disclosure of Libya's undeclared activity was an important variable, and it seems to have been much more influential than the invasion of Iraq.

The quick reversal on 19 December 2003 (six days after the capture of Saddam Hussain) can be explained through the structure of the Libyan regime. Contrary to Saddam Hussain's decision to increase the collaboration with the United Nations inspectors in late 2002, al-Qadhafi's decision to abandon the nuclear weapons project was effective within days, due to the nature of his leadership (Rieker & Braut-Hegghammer 2012, p.46). Additionally, the general consensus amongst Libyan officials was that the possession of nuclear weapons would generate insecurity instead of security and thus no longer being in the interest of the regime. It is therefore likely that a change in national strategy in order to increase security, was also an affecting variable (Bowen 2008, p.347).

Libya's rollback is noteworthy because it did not follow from a regime change or a large-scale domestic political transition. The pursuit of what had initially been an affordable luxury seemed less appealing, and the regime felt compelled to abort its nuclear weapons programme, as it was facing a two-level crisis: The nuclear weapons project clearly affected the regime's internal standing as its expenses combined with the sanctions were affecting development in all other sectors; but it was also leading towards the possible external threat of an intervention which could topple the regime. According to realism, the security of the state and the regime is vital. Thus, Libya shifted from power to economic growth and welfare, as a strategy to keep the regime in power (Braut-

Hegghammer 2009). Like de Klerk's South Africa, al-Qadhafi exchanged the nuclear weapons programme with normalized relations with the United States and the international community – quite similar to what North Korea says it would be willing to do, on and off, without any change of government. Ironically, the nuclear weapons project held the key to the regime's security and survival.

So what effect did the United States' invasion of Iraq have on Libya's nuclear weapons programme? One view is that the invasion of Iraq concentrated al-Qadhafi's mind. Another view points towards the implicit assurances which the Bush administration gave to al-Qadhafi, that behavioural change would ensure regime survival, and that this eventually persuaded al-Qadhafi to close the nuclear weapons programme. The truth is probably a combination of these two views.

The motivation for rollback is best explained through realism, as the regime's security and survival from internal and external threats was important. Having failed to gain security through alliance in both the Arabic and the African communities, Libya sought a stronger platform by embarking on a nuclear weapons programme. When the programme did not pay off, it was dropped in exchange for reassured acceptance by the United States and the European states. It is also possible to argue that Libya's attempt to participate and improve relations with the outside world could be explained through liberalism, but if the regime felt compelled for security reasons to do so, it would undermine the liberalistic motive. Social constructivism cannot provide an explanation for the reversal, but in the aftermath, the reversal gave the regime a moral high ground, which is important in social constructivism. This was exemplified by al-Qadhafi's 2004 call upon all states to abandon their WMD programmes, stating that nuclear weapons made states less secure (Arms Control Association 2013a). However, Libya was advocating non-proliferation after being caught pants down, and conducted a reversal partially out of fear of the consequences, which undermines the social constructivist argument, and enforces the realist argument.

## **5.2 Comparative Analysis**

Having first analysed each case by itself, this part of the analysis will compare all three cases in order to identify the similarities and differences. This part of the analysis aims at investigating what effect the invasion of Iraq could have had on all three cases.

### 5.2.1 Before the Invasion of Iraq

Prior to the 2003 invasion of Iraq, all three states had a history of nuclear weapons ambitions, with North Korea going back to the late 1950s, Libya to the early 1970s and Iran to the mid-1970s. All three states' ambitions for having a nuclear weapons programme appears to be reasoned with either deterrence, which is an element in defensive realism, or prestige and status, which are elements in social constructivism. But at the same time Iran and North Korea (to a lesser extent) also wanted to be self-supplied with nuclear power, and sought to develop facilities related to the production of nuclear energy. Libya on the other hand, had ambitions about a leading role in the Arab world, and viewed nuclear weapons as a short cut to this role. Unlike Iran and North Korea, Libya appears to have had no interest in nuclear energy.

When the Bush administration entered office in 2001, all three states already had a frayed relationship with the United States because of their nuclear programmes, which all were suspected of having possible military dimensions. However, the way the different nuclear programmes were effected, changed from here on out. The 11 September 2001 attacks, and the following War on Terror appears to have given Libya further incentive to re-evaluate its nuclear programme, because of the increased costs of its nuclear weapons pursuit, thereby linking the effect of the War on Terror to realism. At the same time it is likely that North Korea felt the need to develop its nuclear weapons programme further, in order to retrieve the attention it had recently lost to the Middle East, because of the Bush administration's focus on Saddam Hussein's alleged WMD in Iraq. Iran and its nuclear programme appears to have been the one least affected in this particular period.

In 2002 and 2003, the three members of the Axis of Evil witnessed how Iraq, a fellow member, went from being accused of having a nuclear weapons programme, to being invaded by the United States' lead coalition months later. Viewed from the side line, the mounting pressure on Iraq appears to have affected the other states' security concerns, which were closely linked to their nuclear programmes. North Korea's decision to withdraw from the NPT appears to have been affected by the pressure building up, and Pyongyang seemingly saw the need for a nuclear deterrent as imminent. Iran, on the other hand, invited IAEA to conduct inspections, most likely to take some of the edge off its nuclear programme. Both the sudden need for a deterrent and the somewhat reluctant

cooperation could be linked to realism, as ways of ensuring national security. Contrary to the two others, Libya was already negotiating its nuclear programme secretly with the United States and the United Kingdom, a process that was more likely driven by a combination of fear, related to realism, and optimism, related to liberalism.

#### 5.2.2 Possible Short Term Effects of the Invasion of Iraq

One of the first effects of the 2003 invasion of Iraq was that eventually all three regimes wanted bilateral talks with the United States, regarding their nuclear programmes. However, the will to negotiate seemed motivated by different factors. Sanctions appear to have had an effect on Iran and Libya. In the case of Libya, the will to negotiate is likely to stem from the work of sanctions, while in the case of Iran, the fear of having sanctions imposed might have affected the Iranians to initiate negotiations regarding their nuclear programme. North Korea on the other hand is less likely to have been affected by the threat or work of sanctions.

Instead, North Korea appears to have been significantly more affected by the invasion of Iraq. One theory in support of this is that North Korea withdrew from the NPT in January because it did not believe that the United States would attack Iraq, and when it witnessed that the United States actually did attack, it changed policy regarding its nuclear programme. Either way, realism appears to have the best theoretical explanation, as fear once again was the rationale behind North Korea's choice. When it comes to Iran, it is likely that the Iraq invasion had a significant effect on its will to negotiate. But it was not just the fear of being invaded. The American regional military presence, the membership in the Axis of Evil, and the fear of forced regime change were all part of this effective variable. Libya also appears to have been affected by this variable, but to a lesser degree than Iran. It is possible that this was due to its geographical location, where Libya did not face any American regional presence.

It is also worth noticing a difference in the attempts to negotiate right after the invasion of Iraq: While Libya and North Korea was allowed a dialogue in the spring of 2003, Iran was refused. Why? A possible explanation could be that American intelligence organisations knew enough about Iran's progress regarding possible military dimensions to deem it less urgent than North Korea, or that it was due to the lack of diplomatic ties since 1979. Libya on the other hand, was invited to the negotiating table because

negotiations had been on-going since the late 1990s, and the Libyans seemed closer to conduct a nuclear turnaround. In other words, it was worth negotiating.

Further, all three programmes appear to have been used as bargaining chips to different levels. While Libya was about to cancel their programme, an important reason for giving it up was the chance for increased security and regime survival, a concern possibly influenced by the Iraq invasion. As mentioned earlier, it is possible that North Korea withdrew from the NPT in order to develop its nuclear programme further, so it could be used as a bargaining chip. While the rationale behind Libya's and North Korea's behaviour is best explained through realism, Iran's reasons for negotiating its nuclear programme could also be explained through social constructivism. Iran was, as mentioned earlier, affected by the invasion of Iraq, but it was also driven by a foreign policy goal, where a peaceful nuclear programme could provide Iran with pride and status. This goal appears to have been strong enough to leave the subject of enrichment out of the Iranian proposal, while the dual-use aspect functioned as Iran's bargaining chip.

Seemingly, all three states wanted to normalize the bilateral relationship with the United States (this was also a prioritized demand when Iran proposed a deal for the United States in May), but the difference was that North Korea and Libya were willing to give up their entire programmes. During the Six-Party talks in late August 2003, North Korea stated that it would dismantle its nuclear facilities and end its missile testing and export of missiles and related components, if the United States concluded on a "non-aggression treaty", completed the reactors promised under the Agreed Framework, resumed suspended fuel oil shipments, and increased food aid (Arms Control Association 2013c). In general it appears that the invasion of Iraq had affected Libya and North Korea's nuclear weapons programmes in such a way, that they were "for sale if the price was right". The difference between the three programmes was that Libya and North Korea had stated intentions or ambitions about the acquirement of nuclear weapons, and their programmes were therefore viewed accordingly. From a realist perspective, these programmes could be given up, if security was provided. The doubt about security is likely to come off the invasion of Iraq. For Iran the case was different, and one must turn to social constructivism to understand why Iran was not willing to offer the programme for an enhanced chance for security, like the two others. The Iranian programme was first

and foremost a prestige project aimed at providing the Islamic republic with nuclear energy, a right Iran referred to through the NPT. This suggests that Iran's national strategy and foreign policy goals, balanced the negative effects of the fear of sanctions, and the invasion of Iraq, thereby making it a significantly strong variable.

For Libya, the negotiations acted out differently because the Libyans had wanted to address the nuclear weapons issue since 1999, and were allowed to once the Lockerbie tangle had been solved. While the invasion of Iraq affected the Libyan outcome to some point, the disclosure of the A.Q Khan network, as mentioned in Footnote 7, through the seizure of the *BBC China* appears to have affected the outcome of the Libyan nuclear programme. This is in contrast to Iran which seemed less affected by the disclosure, and North Korea which did not appear to be affected at all. Another variable affecting the programmes differently was the access to relevant nuclear technology and expertise. It appears that Libya differs from Iran and North Korea at this specific point, because it did not have the same level of national nuclear expertise as the others.

### 5.2.3 Possible Long Term Effects of the Invasion of Iraq

One significant difference between Libya's programme and the two others is that the other programmes continued after 2003, possibly giving the different variables further and more long lasting effects on the remaining programmes.

The NIE of 2007 states that "international scrutiny and pressure" were instrumental in the decision to halt Iran's enrichment programme in 2003 (NIE 2007), indicating that the threat of war, as well as the threat of sanctions affected Iran's nuclear programme. However, the long-lasting effect of the invasion is rather unclear. Seemingly Iran and North Korea adapted differently in the aftermath of the war. Iran might have feared that the lack of cooperation regarding its enrichment activities could lead to sanctions or military action through a resolution from the UNSC or as a comprehensive counter-proliferation measure taken by the United States, whereas the war in Iraq was a continuous reminder of the latter. Either way, realism serves as the most influential rationale behind the halt, while liberalism could possibly argue that the halt was an Iranian attempt to gain support for its uranium enrichment through diplomacy.



North Korea's strategy of using threats in order to be compensated was evident from the early 1990s, but the threats usually concerned compliance with the NTP or missile moratoriums. From the fall of 2003 North Korea went further, and on 6 November 2003 the North Korean ambassador to the United Kingdom, Ri Yong Ho, told the news agency Reuters that North Korea "possessed a workable nuclear device" (Arms Control Association 2013c). It is likely that the Iraq invasion affected North Korea to "step up" the threats regarding its nuclear programme, and in the terms of defensive realism North Korea needed to show the United States that it was in fact not bluffing, by presenting evidence of deterrence. And so, on 8 January 2004 an American delegation was invited to the Yongbyon facility to witness what North Korea referred to as its "nuclear deterrent". Of especial importance was the testimony of Siegfried Hecker, a former director at the United States Los Alamos National Laboratory<sup>25</sup>. Hecker was used to confirm the realness of the North Korean threat, in order to stop any doubts that potentially could have led to a comprehensive attack by the United States. It is therefore also possible to assume that the Iraq invasion speeded up the North Korean nuclear programme after 2003, so a deterrent could be presented before North Korea came under attack. Simultaneously this transparency could also be influenced by North Korea's foreign policy strategy, in which the nuclear programme was used as leverage. Whether the decision to show the Americans the Yongbyon facility was due to the Iraq invasion or due to the strategy is hard to determine.

After 2005 it is harder to determine whether the 2003 invasion of Iraq still affected the nuclear programmes in Iran and North Korea, but North Korea's withdrawal from the Six-Party talks, and Iran's withdrawal from the Paris Agreement suggest that the effect was decreasing.

Iran's decision to start enrichment in 2005 and cancelling the implementation of the Additional Protocol in 2006 are both actions that confirm the line shift represented by Ahmadinejad. A possible interpretation is that until 2005, Iran's nuclear program seemed affected more by realism through the fear of being next on the list after Iraq and the fear of sanctions, but after 2005 the program seemed to be affected more by a social constructivist policy, where Iranian foreign policy was more focused on prestige and

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<sup>25</sup> Los Alamos National Laboratory is one of two laboratories in the United States where classified work towards the design of nuclear weapons is undertaken.

status through the nuclear programme. Together with North Korea's decision to conduct its first nuclear test on 9 October 2006, these are actions that occurred after a long series of events, in which the Iraq invasion is just one of many. It is therefore impossible to determine for certain if the invasion of Iraq affected these turnouts, but it is reasonable to assume that both Iran and North Korea acted with the war in Iraq as a reminder.

#### 5.2.4 Sanctions and Foreign Policy Affecting the Nuclear Programmes

Although the fear of being next on the list has decreased, thereby not affecting the nuclear programmes in Iran and North Korea, other factors might continue to affect the nuclear programmes. For instance, the threat and work of sanctions have had an indirect effect on the nuclear programme, by affecting Iranian politics. Like the line shift from Khatami to Ahmadinejad in 2005, the Supreme Leader Khamenei let the more liberal Hassan Rouhani become president in the 2013 election. If the line change is due to the effect of economic sanctions, it means that Supreme Leader Khamenei faces domestic pressure, and the only way to solve it is through a new international approach. Since his inauguration as president in August 2013, Rouhani has stated that Iran is willing to participate in new talks regarding their nuclear programme, but by October 2013 an agreement is yet to be concluded. In the case of North Korea, sanctions have been imposed after missile testing in July 2006 and April 2009, and North Korea answered the sanctions by conducting a nuclear test on 12 February 2013. This "choreography" has repeated itself from 2006 to 2009 and 2013 (Lodgaard 2013). This could indicate that North Korea is not affected by sanctions in the same way as Iran is. When it comes to national strategy and foreign policy, both Iran's and North Korea's nuclear programmes appears to have been increasingly affected by this variable in the years after the invasion of Iraq. In the case of Iran, the nuclear programme appears be important for prestige and status, thereby connecting it to social constructivism. In the case of North Korea, the programme serves more as a strategic tool the regime can use to gain incentives, and is therefore best explained through realism, where states always act according to their own interests. Nuclear technology appears to have a lesser effect on both remaining nuclear programmes, as they appear no longer to be in need of assistance, such as the Khan network. It is also uncertain whether the disclosure of nuclear activities has a strong effect on any of the programmes today.

### 5.2.5 Other Variables Potentially Affecting the Nuclear Programmes

In the case of Iran, other measures has been tried in order to hinder its nuclear programme: assassinations of nuclear scientists as well as cyber weapons<sup>26</sup> have been used, by unidentified actors, to cripple the nuclear programme (Lodgaard 2012), but according to Høibråten et.al. (2013) there is little evidence that this has had any significant effect on the technological process on the ground. Although a bit more speculative, a final factor that could have had an effect on Iran's and North Korea's nuclear programmes is the attack on Libya in 2011, which is connected to American influence and fear of the United States military. Libya was attacked after willingly giving up their nuclear programme, something that hardly went unnoticed in Pyongyang or Tehran. While Tehran was more balanced in its critique of the military action against Libya, Pyongyang clearly viewed it differently:

*the U.S sparked a fresh war disaster in order to bring about regime change [...] It was fully exposed to the world that "Libya's nuclear dismantlement" much touted by the U.S in the past turned out to be a mode of aggression whereby the latter coaxed the former with such sweet words as "guarantee of security" and "improvement of relations" to disarm itself and then swallowed it up by force [...] It proved once again the truth of history that peace can be preserved only when one builds up one's own strength as long as high-handed and arbitrary practices go on in the world (KCNA 22 March 2011).*

Once again a member of the Axis of Evil was attacked by an American led intervention, and once again the result was regime change. For Iran and North Korea the lesson is that two out of four states suspected of having nuclear weapons programmes, have been attacked, and that none of them had any nuclear deterrence to use. To Pyongyang this fact is likely to increase the value of their nuclear weapons, and to Tehran this fact must be alarming; both these effects have a clear link to realism. However, it is hard to determine whether the attack on Libya had any actual effect on the nuclear programmes.

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<sup>26</sup> [http://www.nytimes.com/2012/06/01/world/middleeast/obama-ordered-wave-of-cyberattacks-against-iran.html?\\_r=0](http://www.nytimes.com/2012/06/01/world/middleeast/obama-ordered-wave-of-cyberattacks-against-iran.html?_r=0)

#### 5.2.6 Reflections

Iran seems determined to preserve for itself the option of acquiring a nuclear-weapons capability at some future date. Often described as a nuclear latency state<sup>27</sup>, Iran probably wants to shorten the time it would take to build these weapons. Until Iran has all necessary infrastructure and the needed fissile material at its disposal the membership in the NPT gives its nuclear programme the necessary “shelter” from the international non-proliferation pressure. In other words, the rights given by Article IV pushes Iran to the limit of what is accepted regarding Article II, making the road to nuclear weapons shorter. This is an inherent destabilising quality of the NPT as a result of the rather unspecific Articles I, II and IV (see Appendix A) (Høibråten et.al. 2013). Iran’s move towards this latency could be due to the persisting fear of American military presence, and in that case, realism would offer the best explanation. But, Iran could also pursue nuclear weapons as part of its national strategy and its foreign policy, and this would best be described as acting according to social constructivist theory. Iran finds itself in a state of disequilibrium, where nuclear weapons could provide regional prestige and power. The strategy Iran follows has similarities to the one North Korea followed prior to its nuclear breakout. But now that North Korea already possesses a nuclear deterrent, much of the tension regarding its programme is related to North Korea’s next move. Where Iran might be described as having a nuclear energy programme with a weapons option, North Korea could be described as having a nuclear weapons programme, with an energy option. North Korea first tried to obtain light water reactors from the Soviet Union, then through the Agreed Framework, and now they are trying to build light water reactors by themselves. By doing so, North Korea will soon find itself on the same ground as Iran; having an enrichment programme with a dual use aspect. What separates North Korea from Iran is that North Korea already has a workable nuclear device, which serves as a deterrent (Lodgaard 2013). But even if North Korea’s main interest is nuclear power, there is reason to worry. International experts believe that the nuclear tests in 2006, 2009 and 2013 were plutonium bombs. North Korea abandoned its plutonium production in 2006, and it is not known whether the uranium enrichment programme is for research or military use, or even if it is running at all. But, if North Korea were to switch from plutonium to uranium as weapons material, it would enable Pyongyang to greatly expand

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<sup>27</sup> A state that has the infrastructure to produce fissile materials of weapons grade, without doing so, exemplified by Japan and Germany. Today, Iran can also be placed in this category because of its capabilities (Sagan 2010, p. 80-101).

its arsenal (Dahl 2013). In a statement from April 2013, North Korea stated that it would develop its nuclear arsenal both qualitatively and quantitatively, and that this was non-negotiable (Lodgaard 2013). As for the policy, North Korea's leader Kim Jong-un will not accept the starvation and poverty of his people. Therefore, nuclear weapons have acquired a new role in his strategic plan. His father traded the nuclear programme for food and oil, under the Agreed Framework. Kim Jong-un appears to have another plan: to use the threat of nuclear weapons to gain as many needed resources as possible. And this plan works, for now. And as long as it works, the regime will most likely be very reluctant to give up nuclear weapons, their value is too high (Petersson 2013).

### 5.3 Summary

#### 5.3.1 The Individual Nuclear Programmes

Based on the analysis above, this section will identify the most influential variables in the three cases separately.

In the case of Iran, several variables could have affected the decision to halt parts of the nuclear programme: Former President Khatami's diplomatic approach could have had an effect, but it is more likely that the Khatami acted in such manners because he feared *sanctions*. The *sanctions* variable appears to have been balanced by the temptation of technological achievements Iran could gain through the activities in Natanz and Arak, but once the facilities were disclosed, Iran might have feared it could lead to *sanctions*, thereby increasing the effect of this variable. Prior to the invasion were also variables like the *War on Terror*, and the *Axis of Evil* which arguably increased the pressure on Iran. However, the effect of these variables appears to have been weak before the invasion. Once the *Iraq invasion* was a fact, it appears to have taken some time before the variable affected the Iranian nuclear programme, as a variable like *national pride* made Iran reluctant to halt the enrichment at first. Nevertheless, the effect of the *Iraq invasion* appears to have increased when the United States refused dialogue, and Iran had to negotiate with the EU-3. And so did the fear of *sanctions*, because failure in negotiations could also lead to a referral to the UNSC by the IAEA Board of Governors, which could impose *sanctions*. Other variables that could have affected the outcome, was the removal of Iran's regional enemies, the Taliban in *Afghanistan* and Saddam Hussein in *Iraq*, but these variables were levelled out by the *American regional presence* they led to, which

only increased the effect of the Iraq invasion. Also the *Tehran Statement* appears to have had some effect on the outcome on the halt, because Iran was led to believe that the suspension of gas into the centrifuges were sufficient. A more speculative variable is the theory that Iran already had made so much progress on the non-nuclear components of the nuclear weapons that halting the programme would be of little importance but it is impossible to argue for this variable as long as Iran's nuclear programme has a dual-use aspect. The disclosure of the A.Q. Khan network did at best support the effect of the *Iraq invasion* or the *sanctions* variable, but does not appear to have contributed significantly itself.

There are also several variables that could have caused Iran to continue its nuclear programme. The failure of the *Paris Agreement* might have had an effect, and the realisation that the American regional presence was threatening Iran as *de facto regional power* could also have contributed. Still what appears to have affected the decision to continue the nuclear programme most, was the argument over *suspending enrichment*, and the election of *Mahmoud Ahmadinejad* as President in 2005. The Iranian line change appears to have undermined variables like the fear of *sanctions* and the *Iraq invasion*, with variables like *prestige*, *status* and *independence*. It is also possible that the nuclear programme was continued as a clandestine nuclear weapons programme, affected by the *Iraq invasion*.

In the case of North Korea several variables could have affected the decision to withdraw from the NPT. The new policy of the Bush administration, and the way it treated North Korea with the *Axis of Evil*, and the hardened critique of Kim Jong-il seemingly led to the collapse of the *Agreed Framework*, which appears to have had a significant effect on the North Korean decision to withdraw. Another variable that could have contributed to the outcome were the stopping of *KEDO-shipments* with oil in the fall of 2002, but this was related to the collapse of the *Agreed Framework*, and did probably not affect the outcome much by itself. However, the *American regional presence* in South Korea, where North Korea believed the United States had stationed nuclear weapons (even though the United States claimed that they withdrew nuclear weapons from South Korea in 1992), in combination with the more hostile *Bush administration* might have influenced the decision to withdraw. But perhaps a more influential variable was the *distrust in international cooperation*, as North Korea witnessed how members of the NPT became

victims of increasing pressure from the United States. There are also several variables that could have led North Korea to continue develop nuclear weapons. The *Iraq invasion* appears to have had a strong effect on the programme in the period right after the invasion, much due to the increasing pressure on the remaining member of the *Axis of Evil*. However, the effect of the *Iraq invasion* appears to have decreased within the same year as the effect increased on Iran. In 2005 North Korea withdrew from the *Six-Party talks* in February 2005, claiming that it had developed a nuclear deterrent. This could indicate that North Korea's nuclear programme, from here on, were less influenced by the Iraq invasion, more affected by the *national strategy and foreign policy* variable, as the regime understood that it could use the nuclear weapons programme a bargaining chip.

In the case of Libya, several variables could have affected the decision to terminate its nuclear weapons programme. Firstly, the lack of sufficient *national technical expertise* appears to have been an important variable. Secondly, the trade with the *A.Q. Khan* network did not provide Libya with the materials it needed, but the importance of this variable is undermined by the fact that it did not stop Libya's pursuit. However, the *disclosure* of the very same network through the *BBC China* had a strong influence on the decision to terminate the nuclear weapons programme. Further, the *Lockerbie Negotiation* was also an important variable. It was important because the negotiation made Libya realise that the United States did not want *regime change*, and because the negotiations that led to the nuclear reversal were led by the same people. Further, the work of *sanctions* had a significant effect on the nuclear turnaround, as the *sanctions* had crippled the Libyan *economy* for several decades, making the regime desperate for a solution. The Iraq invasion might have contributed, but given all the other variables, it is not given that it caused the effect.

### 5.3.2 Comparative Summary

Amongst the most effective variables was the *Iraq invasion*. It appears to have had an effect on all three programmes, but while it remained strong in the cases of Iran and North Korea, it is harder to determine its strength in the case of Libya. However, the *sanctions* variable appears to be easier to link to the Libyan decision, as the work of sanctions had a significant effect. The sanctions variable also appears to have had an effect on the Iranian decision to halt the enrichment, while it appears to have had no effect on the North Korean nuclear programme. North Korea, however, appears to have

been gradually affected by the *national strategy and foreign policy* variable, along with Iran. For Libya, this variable does not appear to have had any significant effect. When it comes to the *nuclear technology options and activities* variable, it appears to have affected the Libyan decision the most, while Iran and North Korea does not appear to have been affected significantly. Other variables like the *Axis of Evil* appear to only have affected North Korea significantly, while Libya and Iran appears to have remained unaffected. The trade with the *A.Q. Khan network* appears to have affected Libya's decision significantly, and it might have affected Iran's. North Korea appears to remain unaffected by the variable.

The international relations theories used in this research have to a different degree proven useful. In terms of liberalism, all three states have cooperated as some point, but liberalism as an explanation is undermined by the fact that the cooperation was due to fear of consequences. Although useful to show the undermining, liberalism as an international relations theory has contributed less to this research than the two other theories. As the knowledge about the internal factors in North Korea is limited, the actions taken by the regime has been explained mainly by external factors. Therefore realism has been the perfect choice in analysing North Korea's decision to withdraw from the NPT, and eventually develop nuclear weapons. As for Libya, realism also here serves as the best capable theory to explain the rollback. Finally, Iran's behaviour appears to be a hybrid of realism and social constructivism.

## **6 Conclusions**

This research has investigated the possible effects of the 2003 invasion of Iraq on the nuclear programmes in Iran, North Korea and Libya. The assumption of this research was that changes in the nuclear programmes did occur in 2003, and that the invasion of Iraq might have been the reason. The goal of this research has therefore been to clarify to what degree the 2003 invasion of Iraq affected the outcome of the changes in the nuclear programmes. This research assumed that the 2003 invasion of Iraq contributed to Iran's halt in enrichment, Libya's rollback and North Korea's withdrawal from the NPT.

After having conducted both separate and comparative analysis, the assessment of this research is the following: Iran appears to have halted its enrichment primarily because the



regime saw the risk of conducting nuclear enrichment after witnessing the *Iraq invasion*, but also because it feared that *sanctions* could be imposed, and because the *Tehran Agreement* led Iran to believe that the suspension of gas was sufficient. Further it appears that the fear represented by the *Iraq invasion* decreased in 2005 when Mahmoud Ahmadinejad was elected president, and the fear was replaced by a *much* more independent behaviour, aiming for prestige and status. The realisation that EU-3 and the United States wanted a permanent suspension of enrichment appears to have had significant effect on the decision to continue the enrichment programme. The dual-use aspect of the Iranian nuclear programme also makes it possible that a driving force behind the continued development was motivated by nuclear weapons ambitions. It is furthermore the assessment of this research that Iran's decisions could first be described through realism until 2005, and after 2005 in combination with social constructivism.

North Korea appears to have withdrawn from the NPT primarily because of the pressure building up before the *Iraq invasion*, but also because of the collapse of the *Agreed Framework*, and the distrust in international cooperation. Further, it appears that North Korea decided to develop nuclear weapons based on *national strategy and foreign policy*, where nuclear weapons were to serve as a deterrent and as leverage for negotiations. Another variable that appears to have been influencing North Korea to make this choice is the failure of the *Six-Party talks* in 2005. It is the assessment of this research that the behaviour of North Korea can be described through realism, all the way.

Libya's decision to cancel its nuclear programme appears to have been strongly influenced by the work of *sanctions*, while the disclosure of the *A.Q. Khan network*, the *Lockerbie negotiations*; the understanding that the United States did not want *regime change*; and the chance of *increased security* also affected the Libyan nuclear programme. Libya's nuclear reversal could best be described through realism, while liberalism might explain some parts of the negotiations. Finally, a question worth asking is: Would it be possible for North Korea or Iran to conduct a nuclear rollback like Libya did, in the future? The answer is maybe, but that would require a more transparent policy from Washington D.C. because it is presently impossible for the two states to know what will happen if they give up their programmes. Will the United States then cancel the sanctions, or will it demand regime change and improved human rights?

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## Appendix A Nuclear Weapon Development

Nuclear technologies are used worldwide for peaceful purposes such as generating electricity, diagnosing disease, treating cancer, for numerous industrial applications, and for food and medical sterilization. As more and more states implement nuclear technologies, it is important that the IAEA verifies NPT compliance in all non-nuclear-weapon states using its mandate from NPT's Article III (see section 8). This is a challenge for the IAEA, as much nuclear technology has a dual-use aspect, where actors with the necessary know-how could turn a civil programme into a nuclear weapons programme. Especially the implementation of fuel cycle technology opens up for a nuclear weapons option, as will be shown in this section. In order to understand why the IAEA should be concerned when states like Iran, Libya and North Korea expand their nuclear infrastructure (allegedly for civil purposes), it is necessary to understand the key factors of a nuclear weapons programme, and what steps need to be taken by an actor who wants to develop nuclear weapons. This section will provide a very basic introduction to nuclear weapons development.

### A.1 Fissile Material

A nuclear explosion gets its explosive yield when energy is released through either *fission* or *fusion*. In fission, a heavy nucleus is split by an incident neutron, typically into two daughter nuclei, leading to the release of energy as well as two to four neutrons, each capable of splitting another nucleus and thereby create a chain reaction. In a nuclear explosion, it is essential to achieve a chain reaction with a large number of fission processes (typically between  $10^{24}$  and  $10^{25}$ ) releasing energy. In fusion (see Figure 1), light nuclei (hydrogen isotopes<sup>28</sup>) are merged together, releasing energy. The discussion in this research will focus on fission weapons, as nuclear fusion is far more advanced technically and therefore not expected to be implemented in the countries covered here.

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<sup>28</sup> Isotopes are variants of the same element (uranium, for example), but with a different number of neutrons in the nucleus. The chemical properties are the same for all isotopes of a given element, but the nuclear properties vary. The number used to characterise each isotope (such as “235” in “uranium-235”) indicates the total number of nuclear particles (neutrons and protons) in the nucleus.

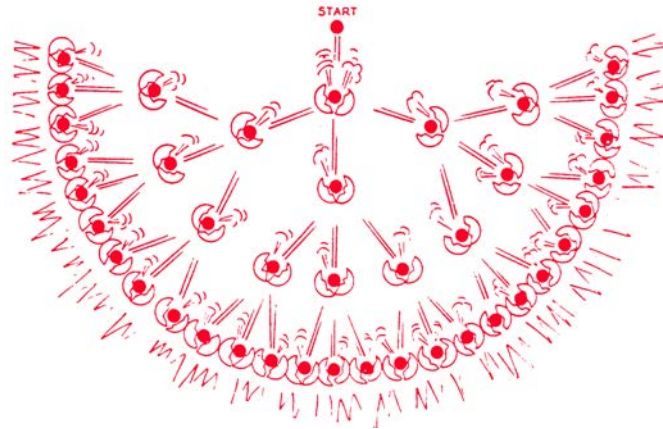


Figure 1: A simple representation of an explosive chain reaction (Breivik 2008).

The most basic element in a nuclear programme, whether it is civilian or military, is the fissile material. A fissile material is a material consisting of atomic nuclei that may be split by neutrons of all energies, enabling it to sustain a rapid chain reaction providing energy for a nuclear explosion. As fissile material, the isotopes uranium-235 (U-235) and plutonium-239 (Pu-239) are the most common and useful. The acquisition of either one of these two isotopes is regarded as the most complex process in the development of nuclear weapons, and the actor will have to build vast and sophisticated (and expensive) facilities for the production, as will be explained below.

Both materials have its origin from natural uranium found in the earth's crust. Either imported or produced in domestic uranium mines, the raw material is sent to a "uranium mill" to separate the waste from the product. The result is uranium concentrate ( $U_3O_8$ ), often referred to as "yellowcake", consisting of less than 0.7 % of the wanted U-235. The further process is known as the "uranium path" or the "plutonium path" depending on the desired outcome. Historically, different states have chosen different paths depending on their national preferences.

#### A.1.1 The Uranium Path

Containing only 0.7 % of the fissile isotope U-235, the rest being the non-fissile uranium isotope U-238, natural uranium must be enriched in U-235 for use in nuclear weapons (and for use as fuel in most nuclear reactors as well). Separating the two isotopes is no simple process, but amongst the 6-7 known methods, gas centrifuges and gas diffusion are the most applied. Uranium enriched to over 90 % of U-235 is commonly referred to as *weapons-grade uranium*. Uranium enriched to 20 % U-235 or more is generally

known as *highly enriched uranium* (HEU), and less than 20 % is known as *low enriched uranium* (LEU). It is worth noticing that LEU is used in most nuclear power plants, with uranium enriched to a 3-5 % level.

### **What is Uranium Hexafluoride (UF<sub>6</sub>)?**

The gaseous feedstock used in the uranium enrichment process that produces fuel for nuclear reactors and weapons.

#### **A.1.2 The Plutonium Path**

As uranium fuel is being burned in any nuclear reactor, a number of plutonium isotopes will be produced in the fuel. Natural uranium may be used as fuel in specially designed reactors (either civil or military). This is the optimal fuel for producing Pu-239, which is the wanted plutonium isotope for use in nuclear weapons, and as the spent fuel is recycled in a reprocessing facility, Pu-239 is extracted (mixed with other plutonium isotopes that may be present). The shorter time the fuel spends in the reactor, the better weapons grade plutonium it is possible to produce (that is, the higher the content of Pu-239 relative to other plutonium isotopes), but the total amount of plutonium will necessarily be correspondingly small. Thus a military reactor will have to change fuel more often than a civilian reactor. It is customary to assume that weapons-grade plutonium contains more than 90 % Pu-239. The advantage of the plutonium path is that an enrichment facility is not needed to produce the weapons-grade fissile material, but the required nuclear reactor and reprocessing facility are also quite complex and expensive.

#### **A.2 Weapons Design**

As mentioned earlier, nuclear fission weapons are the focus of this research, thus only the design of fission weapons is discussed below.

The fundamental goal of a nuclear weapon is to rapidly release a large amount of energy at a given place and time. And in order to do so, the following four challenges must be met:

1. Keeping the fissile material in a *subcritical* condition before the detonation
2. Taking the fissile material from a *subcritical* to a *supercritical* condition.

3. Introducing neutrons into the critical mass as it reaches its *optimal supercriticality* in a small fraction of a second.
4. Keeping the mass together as long as possible during the expansion in order to gain as much energy as possible before the mass self-destructs and becomes *subcritical* again.

### What is Criticality?

Criticality is defined as the condition where a fissile material is able to undergo a sustained chain reaction. A chain reaction is exactly *critical* if one fission leads to exactly one new fission. The mass is *supercritical* if one fission leads to more than one new fission, creating an exponential growth. The steeper the exponential growth, the more effective the bomb will be. A mass is *subcritical* if the material does not have the ability to sustain a chain reaction.

In a fission-based weapons programme, there are two types of design: The *gun-type design* where one piece of weapons-grade uranium is fired through a “gun barrel” to merge with another piece of weapons-grade uranium, creating a supercritical mass and thus making the desirable chain reaction possible. For this type of design only uranium can be used<sup>29</sup>. The implosion-type design is based on the compression of a sphere of subcritical material (either uranium or plutonium) to a higher density where the required critical mass is smaller by detonating conventional explosives very precisely over the entire surface. An advantage of the implosion design is the possibility to reduce the size of the bomb, as the design requires less fissile material. This is due to the fact that the implosion shortens the distance which the neutrons have to travel in order to sustain the chain reaction, hence enabling both a smaller mass and a faster exponential growth.

The gun-type design is considered the easiest way to construct a bomb, and it was used in “Little Boy” which was dropped over Hiroshima in Japan 6 August 1945. However, one

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<sup>29</sup> This is because the collision is too slow for plutonium’s high rate of spontaneous fission, which may set off the chain reaction before the material reaches its optimal supercriticality, almost ensuring pre-detonation and failure.

assumes that today's nuclear-weapon states generally prefer the implosion design for the following reasons:

1. It permits the use of plutonium, which has a significantly smaller critical mass than uranium, enabling a more compact weapon.
2. It is easier to achieve a higher explosive yield.
3. The design requires less fissile material because a nuclear implosion weapon only needs as little as maybe  $\frac{1}{4}$  of its uncompressed critical mass because the implosion will increase the density and thereby significantly reduce the amount of fissile material required for criticality, whereas a gun-type weapon needs more than one critical mass in total for its two separate parts.

Detailed information regarding the amount of fissile material needed for a nuclear weapon is limited by a high degree of confidentiality. It varies depending on the design and desired explosive force combined with the skills of the producer. Aspiring nuclear-weapon states naturally lack experience and thus will likely use more fissile material for each bomb compared to an established nuclear-weapon state.

### **A.3 Means of Delivery**

The difference between a nuclear weapon and a nuclear explosive device is important, as the term "weapon" indicates that it is fully operational in the sense of being deployable, and subsequently delivered on target. In order to have an operational nuclear weapon, the nuclear warhead must be implemented into an available delivery system. Typical delivery systems are missiles, airplanes, ships, submarines and even artillery shells (Toft 2004).

## **Appendix B Treaty on the Non-Proliferation of Nuclear Weapons (NPT)**

The States concluding this Treaty, hereinafter referred to as the Parties to the Treaty,

Considering the devastation that would be visited upon all mankind by a nuclear war and the consequent need to make every effort to avert the danger of such a war and to take measures to safeguard the security of peoples,

Believing that the proliferation of nuclear weapons would seriously enhance the danger of nuclear war,

In conformity with resolutions of the United Nations General Assembly calling for the conclusion of an agreement on the prevention of wider dissemination of nuclear weapons,

Undertaking to cooperate in facilitating the application of International Atomic Energy Agency safeguards on peaceful nuclear activities,

Expressing their support for research, development and other efforts to further the application, within the framework of the International Atomic Energy Agency safeguards system, of the principle of safeguarding effectively the flow of source and special fissionable materials by use of instruments and other techniques at certain strategic points,

Affirming the principle that the benefits of peaceful applications of nuclear technology, including any technological by-products which may be derived by nuclear-weapon States from the development of nuclear explosive devices, should be available for peaceful purposes to all Parties to the Treaty, whether nuclear-weapon or non-nuclear-weapon States,

Convinced that, in furtherance of this principle, all Parties to the Treaty are entitled to participate in the fullest possible exchange of scientific information for, and to contribute alone or in cooperation with other States to, the further development of the applications of atomic energy for peaceful purposes,

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to undertake effective measures in the direction of nuclear disarmament,

Urging the cooperation of all States in the attainment of this objective,

Recalling the determination expressed by the Parties to the 1963 Treaty banning nuclear weapons tests in the atmosphere, in outer space and under water in its Preamble to seek to achieve the discontinuance of all test explosions of nuclear weapons for all time and to continue negotiations to this end,



Desiring to further the easing of international tension and the strengthening of trust between States in order to facilitate the cessation of the manufacture of nuclear weapons, the liquidation of all their existing stockpiles, and the elimination from national arsenals of nuclear weapons and the means of their delivery pursuant to a Treaty on general and complete disarmament under strict and effective international control,

Recalling that, in accordance with the Charter of the United Nations, States must refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any State, or in any other manner inconsistent with the Purposes of the United Nations, and that the establishment and maintenance of international peace and security are to be promoted with the least diversion for armaments of the world's human and economic resources,

*Have agreed as follows:*

#### **B.1 Article I**

Each nuclear-weapon State Party to the Treaty undertakes not to transfer to any recipient whatsoever nuclear weapons or other nuclear explosive devices or control over such weapons or explosive devices directly, or indirectly; and not in any way to assist, encourage, or induce any non-nuclear-weapon State to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices, or control over such weapons or explosive devices.

#### **B.2 Article II**

Each non-nuclear-weapon State Party to the Treaty undertakes not to receive the transfer from any transferor whatsoever of nuclear weapons or other nuclear explosive devices or of control over such weapons or explosive devices directly, or indirectly; not to manufacture or otherwise acquire nuclear weapons or other nuclear explosive devices; and not to seek or receive any assistance in the manufacture of nuclear weapons or other nuclear explosive devices.

### **B.3 Article III**

1. Each non-nuclear-weapon State Party to the Treaty undertakes to accept safeguards, as set forth in an agreement to be negotiated and concluded with the International Atomic Energy Agency in accordance with the Statute of the International Atomic Energy Agency and the Agency's safeguards system, for the exclusive purpose of verification of the fulfilment of its obligations assumed under this Treaty with a view to preventing diversion of nuclear energy from peaceful uses to nuclear weapons or other nuclear explosive devices. Procedures for the safeguards required by this Article shall be followed with respect to source or special fissionable material whether it is being produced, processed or used in any principal nuclear facility or is outside any such facility. The safeguards required by this Article shall be applied on all source or special fissionable material in all peaceful nuclear activities within the territory of such State, under its jurisdiction, or carried out under its control anywhere.

2. Each State Party to the Treaty undertakes not to provide: (a) source or special fissionable material, or (b) equipment or material especially designed or prepared for the processing, use or production of special fissionable material, to any non-nuclear-weapon State for peaceful purposes, unless the source or special fissionable material shall be subject to the safeguards required by this Article.

3. The safeguards required by this Article shall be implemented in a manner designed to comply with Article IV of this Treaty, and to avoid hampering the economic or technological development of the Parties or international cooperation in the field of peaceful nuclear activities, including the international exchange of nuclear material and equipment for the processing, use or production of nuclear material for peaceful purposes in accordance with the provisions of this Article and the principle of safeguarding set forth in the Preamble of the Treaty.

4. Non-nuclear-weapon States Party to the Treaty shall conclude agreements with the International Atomic Energy Agency to meet the requirements of this Article either individually or together with other States in accordance with the Statute of the International Atomic Energy Agency. Negotiation of such agreements shall commence within 180 days from the original entry into force of this Treaty. For States depositing their instruments of ratification or accession after the 180-day period, negotiation of such

agreements shall commence not later than the date of such deposit. Such agreements shall enter into force not later than eighteen months after the date of initiation of negotiations.

#### **B.4 Article IV**

1. Nothing in this Treaty shall be interpreted as affecting the inalienable right of all the Parties to the Treaty to develop research, production and use of nuclear energy for peaceful purposes without discrimination and in conformity with Articles I and II of this Treaty.

2. All the Parties to the Treaty undertake to facilitate, and have the right to participate in, the fullest possible exchange of equipment, materials and scientific and technological information for the peaceful uses of nuclear energy. Parties to the Treaty in a position to do so shall also cooperate in contributing alone or together with other States or international organizations to the further development of the applications of nuclear energy for peaceful purposes, especially in the territories of non-nuclear-weapon States Party to the Treaty, with due consideration for the needs of the developing areas of the world.

#### **B.5 Article V**

Each Party to the Treaty undertakes to take appropriate measures to ensure that, in accordance with this Treaty, under appropriate international observation and through appropriate international procedures, potential benefits from any peaceful applications of nuclear explosions will be made available to non-nuclear-weapon States Party to the Treaty on a non-discriminatory basis and that the charge to such Parties for the explosive devices used will be as low as possible and exclude any charge for research and development. Non-nuclear-weapon States Party to the Treaty shall be able to obtain such benefits, pursuant to a special international agreement or agreements, through an appropriate international body with adequate representation of non-nuclear-weapon States. Negotiations on this subject shall commence as soon as possible after the Treaty enters into force. Non-nuclear-weapon States Party to the Treaty so desiring may also obtain such benefits pursuant to bilateral agreements.

#### **B.6 Article VI**

Each of the Parties to the Treaty undertakes to pursue negotiations in good faith on effective measures relating to cessation of the nuclear arms race at an early date and to nuclear disarmament, and on a treaty on general and complete disarmament under strict and effective international control.

#### **B.7 Article VII**

Nothing in this Treaty affects the right of any group of States to conclude regional treaties in order to assure the total absence of nuclear weapons in their respective territories.

#### **B.8 Article VIII**

1. Any Party to the Treaty may propose amendments to this Treaty. The text of any proposed amendment shall be submitted to the Depositary Governments which shall circulate it to all Parties to the Treaty. Thereupon, if requested to do so by one-third or more of the Parties to the Treaty, the Depositary Governments shall convene a conference, to which they shall invite all the Parties to the Treaty, to consider such an amendment.

2. Any amendment to this Treaty must be approved by a majority of the votes of all the Parties to the Treaty, including the votes of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. The amendment shall enter into force for each Party that deposits its instrument of ratification of the amendment upon the deposit of such instruments of ratification by a majority of all the Parties, including the instruments of ratification of all nuclear-weapon States Party to the Treaty and all other Parties which, on the date the amendment is circulated, are members of the Board of Governors of the International Atomic Energy Agency. Thereafter, it shall enter into force for any other Party upon the deposit of its instrument of ratification of the amendment.

3. Five years after the entry into force of this Treaty, a conference of Parties to the Treaty shall be held in Geneva, Switzerland, in order to review the operation of this Treaty with a view to assuring that the purposes of the Preamble and the provisions of the Treaty are

being realised. At intervals of five years thereafter, a majority of the Parties to the Treaty may obtain, by submitting a proposal to this effect to the Depositary Governments, the convening of further conferences with the same objective of reviewing the operation of the Treaty.

#### **B.9 Article IX**

1. This Treaty shall be open to all States for signature. Any State which does not sign the Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the United Kingdom of Great Britain and Northern Ireland, the Union of Soviet Socialist Republics and the United States of America, which are hereby designated the Depositary Governments.

3. This Treaty shall enter into force after its ratification by the States, the Governments of which are designated Depositories of the Treaty, and forty other States signatory to this Treaty and the deposit of their instruments of ratification. For the purposes of this Treaty, a nuclear-weapon State is one which has manufactured and exploded a nuclear weapon or other nuclear explosive device prior to 1 January 1967.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depositary Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification or of accession, the date of the entry into force of this Treaty, and the date of receipt of any requests for convening a conference or other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

**B.10 Article X**

1. Each Party shall in exercising its national sovereignty have the right to withdraw from the Treaty if it decides that extraordinary events, related to the subject matter of this Treaty, have jeopardized the supreme interests of its country. It shall give notice of such withdrawal to all other Parties to the Treaty and to the United Nations Security Council three months in advance. Such notice shall include a statement of the extraordinary events it regards as having jeopardized its supreme interests.

2. Twenty-five years after the entry into force of the Treaty, a conference shall be convened to decide whether the Treaty shall continue in force indefinitely, or shall be extended for an additional fixed period or periods. This decision shall be taken by a majority of the Parties to the Treaty.<sup>1</sup>

**B.11 Article XI**

This Treaty, the English, Russian, French, Spanish and Chinese texts of which are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signed this Treaty.

DONE in triplicate, at the cities of London, Moscow and Washington, the first day of July, one thousand nine hundred and sixty-eight.