



The Historical Context of Nuclear Weapons in the Middle East:

A select brief history of Middle Eastern Politics

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The assassination of Franz Ferdinand in 1914 was the official start of the First World War. Seventy million people were called to arms for one of the largest wars in history. The conflict drew all of the world powers into either two sides, the Allies (also known as the Triple Entente) or the Central Powers. The Allies, and eventual victors, consisted of the United Kingdom, France, Russia, Belgium, Serbia, Italy, Japan, Greece, and Romania. Germany, the Austro-Hungarian Empire, The Kingdom of Bulgaria, and

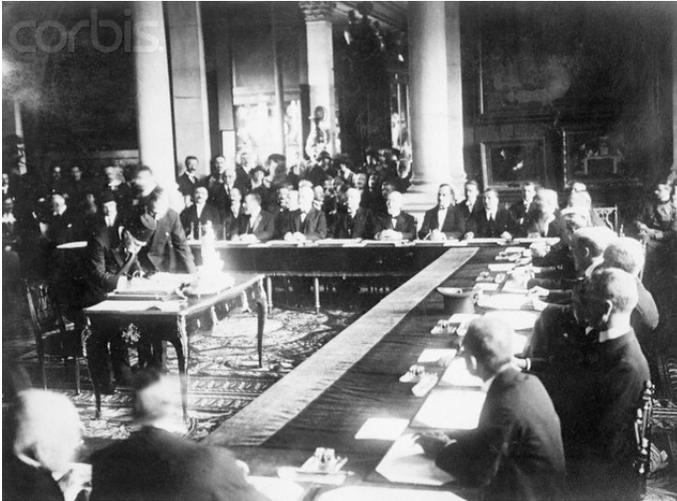


the Ottoman Empire made up the Central Powers. The Ottomans joined on the side of the Central Powers, because of the combined pressure from Germany and the ambition from Ottoman Minister of War Enver Pasha

(Harlow). Pasha saw an opportunity for the Empire to claim victory, motivated by early German victories on the Western Front. In addition, the fact that the Russian Empire, with which the Ottoman Empire had had long standing problems, joined the Triple Entente influenced the Ottoman decision to join the Central Powers.

While [?]World War I was the “straw that broke the camel’s back;” numerous factors attributed to the fall of the Ottoman Empire, including social corruption. In

order to secure their position as heads of state, the corrupt religious leaders known as the *ulema* stifled creativity throughout the Muslim world. For example, Muslims had known about the printing press since the 15th century, but it was not until the mid 18th century that they deemed that it could be used in Islam. Trade was another issue. The countries which had access to the Atlantic Trade Routes were considered to be the most economically developed. Previously, Asian and European countries were required to pass Ottoman lands to have access to the vital trade routes, but the discovery of the Atlantic trade routes allowed for the by-pass of the Empire. Moreover, India and the Far East offered cheaper goods than the Empire (Horrocks). The Sultan, the Muslim sovereign, was slowly losing power to military and religious elites. There was a decree known as *fetva* which allowed the *ulema* to remove the Sultan if they were displeased, causing him to back down from sensitive yet critical matters. The Ottoman sovereignty was weakened furthermore by the fear of Civil War caused by a family member of a Sultan. Often, uncles and brothers of Sultans were imprisoned or executed so that there were no other claims to power. If a brother or an uncle was imprisoned and not executed, the death of the Sultan could lead to his brother or uncle succeeding the Sultan. Since these successors were rarely prepared, there was a series of poor Sultans throughout the 17th and 18th centuries (Horrocks). The prevailing nationalism also debilitated the Ottoman Empire. Nationalism in the Ottoman Empire led to the formation of the "Young Turks" from a group of Turkish students. These nationalists were known to be the most rebellious group that wanted to do away with the aging Empire. The Young Turks joined with other rebels in Macedonia and Bulgaria and demanded total independence from the Empire in 1908. Inefficiencies due to the vast size of the Ottoman Empire resulted in a non-modernized military which was composed mostly of foreigners. So when regiments were sent in from Bulgaria and



Rumelia to quell the Young Turk rebellion, they mutinied and joined the Turks instead. The combined rebellious forces named themselves the Committee of Union and Progress (CUP). The Sultan was unable to resist the CUP and gave into their demands on turning the Empire into

a constitutional monarchy. By the time the First World War ended, the Ottoman Empire collapsed and was succeeded by the Republic of Turkey (Horrocks).

The Ottomans signed a separate treaty, called the Treaty of Sevres, with the Allies in 1919. The United States excluded itself from the treaty while France and Britain divided up Ottoman territories among the victors. The Allies seized control of

Signing of the Treaty of Versailles with the Allies

<http://asbarez.com/84064/at-90-sevres-treaty-is-most-relevant-today/>

the Empire's finances which included control over the national budget,

financial laws and regulations, and direct power over the Ottoman bank. The consent of the Allied powers was required for any developments of the tax system, the customs system, or internal and external loans (Hacken). The control also included import and export duties and the reorganization of the electoral system. The Ottoman Empire had a huge debt problem before WWI. The Allies delegated 67% of that debt to the new Republic of Turkey. The Ottoman military was reduced to 50,000 men, seven sloops and six torpedo boats, and was also denied an air force. The Ottomans lost over 400,000 square miles of land (Hacken) to the Allies and their zones of influence. France gained Syria and parts of southeast Anatolia as zones of influence. France was given mandate

over Lebanon as well. Large parts of southern and mid-western Anatolia were declared Italian zones of influence (Hacken). Britain was granted Iraq and access to its vast oil fields after some negotiations with the Iraqis. Palestine also fell under British mandate. Due to the Turkish War for Independence, the Treaty of Sevres was never actually ratified. The eventual victory of the Turks in their fight for Independence led the Allies back to the negotiating table.

During World War I, letters exchanged between Husayn Ibn Ali, the emir of Mecca, and Sir Henry McMahon, the British high commissioner in Egypt effectively instigated a series of trades. British support of an independent Arab State was traded for military support in the opposition of the Ottoman Empire.

Husayn Ibn Ali was a member of the Hashimite clan who sent McMahon a letter in July 1915 disclosing the details of the supposed partnership with the British. Husayn sought independence for all Arabic-speaking lands to the east of Egypt; however, McMahon opposed this idea and demanded that Hims, Hamah, and Lebanon were not to be included because they were under French administration. These conflicting arguments remained unresolved and were intensified by the secret negotiations taking place during the enactment of the Sykes-Picot Agreement. This agreement contradicted and nullified the agreements, or lack there-of, by Husayn and McMahon.

The Sykes-Picot Agreement of 1916 was a secret meeting held during World War I on May 9, 1916, between Sir Mark Sykes of Great Britain and François Georges-Picot of France, which divided the Ottoman Empire into the Turkish-controlled Syria, Lebanon, Iraq, and Palestine. This agreement took place under the consent of Imperial Russia.

Great Britain and France were prepared to establish direct and indirect administration, as they so chose, of areas southeast of Turkey, southwest of Persia along the northern tip of the Persian Gulf, and north of Arabia. This arrangement allocated power to arrange with the Arab state or confederation of Arab states. It also put the area on the eastern coast of the Mediterranean Sea, namely Jerusalem and Haifa into a state of "international administration," which would be discussed and arranged with Russia and the representatives of Mecca.

The provisions of the agreement mandated that "Russia should acquire the Armenian provinces of Erzurum, Trebizond, Man, and Bitlis, with some Kurdish territory to the southeast" (www.britannica.com). These areas are located on the shore of or shortly inland from the southeastern Mediterranean. France and Great Britain benefitted the most from this agreement, in that "France should acquire Lebanon and the Syrial littoral, Adana, Cilicia, and the hinterland adjacent to Russia's share, that hinterland including Aintab, Urfa, Mardin, Diyarbakir, and Mosul." Great Britain's spoils would include, "southern Mesopotamia, including Baghdad, and also the Mediterranean ports of Haifa and 'Akko.'" Great Britain had the right to build transportation systems through Haifa, declared a free port with respect to France and her allies, and to allow military transport through this line. Discrimination against French goods was not to be tolerated in any way, shape, or form (www.jewishvirtuallibrary.org). The confederation of Arab states, or solitary state, was to be divided amongst French and British spheres of influence. As protectors of the state, both countries would not attempt themselves acquire, nor consent to another country's attempt to acquire land or naval power within the Arabian Peninsula. Palestine, however, was considered international territory due to religious sentiment.

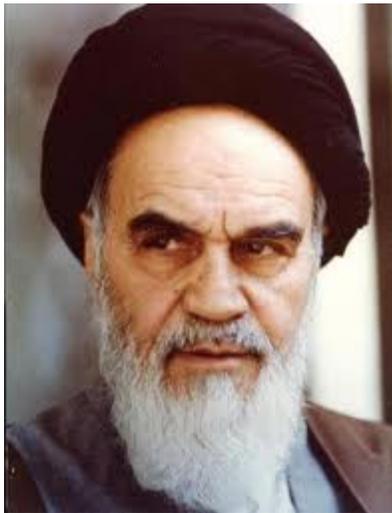
This agreement irritated Hashemite dynast Husayn Ibn Ali, the Sharif of Mecca, whose plans, at the time, would cause an Arabian revolt against Turkey on the conclusion that they would earn a majority of the victory. When Italy declared war with Germany, the Agreement of Sain-Jean-de-Maurienne in April 1917 instated that Italy was to control southern and northwestern Anatolia. It was during the span of these few years that the Arabs had learned of the Sykes-Picot Agreement through its publication, and their resentment persisted for years on end.

Palestine was still, at this point, an unclaimed territory, but during 1917, "a letter made public the British support of a Jewish homeland in Palestine, which led the League of Nations to entrust the United Kingdom with the Palestine Mandate in 1922" (www.about.com). Great Britain needed aid during World War I when Germany had more resources to produce acetone, a key ingredient for the production of weapons. Fortunately for Great Britain, Chaim Weizmann, the leader of the Zionist movement, had just invented a fermentation process for acetone and caught the attention of David Lloyd George and Arthur James Balfour. Lloyd George was the minister of ammunitions at the time, and Balfour was an admiral. Balfour himself was an advocate for the Jewish state; however, Great Britain wanted the support of the United States in war, and therefore wrote the Balfour Declaration, in effect luring the U.S. into supporting the British. This declaration was sent to Lord Rothschild, who was the president of the British Zionist Federation at the time. "The declaration was accepted by the League of Nations on July 24, 1922, and embodied in the mandate that gave Great Britain temporary administrative control of Palestine" (www.about.com).

There was a brief rise in independence movements before and after World War II as once powerful countries such as France and Britain had lost the prestige, money, and

military resources needed to maintain control. As a result, their major colonies in India and several African countries were able to wage effective independence movements and gain their freedom. In the end, the colonization of these nations came to a screeching halt.

After World War II, the British mandate system met its end and several countries escaped the control of Great Britain. India, which had been its colony from 1858 to 1947, successfully decolonized after World War II (Indian culture). At one time “the sun never set on the British Empire,” but this all changed at the conclusion of World War II. Even though Britain was one of the “winners” of the war, with many of her cities and industries in rubble and protests taking place in the colonies, she simply had no choice but to sign off on freedom (novelguide.com).



The Iranian Revolution began in the early 1970’s as a reaction to the Reza Shah’s oppressive regime. This decade also marked the largest economic growth the country had experienced because of petroleum and increased Western oil consumption. Much of the political unrest came from the Shah’s handling of the growing revenues from oil. Heavy government spending led to high inflation rates and a decrease in the standard of living for many Iranians. The Revolution eventually exiled the Shah and installed a more autocratic leader, Ayatollah Khomeini, who still rules today (www.britannica.com).



Mohammad Reza Pahlavi

<http://www.pahlavi.org/>

Reza Shah Pahlavi ruled Iran from 1941 to 1979.

The United States supported his reforms in the 1950's in the White Revolution. The reforms included domestic transportation construction, medical and educational advances, industrial growth, and land reform. The reforms improved domestic support but negativity surrounded the Shah for his corruption as the country accumulated more and more wealth from

oil. In the early 1970's the Shah was bombarded with political and religious criticism for his political greed, the unequal distribution of the oil wealth, the Savak- violent secret police-, and his support of Westernization (britannica.com). As public dissatisfaction grew so did support for the Ayatollah Ruhollah Khomeini.

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In the 1960's Khomeini was an acclaimed Grand Ayatollah- one of the supreme religious leaders in the Shiite community. He was vehemently against the Shah's

reforms and in 1960 was exiled for his activism. Although he was out of Iran he continued to call for the overthrow of the Shah and had a growing group of supporters in the country. He smuggled taped speeches of himself and his followers, mostly Iranian youth, incited mass demonstrations against the Shah. In January 1978 there were mass riots protesting the Shah's regime. The riots quickly turned violent as the government turned against the protestors. In early 1979 the Shah was forced to flee the country because of the mounting violence. Soon after, Khomeini traveled to Tehran and by April 1st became the official religious leader of the revolution. There was then a National Referendum on a new Iranian constitution that claimed Iran to be an Islamic Republic under Sharia law (<http://www.britannica.com/EBchecked/topic/316812/Ruhollah-Khomeini>).

The Revolution ended after the constitution became official and Iran became an Islamic State. When Khomeini took control as the Supreme Leader he instituted harsh Islamic law. The Shiite clerics largely control the formulation of government policy. Khomeini repressed opposing political groups, had a strong anti-westernization foreign policy, and controlled the informal religious militia the Revolutionary Guards. An oftentimes violent leader, he supported the Iran Hostage Crisis after the United States allowed Reza Shah Pahlavi into the country for cancer treatment. Khomeini had a tight and oppressive control of Iran and his dictatorial regime caused mounting unrest among Iranians who wanted their country to grow and modernize.

Palestine is one of the longest-disputed territories in the world. Originally claimed by the Ottomans and then the Turks, Palestine has never been its own separate state. The territory was put under British Mandate in 1923 and was gained independence as the State of Israel in 1948. The British Mandate gave the British government responsibility

for the territory specifically to assist Jewish immigration, settlement, and to create a national Zionist state for the Jewish people.

After the war for independence in 1948, Israel became its own sovereign state. At this time its borders with Lebanon and Syria were restored, its border with Egypt was restored except Egypt would control the Gaza Strip, and Jordan kept the West Bank and controlled the Old City of Jerusalem. In 1949 Israel signed an Armistice Line with Jordan to have access to holy grounds but it was not enforced or guarded. These borders were not “safe and recognized” by the U.N. under these agreements and only served as ceasefire lines (www.palestinefacts.org).

In 1948 U.N. Resolution 194 was passed. This Resolution set up a U.N. Conciliation Commission to mediate between the countries involved in the conflict. It also stated that all refugees should be allowed to return to their homes at peace and be compensated for land or property damage although it does not specify who these refugees are; they could include either the Israelis or Arabs. Also, resolutions made at the General Assembly are only suggestions and are not enforceable.

In 1964, the Arab League founded the Palestine Liberation Organization (the PLO). The PLO was created to deal with the Palestinian Arabs and called for the destruction of Israel and the formation of a Palestinian Entity. The PLO does not have any territorial sovereignty over the West Bank or the Gaza Strip. It serves mainly as an umbrella group with many fractions. The two largest of these fractions are Fatah, the military part of the PLO, and the Popular Front for the Liberation of Palestine, a violent commando group.

Between 1965 and 1967 the PLO continuously attacked Israel over the border through the occupied territories of the Gaza Strip and the West Bank, causing mounting tensions between the neighboring countries. After Egypt placed troops on the Sinai Peninsula, Israel attacked preemptively and started the 6 Day War on June 4th, 1967. By June 10th Israel had gained Jerusalem, Golan Heights, the Sinai Peninsula, the Gaza Strip, and the West Bank in an unexpected victory.

The Soviet Union, embarrassed by its Arab counterpart's easy defeat, called for a U.N. General Assembly in 1967. The General Assembly referred the issue to the Security Council, which produced U.N. Resolution 242. This Resolution calls for all parties involved in the to negotiate a solution for peace in the Middle East and in exchange for peace from the Arab countries, Israel will withdraw to secure borders- that were not specified in the Resolution. It essentially states that Israel can keep its territories until a lasting peace in the Middle East is established.

After tensions between Egypt and Israel in the early 1970's with rejected peace proposals and the Yom Kippur war Egypt and Israel both participated in the Camp Davis Accords in September 1978. There, Israel returned the Sinai to Egypt in exchange for full diplomatic relations from Egypt. Both Egyptian President Anwar El Sadat and Israeli Prime Minister Menachem Begin shared the Nobel Peace Prize in 1978 for their agreements but without Egypt the united Arab countries against Israel were not as strong.

In 1987 there was a violent intifada uprising organized by the PLO. It was an insurrection of Palestinians against Israel with Hamas leaders stepping up for the first time. Hamas is a violent anti-Semitic group that currently holds a majority in the

Palestine National Authority Parliament and is against peace talks with Israel. It was sometimes referred to as the “Palestinian Revolution” continued until 1992 when the Palestinian Authority began to take shape in the West Bank and Gaza Strip.

The Oslo Accords, otherwise known as the Israeli-Palestinian Declaration of Principles, took place in 1993. These peace negotiations occurred from 1993 to 2000 and led to many agreements. One of the most important was the Gaza-Jericho agreement in which Israel gave those territories to the Palestine Authority to control. In 1995 the Oslo II Agreement divided the West Bank and the Gaza Strip into three areas that were to be under Israeli military control, Palestinian Authority control, or a mix of the two: one controlling security and the other civil authority.

At Camp David in 2000, U.S. President Clinton, Israeli Prime Minister Barak, and PLO leader Arafat met to discuss peace proposals. Yasser Arafat walked out of the meetings although Israel offered extensive concessions. In 2001, Israel was accused of violating the 4th Geneva Convention by building settlements on occupied territory. The allegations were not backed up with substantive evidence and Israel defended itself by saying it gained the territory in the 6 Day War therefore it is not violating the Convention to build there. The issue of Israeli settlements in occupied Palestinian territory remains a complex issue today.

In 2005, Mahmoud Abbas was elected President of the Palestinian Authority; also making him the leader of the PLO. In 2006, Hamas won elections to become the majority in the Palestinian Authority Parliament. Abbas’ term was set to end in 2010 but because of conflicting interpretations of the Palestine National Authority Basic Law, the election was pushed back to September 2011. In the Basic Law it states that both the

President and Parliament will serve concurrent four year terms but the President was elected a year before Parliament. Palestine National Authority wants the elections in September 2011 but Hamas wants to join the PLO before new elections. There will not be elections until all fractions of the Palestine National Authority agree.

Currently, there is no lasting peace in the Middle East. There have been numerous Peace Talks and there has been progress made between the two nations. Both countries seem willing to at least try to negotiate on a lasting peace.

Throughout the history of the Middle East, attempts at peace have proved to be a difficult process. Many conferences and negotiations have been held between Middle East countries, especially Egypt, Israeli, and Palestinians, in order to achieve agreements on focal issues, maintain peace in that region, and gain cooperation and development.

The history of peace talks traces back to the Faisal-Weizmann Agreement which was signed on January 3, 1919 by Emir Faisal (son of the King of Hejaz) and Chaim Weizmann (later President of the World Zionist Organization) as part of the Paris Peace Conference, settling disputes stemming from World War I (mideastweb.org). It was a short-lived agreement for the development of a Jewish homeland in Palestine and an Arab nation in the Middle East.

After the Second World War, in 1949, the Armistice Agreements were signed by Israel and Egypt, Lebanon, Jordan, and Syria. The negotiations began on January 12, 1949 on Rhodes, a Greek island (mfa.gov.il). Egypt was the first Arab State to enter into armistice negotiations with Israel and paved the way for negotiations with the other Arab belligerents. The agreements ended the hostilities of the 1948 Arab-Israeli War and

established Armistice Lines (known as the “Green Line”) between Israel and the West Bank (feelingeuropa.eu).

In 1977 the president of Egypt, Muhammad Anwar al-Sadat, offered peace and recognition to Israel after years of failed negotiations and continuing conflicts between Israel and Egypt. In 1978, Sadat and Israeli Prime Minister Menachem Begin met at the U.S. presidential retreat Camp David, had a two-week conference, and achieved an agreement which was known as Camp David Accords (pbs.org). The Camp David Accords called for Peace in the Middle East to deal with the “Palestinian problem” and make treaties between the Middle East countries. It included a peace treaty between Egypt and Israel on the issues of Egypt’s control of the Sinai and reorganization of Israel’s border (bbc.co.uk). However, the Camp David Accord failed to warm the peace between Egypt and Israel because it was unpopular and led to assassination of President Sadat.



Camp David Accords 1978

http://www.jimmycarterlibrary.gov/documents/campdavid25/campdavid25_photos.phtml

Another talk was in 1991, the Madrid Conference, co-sponsored by the United States and the Soviet Union, held to follow up the Egypt-Israel treaty by encouraging other Arab countries to sign their own agreements with Israel (bbc.co.uk). Israel, Egypt, Jordan, Lebanon, Syria, and Palestinians were represented for this conference and agreed on a peace treaty between Israel and Jordan in 1994. The Madrid Conference also made Israeli to talk with Syria

and Lebanon. However, the talks were complicated by border disputes, especially the war in 2006 between Israel and Lebanese Hezbollah militants (bbc.co.uk).

Two years later, in 1993, the Oslo Negotiations attempted a direct agreement between Israel and Palestine. This talk took place in secret under Norwegian auspices and the agreement was signed on the White House lawn on September 13, 1993, witnessed by U.S. President Bill Clinton (bbc.co.uk). In the Oslo Accords, Israel agreed to withdraw troops from the West Bank and Gaza and set up a five-year transitional period which would lead to a permanent settlement. However, Hamas and other Palestinian rejectionist groups did not accept the Oslo Accords and launched suicide bomb attacks. Moreover, oppositions in Israel from settler-led groups also made the Oslo Accords only partially implementing.

It seemed no accomplishment on Middle East issues was achieved in the twentieth century. At the urging of Israeli Prime Minister Ehud Barak, U.S. President Clinton invited him and Palestinian Authority Chairman Yasser Arafat to come to Camp David to continue their negotiations on the Middle East peace process (mfa.gov.il). The Camp David 2000 Summit convened on July 11, 2000, but ended without an agreement.

In January 2001, Israel Foreign Minister Shlomo Ben-Ami and Palestinian chief negotiator Saeed Erekat met at Taba, Egypt and had another talk without a peace deal. The Taba Summit followed previous negotiations in Washington and Cairo and aimed at bridging the gap between the two sides revealed at Camp David (Rooney). However, with the election of Ariel Sharon in February 2001 (bbc.co.uk), Israel and Palestine failed to make an agreement.

Despite their attempts at negotiation, the Middle East countries were not making any progress in solving the conflicts and maintaining peace. In 2002, Saudi Arabia introduced the Arab Peace Initiative which was endorsed by all the Arab countries. It offered Israel full recognition by the twenty-two members of the Arab League in exchange for an Israeli withdrawal to its pre-1967 borders, which allowed the Palestinians to create a viable independent state on what is only twenty-two percent of historic Palestine (Siniora). However, this initiative did not come into effect immediately and its further Arab summit in Riyadh in 2007, too, did not achieve stability in the Middle East.

The next year, in 2003, the Roadmap was drawn up by the “Quartet” - the United States, Russia, the European Union and the United Nations (bbc.co.uk). The Roadmap called for the final agreement to be reached in 2005 but has not been implemented; it has remained a reference point for negotiations.

In the same year, an informal agreement known as the Geneva Accord was announced in December by Israeli and Palestinian figures - Yossi Beilin and Yasser Abed Rabbo (bbc.co.uk). The Geneva Accord reversed the concept of the Roadmap. The Palestinians would give up their “right of return” in exchange for almost the whole of the West Bank and the right to have their capital in East Jerusalem, while Israelis would give up some major settlements such as Ariel. Another unofficial agreement was drawn up and made a return to the 1967 Lines, an open city of Jerusalem and an end to the Palestinian claim to a right of return to former homes.

In 2007, U.S. President George W. Bush hosted a conference at the U.S. Naval Academy at Annapolis, Maryland which aimed at relaunching the peace process. Israeli

Prime Minister Ehud Olmert and Palestinian Authority President Mahmoud Abbas took part in talks along with officials from the peace-making Quartet and more than a dozen Arab countries, including Saudi Arabia and Syria (bbc.co.uk). However, the Palestinian group Hamas, which had won parliamentary elections and taken control of the Gaza Strip, was not represented. Hamas declared that it would not be bound by anything decided and the talk in Annapolis failed.

In 2008, leaders of Israel and Palestine engaged in negotiations aimed at the goal of a full peace deal by the end of that year (bbc.co.uk). Regular meetings took place between these two countries and it seemed to have made good progress on border issues. However, Israel's military offensive in Gaza interrupted the negotiations in late 2008 and the problems of the Middle East still continue today. Even though it is still a long way for the Middle East countries to gain an agreement on the key issues, the United Nations and the other important countries will continue to try to attempt a final solution on the Middle East problems and maintain the world's peace.

Considering such an enduring discord in the Middle East, the current nuclear dispute with Iran will inevitably provoke instability and enmity in the region. As this paper moves forward, the topic of nuclear weapons including the scientific basis will be fully explored and connected to these existing problems.

The atom, the basic building of a chemical element, has properties that enable the atom itself to release tremendous energy. An atom is made up of three basic sub-atomic particles: protons, neutrons and electrons. Protons and neutrons together are often called a nucleon and a number of nucleons are in the nucleus, the center of the atom. Protons have a positive charge, and neutrons are electrically neutral since they do not

have a charge. Usually, protons and neutrons have the same mass. An electron is a particle that revolves around a dense and positively charged nucleus. An electron carries a negative charge and it has a much smaller mass than either a proton or a neutron (www.howstuffworks.com). The ratio of protons to electrons is always one to one, thus the atom itself has a neutral charge. Most chemical elements in nature are made up of atoms with different masses but with identical chemical properties (www.nti.org). These kinds of atoms are called isotopes. It is the certain structure of the nucleus of certain isotopes that makes it possible for the atom to release large amounts of energy. This is called Nuclear energy (atomic energy) by splitting atoms. Similar to this, nuclear weapons also the results of the conversion of matter of the radioactive isotopes into energy according to Albert Einstein's formula $E=mc^2$ (E =energy, m =mass and c =speed of the light). Einstein's equation also proves that even a small amount of mass can be turned into tremendous energy (c =approximately $3*10^8\text{km/seconds}$).

Nuclear weapons have been produced using two different processes, fission and fusion. Fission is a process that splits a nucleus into two or more smaller ones. On the other hand, the fusion process produces a nucleus by combining smaller nuclei or isolated protons and neutrons. Normally, the fission process only occurs when the nucleus of a heavy element splits itself by absorbing a free neutron (Freudenrich). The elements contain such fissionable nucleus are called a fissile material. Two isotopes of uranium 235 and 238 and one isotopes of plutonium 239 are three typical fissile materials.

Uranium has two radioactive isotopes U-235 and U-238, but U-235 is more often used in the fission process because comparatively U-235 has better properties for nuclear power production. U-238 requires about 4.5billion years to half its atoms to

decay by spontaneous fission (www.howstuffworks.com). However, U-235 is one of few materials that are able to undergo induced fission. This process allows the U-235 nucleus to split within picoseconds (0.000000000001 seconds) just by adding a neutron (www.howstuffworks.com). Once a large enough amount of either U-235 or plutonium 239 is assembled, a self-sustaining chain reaction occurs naturally. The splitting of atomic nuclei causes the emission of neutrons in a chain reaction. These neutrons again split the other atomic nuclei rapidly and continuously.

There are three conditions of mass that determine a reactor's status: Critical, Sub-critical and Super-critical. Each of these mass is dependent on the shape, composition and the level of purity of the fissile material (www.atomicarchive.com). The critical mass is the least amount of material that is needed in order to sustain a chain reaction. The other two types of mass will either die out or heat up the reactor. In general, about 11 pounds (5 kilograms) of plutonium 239 or 33 pounds (of uranium 235 is needed to achieve a critical reaction (Freudenrich).

Nuclear fusion is used to unite two nuclei forming a heavier one. In order for a fusion reaction to occur, the repellant forces occurring between protons in the nuclei have to be overcome with temperature over 1 billion degrees centigrade and this is why fusion weapons are often referred as thermonuclear weapons. Two different forms of hydrogen, deuterium and tritium are typically used for fusion (www.nti.org). Nuclear fusion is the power that is produced by the sun and stars (www.howstuffworks.com). The bombs made out of this reaction are complex and can produce higher kiloton yields and greater efficiencies than fission weapons.

The tremendous and explosive energy is derived from the fusion of hydrogen's two rare isotopes: Tritium (T) and Deuterium (D). Tritium has a nucleus with a proton and two neutrons and Deuterium's nucleus is composed of one proton and one neutron. These two isotopes' nuclei are fused in thermonuclear weapons. In order to start the process, either T or D has to be compressed with a large amount of heat, thus tremendously high temperature is an essential condition. The fusion reaction that occurs by combining nuclei of D and T will result in helium4 (He4) which has a nucleus containing 2 neutrons and 2 protons ($D + T \rightarrow He4 + \text{neutron} + \text{energy}$). The slight difference in mass between D+T and He4+neutron will convert to energy according to Einstein's formula $E=mc^2$ (Freudenrich).

There are two basic techniques used in fission bomb: gun-triggered and implosion. The gun-triggered is the simplest way to achieve a super-critical mass by firing one sub-critical mass into another. Highly enriched uranium-235 is the only fissile material that can be used in this particular method. One U-235 bullet is placed on the end of the gun barrel shaped device and a powerful conventional explosive is behind the 'bullet'. A sphere of U-235 surrounded by a neutron generator is brought some distance away from the 'bullet'. The conventional explosive fires the bullet at a high speed and a super-critical mass is created as soon as this bullet hits other mass. The super-critical mass will cause all of the U-235 atoms to be split in a microsecond by providing an excessive amount of neutrons and the bomb detonates (www.howstuffworks.com). The gun-triggered method was used to create 'Little Boy', the atomic bomb dropped on Hiroshima on August 6, 1945. Plutonium-239 cannot be used to build this type of bomb. This is because plutonium-240 (which is an impurity of

P-239) has a high spontaneous fission rate that will cause the fission reaction to occur earlier than the explosion and this will make bomb inefficient (www.nti.org).

The other technique, implosion, was used in building 'Fat Man' which was exploded over Nagasaki on August 9 1945. The implosion bomb has a much more complex structure and is much more efficient than the gun-typed bomb. In this method, compression reduces the mass of a sub-critical volume and converts it into a super-critical mass. This type of bomb contains a plutonium-239 core that is surrounded by conventional explosives and a tamper. When conventional explosives explode toward the center, the sub-critical mass will be compressed and become super-critical which makes a self-sustaining chain reaction to occur and cause the bomb to explode (Freudenrich). A tamper is a dense material made of uranium-238. Once it gets heated, it exerts the pressure on the fission core and slows down the rate of the core's expansion. Also, it helps to improve both the efficiency and yields of the bomb by reflecting neutrons back to the core (www.howstuffworks.com). The implosion type can use either uranium-235 or plutonium-239 and it requires less amounts of material than the gun-triggered type (www.fas.org).

The fusion (thermonuclear) bomb is designed in a complex structure, but has much higher yields and greater efficiency than a fission bomb. The basic concept of this bomb is to explode with tremendous energy from the fusion reaction of tritium and deuteride. According to the Teller-Ulam Design of fusion bomb, the bomb consists of two major parts: a fission bomb and a cylinder shaped tamper (U-238) and a two stage of process: a primary (fission and X-rays) and a secondary (fusion). The fission bomb, also called as the 'primary device', provides X-rays when it implodes and these X-rays provide high pressures and temperatures that are enough to initiate the fusion reaction. The second

part of the bomb, the tamper cylinder contains the Lithium deuteride and a rod of plutonium-239 at its center (www.howstuffworks.com). Besides the two major parts, the remaining space of the bomb is filled up with polystyrene foam which provides heat and pressure direct to the tamper cylinder by absorbing X-rays. Once the primary device provides the X-rays, the high temperature expands the tamper case and the compression shock waves initiate a fission reaction in the plutonium rod. The fission reaction will release neutrons and these neutrons will change Lithium deuteride into helium, tritium and deuteride. Finally, Tritium and deuteride achieve fusion reaction under the optimum condition and the neutrons will also undergo a fission reaction with the tamper. Energies that are converted from two-types of nuclear reaction will result in a thermonuclear explosion (Freudenrich). All of these process can be done within 600 billionths of a second and the bomb itself obtains about a 10,000 kiloton yield which is 700 times greater than explosion of 'Little Boy' (www.howstuffworks.com). A nuclear reactor is a device to initiate and control a sustained nuclear chain reaction. The most common use of nuclear reactors is for the generation of electrical power. There are lots of methods to classify nuclear reactors. And each of the nuclear reactors has its own advantages and disadvantages.

The first way of classifying nuclear reactors is classification by use. The most common way to utilize the reactor is to produce reactors for transmutation of elements which is the conversion of one chemical element to isotope into another through either nuclear reactions or radioactive decay. For instance, breeder reactors are capable of producing more fissile materials than they consume during the fission chain reaction (convert U-238 to Pu-239) which makes it possible to generate more fissile materials than it consumes (Experimental Breeder Reactor 1 factsheet, Idaho National

Laboratory). To create various radioactive isotopes is also a main way of using nuclear reactor. For instance, some reactors can generate isotopes such as Americium for use in smoke detectors, and cobalt-60, molybdenum-99 and others, used for imaging and medical treatment. Indeed, a nuclear reactor is able to provide a source of neutron radiation. In order to develop new types of nuclear reactor, there are reactors used for research and training and material testing. The general utilization of nuclear reactors in daily life is to generate electricity like the Nuclear power plants and to create propulsion and to generate heat for domestic and industrial heating system.

The second genre of classification is by the type of nuclear reaction. The first type is a nuclear reactor that uses nuclear fission. All commercial power reactors are based on nuclear fission. They generally use uranium and its product, plutonium, as nuclear fuel. Fission reactors can be divided roughly into two classes, which depends on the energy of the neutrons that sustain the fission chain reaction. The two genres are thermal reactors and fast neutron reactor. Thermal reactors use thermal neutrons and most current reactors are of this type. The thermal reactors contain neutron moderator materials that will slow neutrons until their kinetic energy is close to the average kinetic energy of the surrounding particles. In contrast, fast neutron reactors use fast neutron to generate fission in their fuel. The most distinctive characteristic of this reactor is that it does not have a neutron moderator and it uses less-moderating coolants instead. Fast reactors have the potential to produce less transuranic waste because all actinides are fissionable with fast neutrons, but they are more difficult to build and more expensive to operate. Overall, fast reactors are less common than thermal reactors in most applications. Some early power stations were fast reactors, as are some Russian naval propulsion units (Golubev). Another type is that reactor's energy is generated by

nuclear fusion. However, fusion power is still an experimental technology, generally using hydrogen as fuel which is not suitable for power production. The last type of reactor is generating energy by radioactive decay. For example, there are radioisotope thermoelectric generators which generate heat and power by exploiting passive radioactive decay.

There is a very crucial classification method which is to classify nuclear reactors by moderator material. In this way, these types of reactors have been developed to prototype and commercial scale. Six types of reactors (Magnox, AGR, PWR, BWR CANDU and RVMK) have emerged as the designs used to produce commercial electricity around the world. (Published by the Institution of Electrical Engineers, Savoy Place, in 1993) The first two commercial types which are Magnox and AGR, use gas cooled, graphite moderated material. The effectiveness of this type of reactor is relatively low so that it is necessary to go to higher temperatures to achieve higher thermal efficiencies and higher power densities to reduce capital costs. The AGR (Advanced Gas-Cooled Reactor) is found on the premise of Magnox and improves its efficiency. AGR still uses graphite as the moderator and the steam generators and gas circulators are placed within a combined concrete pressure-vessel shield. The only design of heavy water moderated reactor in commercial use is the CANDU. In this reactor unenriched uranium dioxide is held in zirconium alloy cans loaded into horizontal zirconium alloy tubes, The fuel is cooled by pumping heavy water through the tubes and then to a steam generator to raise steam from ordinary water in the normal way. Light water reactors use ordinary water to moderate and cool the reactors. When at operating temperature, if the temperature of the water increases, its density drops, and fewer neutrons passing through it are slowed enough to trigger further

reactions. The drawback stabilizes the reaction rate. Graphite and heavy water reactors tend to be more thoroughly thermalised than light water reactors. Due to the extra thermalization, these types can use unenriched fuel. And the commonly used design is BWR and PWR which do not need heat exchanger but offset by need for some shielding of steam circuit and turbine.

There are also some types of classification that are relatively less commonly used. For instance, there is classification by coolant which includes Pressurized water reactor (PWR), Pressurised heavy water reactor and boiling water reactor (BWR); Classification by generation which includes Generation I Reactor to Generation IV Reactor.

Although there are lots of distinct ways of classifying the nuclear reactors, the types of reactors are actually limited. Idealistically, there are 900 designs for nuclear reactor to generate energy safely. However, only a limited number of designs are possible to be achieved with the current technological support.

Nuclear weapons probably are the most destructive power in the world, and as the number of nuclear activities in the Middle East grows larger and larger, people or the whole world is worry about the effect that the nuclear weapons bring to society. Controlling the nuclear activities effectively especially in Middle East becomes one of the hardest problems to solve. As the discussion about this topic goes on among the world, a lot of countries and also United Nation start to process some programs in order to monitoring the nuclear activities in Middle East.

The world quickly recognized the possible danger nuclear activities entail and began to control them by forming organizations. Arms Control and Regional Security (ACRS) is an organization which aims to promote peace in the Middle East (idds.org).

The most important steps to reach this goal are to take good care of the nuclear weapon if there are, and always to keep an eye on nuclear activities in the Middle East. As what the CNS (center for nonproliferation studies) reported in 2003, Israel neither confirmed nor denied there were nuclear weapons within the country (Amini, Gitty M.). Therefore, facing this uncertainties of whether there are nuclear weapons in Middle East or not and in order promote a safer world for people, ACRS began to create an framework between 1992 and 1995, stating that to control the arms would be their first step. Secondly, ACRS ensured the regional security center with mostly the Middle East countries which include Egypt, Israel, Jordan, and Palestinian in 2000. Finally, ACRS started processing its plan under American help to provide ACRS with better techniques to control nuclear weapons.

Hardly any program can process successfully if it lacks monetary support. In order to monitor nuclear activities in the Middle East more efficiently, a larger incentive is indispensable. Consequently, the organization called Conference on Security and Cooperation in the Middle East is gathering monetary incentives for those who guard nuclear activities in the Middle East (Kimball, D. G.). The Conference on Security and Cooperation also helps the governments in the Middle East to better shape their economy, an idea proposed by Dr. Yossi Berlin in a CSCE review conference on October 13, 1994(mfa.gov.il).

The United Nations was designed to erect a more peaceful and secure world. As what Iranian did in the past, saying to the world that it will only use nuclear source in appropriate way but did not report where the nuclear source go, makes UN worry about the nuclear activities in Iran. One way the United Nations can implement this mandate or eliminate the worry is to establish a Nuclear Weapon Free Zone (NWFZ) in

the Middle East (idds.org). In order to strengthen the NWFZ, the United Nations granted Atomic Energy Agency permission to detect illegal nuclear activities in the Middle East. In "Monterey Institute of International Studies, International Workshop on the 2000 Conference", Piet de Klerk said Atomic Energy Agency aimed to contribute in peace, the health problems which were caused by nuclear activities and the prosperity, and Atomic Energy Agency would not contribute or collaborate with any people, organizations or countries who wanted to use Atomic Energy Agency in further military purpose (cns.miis.edu). Atomic Energy Agency will always devote itself to prevent nuclear weapons or activities from spreading, and also attract those who uses nuclear source in an inappropriate way. Not only Atomic Energy Agency has obligation to provide safeguard of nuclear activities or sources, but also the countries have the same obligation to report all the nuclear activities within their countries.

The conflict between the Middle East countries and America, and also the competition of owning nuclear weapons are two of determinant factors causing nuclear activities happen frequently in the Middle East. As what Mrs. Clinton said if Iran owned nuclear weapons, other Middle East countries may also wanted to own some nuclear weapons no matter for what purpose (Landler, Mark). Not only the Weapon Race increases the nuclear activities, the war between United States and Iran also increases the nuclear activities because of Iran wants to defense itself by holding nonlethal weapons (Moraitis, Tilemachos). Therefore, the United Nations invests a significant amount of time and effort on finding solutions to solve the conflict between Iran and America and reduce nuclear activities in the region. In Security Council Resolution 1696 on July 31, 2006, the United Nations demanded Iran stop nuclear proliferation. In Security Council Resolution 1737 on December 23, 2006, the United

Nations more strictly stated that Iran would be punished if Iran continues exporting or importing nuclear resources and equipment. In Security Council Resolution 1929 on June 9, 2010, the United Nations started to stop nuclear proliferation in the Middle East. Also in Security Council Resolution 1929, the United Nations began to monitor trade activities. The United Nations, other organizations and also a lot of countries in the world have begun cooperating to control nuclear activities in the Middle East.

There are still some nuclear activities organized secretly in the Middle East; the United Nations estimates that approximately 18 countries of the Middle East are in search of or have nuclear power (Kane). It is suspected that Israel, Algeria, Iraq, Libya, Syria, and Iran have had, have, or are developing nuclear weapons, while the UAE, Jordan and Turkey are or have developed nuclear power structure (Kane). Middle Eastern states search for nuclear power as a source of diversification of energy, desalination of water, and further economic and scientific development (Crail).

In reality, however, the progress of the nations' nuclear facilities, namely Iran, has left the rest of the countries of the Middle Eastern region concerned for their national security. In the wake of Iran's progress, many of these states have begun to speak out, including Egypt's UN Ambassador Maged Abdel Aziz who, earlier in 2010, stated that Egypt "refuses the existence of any nuclear weapons [in the Middle East], whether it is in Iran or whether it is Israel" (Murphy). It is noticeable that the Egyptians fear for the safety of their country, and although they lobby against Nuclear Weapons, the suggestive intentions of creating nuclear plants for energy is a step that leads them closer to weapon security and a reduced fear against the other states (Kane).

Currently, Iran is the only state developing enrichment and reprocessing plants, while Israel already holds the reprocessing capability (Crail). The development and establishment of these plants only increases the desire for other nations to create fuel cycle plants (Crail). However, some states have decided not to follow suit. Bahrain, for example, released a statement on March 24, 2008 affirming “its intention to forgo sensitive fuel cycle technologies and rely on existing international markets for nuclear fuel... in direct contrast to Iran’s nuclear activities” (Crail). Similarly, on April 20, 2008, the UAE released proposed nuclear energy plans that indicated the pursuit of uranium enrichment and plutonium-reprocessing technology not to be in her future because of the international concern this idea upholds (Crail).

These initiatives are certainly a gamble that the UAE and Bahrain have decided to commit to. Although the international community appreciates their decision to avoid dual-use natures of nuclear energy, the UAE and Bahrain leave their nations vulnerable to Iran and other nations that will plan to develop nuclear technologies.

Turkey, on the other hand, has established nuclear reprocessing plants. In addition, there are 54 Turkish companies that produce materials that can potentially be used for the production of nuclear firearms. The materials that these companies produce range from dual-use technological equipment to aluminum (Visky). These companies export materials across the world and are some of the options that states like the UAE and Bahrain may use to import materials. These companies have the ability to sell to anyone interested, unless government decisions prevent this export from occurring. The Turkish government has banned these companies from exporting their materials to Iran, per United States request (Visky). It is evident that the United States is concerned with Iran’s use of these materials.

Western states fear the Middle East being unable to control the use of nuclear power. The strong territorial, religious and ethnic clashes of the region create instant alarms among outside nations (Kane). History has shown violence to be the answer to these nations' disputes. These frail nations, lacking infrastructure and trusted personnel, are questioned with such power. Tensions between nations create a great enough fear, but the transferring of nuclear weapons to non-state actors and terrorist groups raises alarm exponentially. The unreliable governments trigger senses to be heightened and cause a continuous overlooking of the Middle East. Not only is it feared that the weapons may wind up in un-trusted hands, but also the poor infrastructure and finance of these countries may cause extreme harm to the nations as a whole.

The tapestry of the history and politics of the modern Middle East reveals systemic, intermediate, and precipitating issues of the great concern. Thus in this ominous climate, the prospect of negotiating successfully through the mine field of nuclear weapons and technology is fraught with difficulties.

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