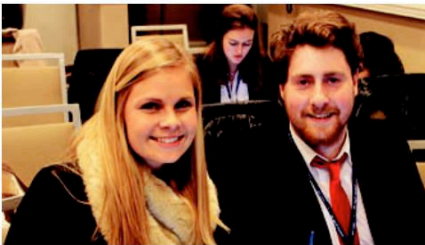


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INTERNATIONAL ATOMIC ENERGY AGENCY BACKGROUND GUIDE 2017



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NATIONAL MODEL UNITED NATIONS

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Abbreviations

AFRA	<i>African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology</i>
ARASIA	<i>Cooperative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology</i>
ARCAL	<i>Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean</i>
CSA	Comprehensive Safeguards Agreement
DBD	Deep borehole disposal
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
HLW	High-level waste
IAEA	International Atomic Energy Agency
ILW	Intermediate-level waste
INVO	Iraq Nuclear Verification Office
JCPOA	<i>Joint Comprehensive Plan of Action</i>
JRC	Joint Research Centre
LFA	Logical Framework Approach
LLW	Low-level waste
NEA	Nuclear Energy Agency
NPT	<i>Treaty on the Non-Proliferation of Nuclear Weapons</i>
NWFZ	Nuclear-Weapons-Free Zone
OECD	Organisation for Economic Co-operation and Development
PACT	Programme of Action for Cancer Therapy
PUI	Peaceful Uses Initiative
RCA	<i>Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific</i>
RSA	<i>Revised Supplementary Agreement</i>
SC	Security Council
SDG	Sustainable Development Goal
SNF	Spent nuclear fuel
TC	Technical cooperation
TCF	Technical Cooperation Fund
TCP	Technical Cooperation Programme
TCPC	Division of Programme Support and Coordination
UN	United Nations
UNEP	United Nations Environment Programme
UNIDIR	United Nations Institute for Disarmament Research
UNODA	United Nations Office for Disarmament Affairs
WAMAP	Waste Management Advisory Programme
WANO	World Association of Nuclear Operators
WHO	World Health Organization
WMD	Weapon of mass destruction

Committee Overview

“The Agency shall seek to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world.”¹

Introduction

The International Atomic Energy Agency (IAEA) is an independent intergovernmental organization of the United Nations (UN) founded “in response to the deep fears and expectations resulting from the discovery

The **International Atomic Energy Agency (IAEA)** is an independent intergovernmental organization that reports to the United Nations General Assembly and Security Council.

of nuclear energy.”² The Agency’s creation began with a speech from President Eisenhower in front of the General Assembly in 1953 and was formalized with the unanimous adoption of the *Statute of the International Atomic Energy Agency* (the Statute) on 23 October 1956 by 81 Member States.³ Despite the passionate words of Eisenhower, the Agency had a rocky start due to the complicated political climate during the Cold War.⁴ However, in the aftermath of the Cuban Missile Crisis and the resulting concerns about nuclear weapons, the IAEA was able to launch its work effectively.⁵ The Agency’s position and influence was particularly strengthened through the growing number of Member States and the worrisome situations in many regions, such as the violations of the safeguard provisions by Iraq and the Democratic People’s Republic of Korea and the nuclear power plant catastrophe in Chernobyl.⁶

During the recent 60th meeting of the General Conference, the body voted on the budget update for 2017 and adopted the annual report of the IAEA for 2015.⁷ In addition to these items, the Member States discussed topics such as nuclear security, emergency preparedness and response, the Agency’s technical cooperation activities and cooperation in nuclear, radiation, transport and waste safety, and the IAEA’s safeguards in the Middle East and in the Democratic People’s Republic of Korea.⁸ Additionally, the IAEA’s 60th anniversary was celebrated during the General Conference with a number of side events and exhibitions.⁹ During the General Conference, the Scientific Forum was held and included a high-level discussion titled, “How can nuclear techniques help countries achieve the Sustainable Development Goals?”¹⁰ This discussion illustrated the importance and role of the Sustainable Development Goals (SDGs) (2015) within the IAEA’s priorities and aims.¹¹

Governance, Structure, and Membership

The Secretariat, the General Conference, and the Board of Governors

The General Conference, attended by all IAEA Member States, is the highest policy body of the IAEA and meets annually.¹² Apart from the annual meetings, the General Conference can also be convened at any time by the Director General upon request of the Board of Governors or a majority of Member States.¹³ The functions and powers of the General Conference are described in Article V of the IAEA Statute.¹⁴ The General Conference discusses and makes decisions on matters within the scope set in the IAEA Statute, including the election of the Board of Governors, the approval of the applications for membership, the appointment of the Director General, and

¹ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. II.

² Fischer, *History of the International Atomic Energy Agency: The first Forty Years*, 1997, pp. 1-3; New Zealand Ministry of Foreign Affairs and Trade, *UN Handbook 2016-17*, 2016, p. 371.

³ Fischer, *History of the International Atomic Energy Agency: The first Forty Years*, 1997, pp. 1-3.

⁴ Ibid.

⁵ Ibid.

⁶ Ibid.

⁷ IAEA, *General Conference Provisional Agenda (GC(60)/1)*, 2016, p. 2.

⁸ Ibid.

⁹ IAEA, *Sixtieth Anniversary of the IAEA*.

¹⁰ Ibid.

¹¹ Ibid.

¹² IAEA, *IAEA General Conference*, 2016.

¹³ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. V.

¹⁴ Ibid.

the decision upon changes made to the IAEA Statute.¹⁵ Additionally, the General Conference has the power to suspend Member States, considers the annual report of the IAEA, votes on the budget suggested by the Board of Governors, adopts reports submitted to the UN, and approves agreement made between the IAEA and the UN or other organizations.¹⁶

The Board of Governors, which consists of 35 representatives of IAEA Member States and is elected by the General Conference, meets five times annually and makes recommendations to the General Conference concerning the IAEA's accounts, actions, and budget, and considers applications for IAEA membership.¹⁷ The Board also prepares the annual report of the IAEA on the activities and actions of the Agency, which is presented to the General Conference each year.¹⁸ Generally, the Board is responsible for carrying out the functions of the IAEA as outlined in the Statute and according to its responsibilities to the General Conference.¹⁹

The Secretariat is headed by the Director General and consists of four offices and six departments that carry out the day-to-day work of the Agency.²⁰ The Director General's Office for Coordination, the Office of Internal Oversight Services, the Office of Legal Affairs, and the Office of Public Information and Communication provide administrative functions and support to the remainder of the Secretariat.²¹ The Departments of Management, Nuclear Energy, Nuclear Safety and Security, Nuclear Sciences and Applications, Safeguards, and Technical Cooperation carry out the IAEA's work in promoting disarmament, nonproliferation, and peaceful use of nuclear technology.²²

Member States

The IAEA currently has 168 Member States.²³ The Member States of the UN and of specialized agencies can become Member States of the IAEA by signing and ratifying the IAEA Statute, or in the case a non-UN Member State, can become a member of the IAEA by accepting the IAEA Statute and by being accepted by the General Conference.²⁴ A particular situation exists concerning the states that are Member States of the IAEA but have not joined the *Treaty on the Non-Proliferation of Nuclear Weapons* (NPT) (1968), and the States parties to the NPT that are not Member States of the IAEA.²⁵ Currently, there are 189 States parties to the NPT and while India, Pakistan, North Korea and Israel have not joined the NPT, they are, with the exception of North Korea, Member States of the IAEA.²⁶

Mandate, Functions, and Powers

According to Article 2 of the Statute, the Agency aims to “accelerate and enlarge the contribution of atomic energy to peace, health and prosperity throughout the world” and thus, the primary role of the IAEA is to ensure that atomic energy is used for safe, secure, and peaceful purposes.²⁷ The mandate is further defined by the provisions of the NPT, which establishes binding international law concerning nonproliferation of nuclear weapons, the disarmament of existing nuclear weapons systems, and the advancement of peaceful nuclear technology, thereby outlining the tasks and responsibilities of the IAEA.²⁸

The functions of the IAEA are described in Article 3 of the Statute, which consist of the assistance and surveillance of the peaceful use of atomic energy accomplished through the provision of research and technical assistance for the practical application and development atomic energy.²⁹ To that end, the IAEA makes provisions about the standards

¹⁵ Ibid.

¹⁶ Ibid.

¹⁷ IAEA, *Board of Governors*, 2016.

¹⁸ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. VI.

¹⁹ Ibid.

²⁰ IAEA, *Organizational Chart*, 2013; IAEA, *Employees & Staff: Strength Through Diversity*, 2016.

²¹ IAEA, *Organizational Chart*, 2013.

²² Ibid.

²³ IAEA, *Member States of the IAEA*, 2016.

²⁴ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. IV; IAEA, *Member States of the IAEA*, 2016.

²⁵ World Nuclear Association, *Safeguards to Prevent Nuclear Proliferation*, 2016.

²⁶ Ibid.

²⁷ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. III.

²⁸ *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

²⁹ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. III A.

for materials, services, equipment, and facilities to conduct research and produce atomic power.³⁰ Furthermore, the IAEA encourages and assists in the exchange of information, training, and the exchange of scientists.³¹ Additionally, the IAEA is able to acquire facilities, plants, and equipment necessary to conduct its tasks and responsibilities.³²

Under its safeguard provisions in Article 7 of the Statute, the IAEA has the power to examine facilities and equipment, which includes the right to send inspectors to Member State facilities and to request progress reports from those states.³³ Furthermore, the IAEA has the power to require information on health and safety standards, and on the production and recovery on fissionable materials.³⁴ In case of noncompliance with IAEA provisions, the Agency is able to take further sanctioning steps including the suspension or termination of IAEA assistance or the withdrawal of material and equipment provided by the Agency.³⁵

Additional functions of the IAEA are set out in Article 3 of the NPT, which obliges States parties to the treaty to accept safeguard provisions, which should be negotiated between the Member State and the IAEA in accordance with the provisions outlined in the Statute and the NPT.³⁶ The IAEA is responsible for supervising and ensuring compliance to the established safeguard provisions, including the prevention of the misuse of nuclear material for non-peaceful usage, such as nuclear weapons or other explosive nuclear devices, and the supervision of the production, possession, and usage of fissionable material.³⁷ Finally, the Statute establishes the IAEA's reporting to UN bodies, including annual reports to the General Assembly, reports to the Security Council as needed, and reports to other organs regarding matters within the "competence" of those bodies.³⁸

Recent Sessions and Current Priorities

Outcomes of the 59th General Conference

The 59th General Conference took place in September 2015, and was attended by more than 5,000 delegates from 165 IAEA Member States, international organizations, non-governmental organizations, and the media.³⁹ During the Conference, the Member States adopted several resolutions on the further intensification of the IAEA's work on nuclear science and technology, safety, security, safeguards, and technical cooperation.⁴⁰ Other important decisions made at the 2015 General Conference were the adoption of the budget for 2016-2017, the approval of the resolution on the implementation of the safeguards agreement between the IAEA and the Democratic People's Republic of Korea, and the continuation of the Nuclear Security Plan 2014-2017.⁴¹ Furthermore, the applications of membership of Antigua and Barbuda, Barbados, and Turkmenistan were approved.⁴²

Peaceful Uses Initiative and the SDGs

The Peaceful Uses Initiative (PUI), which was launched in 2010, aims to finance unfunded projects in the area of peaceful usage of nuclear technologies and provide additional financial support to projects that foster technical cooperation.⁴³ The aim of the initiative is to be more efficient and flexible in reacting to the needs of Member States and to critical events that require quick and effective responses and support.⁴⁴ Examples of such events are the

³⁰ Ibid.

³¹ Ibid.

³² Ibid.

³³ Ibid., Art. XII.

³⁴ Ibid.

³⁵ Ibid.

³⁶ *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

³⁷ Ibid.

³⁸ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956, Art. III.

³⁹ IAEA Office of Public Information and Communication, *Key Resolutions Adopted as IAEA General Conference Draws to a Close*, 2015.

⁴⁰ Ibid.

⁴¹ Ibid.

⁴² Ibid.

⁴³ IAEA, *What is the Peaceful Use Initiative*, 2016.

⁴⁴ Ibid.

outbreak of Ebola in West Africa or the effects of the Zika virus in Latin America, whereby the PUI provided training courses on nuclear-derived techniques to advance the research on the Ebola and Zika virus.⁴⁵

The IAEA's objective to provide nuclear technology for Member States in order to advance fields such as energy, human health, food production, water management, and environmental protection demonstrates the close link between the work of the IAEA and the SDGs.⁴⁶ Nuclear technologies play a crucial role in effectively addressing many of the challenges set out by the SDGs, such as in health care to diagnose, cure, or palliate disease; in agriculture, to monitor and protect the environment to identify and protect water resources; and in energy production, to support the production of clean, sustainable, and affordable energy for everybody.⁴⁷

The 2020 NPT Review Conference

Every five years the NPT parties meet to review and reform the agreements within the treaty.⁴⁸ The most recent conference was held in 2015 and ended unsuccessfully with States parties unable to reach a consensus on the substance of the Final Document.⁴⁹ As several Review Conferences have been of limited success in recent decades, it is crucial that the States parties to the NPT reach a consensus on the continuation and reform of the NPT and the future global nuclear order at the Review Conference in 2020.⁵⁰

Conclusion

The primary aim of the IAEA is to guarantee the peaceful use of nuclear material. Thereby, the Agency faces the challenge to advance nuclear technology and to spread knowledge on effective and sustainable usage of nuclear energy on one hand, and to prevent the usage of nuclear material for atomic weapons and non-peaceful purposes on the other hand.⁵¹ The work of the IAEA is crucial to the development of nuclear security standards that allow for the development of peaceful uses of nuclear technologies to guarantee the protection of human health and the environment.⁵² Several key challenges undermine the ability of the Agency to enforce these standards, including the situations in North Korea and the Middle East. As the IAEA continues its work toward the realization of the SDGs through its day-to-day operations, implementation of the PUI, and preparation for the 2020 NPT Review Conference, great focus will be on addressing current security challenges facing the Agency.

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Fischer, D. (1997). *History of the International Atomic Energy Agency: The first Forty Years*. Retrieved 19 July 2016 from: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1032_web.pdf

This publication covers the first 40 years of the IAEA's history and describes the foundation and developments of the Agency during that period. The publication particularly concentrates on the foundation of the Agency and the difficulties the IAEA faced during the period of the Cold War.

The publication provides an in-depth and comprehensive oversight of the challenges and achievements of the Agency during the first 40 years after its creation. Even though the publication is quite old and lacks the development of the last 20 years, it is a helpful and rich source to learn about the first years of the Agency and the challenges during the Cold War and post-Cold War period.

International Atomic Energy Agency. (n.d.). *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals* [Report]. Retrieved 8 August 2016 from: https://www.iaea.org/sites/default/files/sdg-brochure_forweb.pdf

The report explains very well the connection between the responsibilities and tasks of the IAEA and the Sustainable Development Goals. The Agency shows how nuclear energy can contribute to advance the Goals and how their projects and initiatives can advance many areas to make them become reality. This publication is a good way to help delegates connect the IAEA's work not purely to nuclear and energy security, but also to often overlooked humanitarian and development aims. The diversification of the IAEA's work is well illustrated and should motivate delegates to perceive the Agency as more than just a supervisor of the distribution of nuclear weapons and nuclear energy usage.

International Atomic Energy Agency. (2016). *Annual Report 2015 (GC(60)/9)*. Retrieved 14 August 2016 from: https://www.iaea.org/About/Policy/GC/GC60/GC60Documents/English/gc60-9_en.pdf

The report is the newest publication of the IAEA's annual report about its work and achievements of the period of 2015. The report provides an overview of the various areas of engagement of the IAEA, including nuclear technology, nuclear safety and security, nuclear verification, and technical cooperation. Thereby, the report particularly concentrates on nuclear technologies and also assesses areas that are related to nuclear energy and technology, such as, but not limited to, food and agriculture, environment, water resources, and human health. The report is a good way for delegates to receive an overview of the Agency's areas of action and the achievements reached in different areas of nuclear energy.

⁴⁵ IAEA, *What is the Peaceful Use Initiative*, 2016; IAEA Office of Public Information and Communication, *Scientists Learn to Detect Zika Virus Using Nuclear-Derived Technique*, 2016.

⁴⁶ IAEA, *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*, p. 2ff.

⁴⁷ IAEA, *IAEA and the Post-2015 Development Agenda*, 2015.

⁴⁸ IAEA, *NPT Review Conferences*; UN, *Conference to the Parties of the NPT, 2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)*.

⁴⁹ IAEA, *NPT Review Conferences*; United Nations, *2015 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons (NPT)*.

⁵⁰ Meyer, *A failed nuclear NPT review conference: Fin de regime?*, 2015; Baklitskiy, *The 2015 NPT Review Conference and the Future of the Nonproliferation Regime*, 2015.

⁵¹ IAEA, *Annual Report 2015 (GC(60)/9)*, 2016, p. 1ff.

⁵² IAEA, *The IAEA Mission Statement*.

Treaty on the Non-Proliferation of Nuclear Weapons (1968). Retrieved 12 August 2016 from:

<https://www.iaea.org/sites/default/files/publications/documents/infcircs/1970/infcirc140.pdf>

The Treaty on the Non-Proliferation of Nuclear Weapons is one of the most important treaties leading and defining the IAEA's responsibilities, mandate, and powers. The Treaty depicts a major achievement of the Agency and significantly advanced the combat against the spread of nuclear weapons. The Treaty provides delegates with the necessary knowledge on the current legal situation on the proliferation of nuclear weapons and shows possible gaps and necessary improvements that delegates should discuss and negotiate on.

United Nations, Conference on the Statute of the International Atomic Energy Agency. (1956). *The Statute of the International Atomic Energy Agency*. Retrieved 19 July 2016 from:

<https://www.iaea.org/sites/default/files/statute.pdf>

The Statute is the founding document of the IAEA that outlines and describes the terms and conditions of the establishment and the functioning of the Agency. The Statute includes objectives, functions, rules for memberships, and further regulations concerning the structure and the work of the IAEA. The Statute is the ideal source to get familiar with the Agency's mandate, responsibilities and functions, powers and possibilities. This source is a good starting point for the research of delegates and provides a basis for the knowledge necessary to continue research on the substantive work and actions of the Agency.



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I. Application of IAEA Safeguards in the Middle East

*“Above all else, we need a reaffirmation of political commitment at the highest levels to reducing the dangers that arise both from existing nuclear weapons and from further proliferation.”*⁵³

Introduction

For the past several decades, the Middle East has remained a politically volatile region, often subject to war, instability, and weapons proliferation.⁵⁴ There have been numerous conflicts within the region, including some that deployed weapons of mass destruction (WMDs), such as the use of chemical weapons by Saddam Hussein during the Iran-Iraq war in the 1980s.⁵⁵ With such relative instability and reoccurring violence, the international community has placed high importance on ensuring that WMDs do not lead the Middle East to a destructive tipping point.⁵⁶ Thus the international community has put a special focus on preventing the proliferation of WMDs within the Middle East, particularly nuclear weapons.⁵⁷ This initiative grows increasingly crucial as the rise of non-state actors, such as terrorist organizations, may also seek to obtain nuclear technologies and enriched uranium for destructive purposes.⁵⁸ The International Atomic Energy Agency (IAEA) has been playing a crucial role in this initiative through applying safeguards that ultimately aim to prevent the production and proliferation of nuclear weapons.⁵⁹ In a general sense, IAEA safeguards are technical measures that are agreed by the IAEA and the state in question to monitor the nuclear activities through the use of information sharing, cooperation and inspections.⁶⁰ These measures are then used to determine if the nuclear program is being used for peaceful purposes.⁶¹

Safeguards application has been a troubled issue within the Middle East, particularly because the majority of the instances where the IAEA has found states to be noncompliant with their safeguards agreement have occurred within the region.⁶² Since the 1970s, the IAEA has suspected several Middle Eastern states of having tried to circumvent their safeguards agreements in order to develop a clandestine nuclear weapons program.⁶³ Within the region, the Republic of Iraq was investigated for a covert nuclear weapons program in 1991, as were the Islamic Republic of Iran in 2002 and the Syrian Arab Republic in 2007.⁶⁴ Libya also declared it had a secret nuclear weapons program in 2003, but renounced any further efforts to pursue a nuclear weapon at that time.⁶⁵ Following these discoveries, the IAEA was able to prevent some states, such as Iraq and Iran, from acquiring nuclear weapons and both states have since been brought back into compliance with their safeguards agreements.⁶⁶ The IAEA has however had limited communication with Syria, due to the instability within the region.⁶⁷ Combined with the rise of instability, violence and a deteriorating security situation, the IAEA faces numerous complications in cooperating and communicating with various states in the region.⁶⁸ In the future, the application of the safeguard agreements and capacity-building measures would help reduce the risk of using nuclear technology and fissile materials for destructive purposes.⁶⁹

⁵³ UN General Assembly, *We the Peoples: The Role of the United Nations in the 21st Century (A/54/2000)*, 2000.

⁵⁴ Cordesman, *The [New-Old] Crises and Instability in the Middle East and North Africa in 2016*, 2016.

⁵⁵ *Ibid.*

⁵⁶ Nuclear Threat Initiative. (2011). *Middle East Instability Increases Proliferation Threat, Former U.S. Official Says*, 2011.

⁵⁷ James Martin Center for Nonproliferation Studies & Vienna Center for Disarmament and Nonproliferation, *Topic: Middle East Issues*, 2016.

⁵⁸ Goren, *The Middle East: The Culprit for my Nuclear Security Insomnia. Bulletin of the Atomic Scientists*, 2016.

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⁶⁰ Amano, *IAEA safeguards: a vital contribution to international peace and security*, 2016.

⁶¹ IAEA, *IAEA Safeguards, Serving Nuclear Nonproliferation*, 2015.

⁶² Arms Control Association, *Who Has What at a Glance*, 2016.

⁶³ *Ibid.*

⁶⁴ *Ibid.*

⁶⁵ *Ibid.*

⁶⁶ Arms Control Association, *WMD-Free Middle East Proposal at a Glance*, 2015.

⁶⁷ IAEA, *Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic*, 2014.

⁶⁸ Cordesman, *The [New-Old] Crises and Instability in the Middle East and North Africa in 2016*, 2016.

⁶⁹ *Ibid.*

International and Regional Framework

To date, all United Nations (UN) Member States within the region, with the exception of Israel, are party to the *Treaty on the Nonproliferation of Nuclear Weapons* (NPT) (1968).⁷⁰ The NPT is important in this context, as all States parties within the Middle East are designated as “Non-Nuclear Weapons States” (NNWS) which does not permit them to construct, acquire or possess nuclear weapons.⁷¹ Moreover, the NPT also legally binds NNWS to accept IAEA safeguards that monitor their nuclear activities to ensure their peaceful purposes.⁷² Typically, each

NNWS has a specific “safeguards agreement” with the IAEA in place.⁷³ Grounded in Article III of the NPT, NNWS must accept IAEA safeguards and negotiate a safeguards agreement within 180 days of signing the NPT that will be applicable to all nuclear activities, domestic and abroad, as well as any fissile material that is transferred for peaceful uses.⁷⁴ The NPT also hosts a Review Conference, held every five years, where a number of notable decisions have been made in reference to IAEA safeguards in the Middle East.⁷⁵ The Review Conference held in 1995 is the first time States parties agreed to convene a conference specific to banning all WMDs in the Middle East.⁷⁶

In 1989, a technical study of the IAEA identified the geographic boundaries of the Middle East as far west as Libya and as far east as Iran, but the definition has since been interpreted to include most of North Africa.⁷⁷ The IAEA General Conference has adopted several resolutions on the safeguards in the Middle East for over the past decade, included the 2015 resolution on “Application of IAEA Safeguards in the Middle East.”⁷⁸ The resolution emphasized that the application of IAEA safeguards in the region as a practical and appropriate step towards establishing a verifiable Nuclear-Weapons-Free Zone (NWFZ) and described the preparation of model safeguard agreements as a necessary step towards the full implementation of comprehensive safeguards agreements.⁷⁹ In addition to this resolution, the Report by the Director General released in 2015, *Application of IAEA Safeguards in the Middle East*, highlighted the need to implement full-scope agency safeguard agreements and provided an overview on the status of safeguard implementation.⁸⁰

There have been a variety of General Assembly resolutions that have either addressed the topic directly or have set a foundation for the topic to be negotiated from that point onward.⁸¹ General Assembly resolution 3472 B of 1975 outlines the functioning and operation of a NWFZ.⁸² Specifically, the resolution defines a NWFZ as any zone recognized by the General Assembly, with any group of willing and able Member States, that specifically prohibits the manufacturing, possession or transfer of nuclear weapons between those states, and as well as a verification mechanism to ensure compliance with the agreement.⁸³ More recently, during its 70th session, the General Assembly passed resolution 70/24, “Establishment of a Nuclear Weapons Free Zone in the Middle East,” which calls for the establishment of a NWFZ in the Middle East and also calls for states in the region to place all of their nuclear activities under IAEA safeguards.⁸⁴ Moreover, it also invites states within the region to not produce any nuclear weapons, nor host or place them within their territory, and for Nuclear Weapons States to refrain from any action counter to the spirit of the resolution.⁸⁵

⁷⁰ IAEA, *Israel Nuclear Capabilities*, 2010.

⁷¹ *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

⁷² *Ibid.*

⁷³ IAEA, *IAEA Safeguards, Serving Nuclear Nonproliferation*, 2015.

⁷⁴ *Treaty on the Non-Proliferation of Nuclear Weapons*, 1968.

⁷⁵ Arms Control Association, *WMD-Free Middle East Proposal at a Glance*, 2015.

⁷⁶ James Martin Center for Nonproliferation Studies & Vienna Center for Disarmament and Nonproliferation, *Topic: Middle East Issues*, 2016.

⁷⁷ IAEA, *Modalities of Application of Agency Safeguards in the Middle East*, 1989.

⁷⁸ IAEA General Conference, *Application of IAEA Safeguards in the Middle East (GC(59)/RES/15)*, 2015.

⁷⁹ *Ibid.*

⁸⁰ IAEA Board of Governors, *Application of IAEA Safeguards in the Middle East (GOV/2015/45-GC(59)/15)*, 2015, p. 3.

⁸¹ UN General Assembly, *Follow-up to the 2013 high-level meeting of the General Assembly on nuclear disarmament (A/RES/68/32)*, 2013, p. 2.

⁸² Arms Control Association, *WMD-Free Middle East Proposal at a Glance*, 2015.

⁸³ UN General Assembly, *Comprehensive Study of the question of nuclear-weapons-free-zones in all its aspects (3472 B)*, 1975.

⁸⁴ UN General Assembly, *Establishment of a Nuclear Weapons Free Zone in the Middle East (A/RES/70/24)*, 2015.

⁸⁵ *Ibid.*

In addition, the Security Council has adopted several resolutions that address this topic, either directly or indirectly.⁸⁶ Security Council resolution 687 (1991), which addressed Iraq's invasion of Kuwait and sought to bring Iraq in compliance with its safeguards agreement, was the first time when the Security Council endorsed the goal of establishing a zone free of WMDs in the Middle East.⁸⁷ Security Council resolution 1540 imposes obligations onto Member States to adopt legislation to prevent the proliferation and illicit trafficking of chemical, biological, and nuclear weapons, as well their technologies and materials.⁸⁸ The resolution also established the 1540 Committee, which functions as the implementation arm of the resolution and pairs technical experts with requests for assistance by Member States.⁸⁹ Such a partnership can assist Member States to strengthen their cooperation to build capacity that could complement and reinforce existing safeguard agreements.⁹⁰

Role of the International System

While the General Conference has over the past decade taken up the topic of "Implementing IAEA Safeguards in the Middle East" as one of the main priorities on its agenda, the IAEA Board of Governors also has the power to approve safeguards agreements between states and the IAEA.⁹¹ As the key communicative body concerning States parties' compliance, the Board calls upon noncompliant parties to correct their actions and report noncompliance to the General Assembly and the Security Council.⁹² In the Middle East, the Board utilized this power when Iraq was found to be noncompliant with its safeguards agreement in 1991, subsequently causing the SC to pass the aforementioned resolution 687.⁹³ The Board can also cease any assistance being provided to the state by the IAEA and call for the return of any materials provided.⁹⁴

Within the UN system itself, one primary body addressing this topic is the UN General Assembly, and the General Assembly First Committee.⁹⁵ Through the First Committee agenda, Member States have dedicated significant attention to the risk of nuclear nonproliferation within the Middle East and the implementation of a NWFZ in the region.⁹⁶ The body aims to negotiate the application of full-scope agency safeguards within the region and seeks to find a political agreement on how to advance negotiations on the process towards a NWFZ in the Middle East, and often follows up to previous negotiations, such as those within the NPT Review Conference.⁹⁷ Points of contention have however arisen from this body, as many states have disagreed with the current approach towards a NWFZ, arguing that implementing IAEA safeguards in the region cannot be addressed in isolation from creating stable security conditions.⁹⁸

The UN Office for Disarmament Affairs (UNODA) also provides substantive and organizational support for disarmament and nonproliferation related matters within the UN system and other bodies.⁹⁹ Applying IAEA safeguards in the Middle East can fall into the UNODA's purview as it provides advisory support, can facilitate inter-agency cooperation, and assists with confidence-building measures.¹⁰⁰ In addition to the UNODA's substantive assistance, the United Nations Institute for Disarmament Research (UNIDIR) creates research papers to help guide policy makes on matters related to disarmament and nonproliferation.¹⁰¹ Substantive examples of policies area that UNIDIR has touched upon include recommendations for a NWFZ in the Middle East and multilateral cooperation in

⁸⁶ Arms Control Association, *WMD-Free Middle East Proposal at a Glance*, 2015.

⁸⁷ UN Security Council, *Iraq-Kuwait (S/RES/687)*, 1991. p. 2.

⁸⁸ UN Security Council, *About Security Council Resolution 1540*.

⁸⁹ *Ibid.*

⁹⁰ *Ibid.*

⁹¹ IAEA, *Rules and Procedures of the Board of Governors*; IAEA, *Statute, Article XII, Section 7.C*, 1956.

⁹² IAEA, *Statute, Article XII, Section 7.C*, 1956.

⁹³ *Ibid.*

⁹⁴ *Ibid.*

⁹⁵ UN General Assembly, *First Committee*, 2015.

⁹⁶ Osgood Center, *History of the General Assembly First Committee*, p. 3.

⁹⁷ UNODA, *Disarmament in the General Assembly*, 2016.

⁹⁸ IAEA Board of Governors, *Application of IAEA Safeguards in the Middle East (GOV/2015/45-GC(59)/15)*, 2015 p. 3.

⁹⁹ UNODA, *About Us*, 2016.

¹⁰⁰ UNODA, *About Us*, 2016; UNODA, *Confidence-building Measures*, 2016.

¹⁰¹ UNIDIR, *About*, 2016.

fuel cycles.¹⁰² These reports serve as a resource for Member States to draw upon expert opinions related to IAEA safeguards, including in the context of their implementation in the Middle East.¹⁰³

Understanding Safeguards: Cooperation, Implementation, and Verification

The IAEA uses three types of safeguard agreements to administer safeguards and to implement agreements: Comprehensive Safeguards Agreements (CSAs), Item-Specific Safeguard Agreements, and Voluntary Offer Agreements.¹⁰⁴ When a Member State enters a CSA, it is expected to accept safeguards on all its peaceful nuclear activities throughout the entirety of its territory and on all nuclear material under its control outside of this territory.¹⁰⁵ NNWS under the NPT are required to “conclude CSAs with the IAEA, while the IAEA also has the right and obligation to ensure that such safeguards are applied on all nuclear materials.”¹⁰⁶ A state may also enter item-specific safeguard agreements, whereby it “agrees to use nuclear material, non-nuclear material, facilities, and other items specified within the agreements solely for peaceful purposes.”¹⁰⁷ An Item-Specific Safeguard Agreement specifically defines the items that are subject of monitoring, and excludes all non-mentioned items from the supervision.¹⁰⁸ Finally, some Member States, typically nuclear weapon states, have entered a Voluntary Offer Agreement, allowing the IAEA to apply relevant safeguards to nuclear facilities controlled by these Member States.¹⁰⁹ The IAEA also works with additional protocols, which can be supplemented with any type of safeguards agreement and grants the IAEA complementary legal authority in verifying a state’s nuclear activities.¹¹⁰ States with CSA must accept the Model Additional Protocol, which was developed in 1997 and approved by the IAEA Board of Governors.¹¹¹ Furthermore, the Small Quantities Protocol, developed in the early 1970s and revised in 2005, is meant to relieve the burden of countries with small amounts of fissile materials and minimal nuclear activities.¹¹²

Applying IAEA safeguards is a sensitive issue as Member States are required to communicate very technical information to the IAEA in a timely and predictable manner.¹¹³ When mechanisms are not properly implemented, the overall effectiveness of the safeguards and potentially burden peaceful uses of nuclear technology is at risk.¹¹⁴ The IAEA thus uses various measures to guarantee the implementation of safeguards and to promote cooperation between the two parties.¹¹⁵ The IAEA provides three different types of assistance to Member States: 1) IAEA State system of accounting for and control of nuclear material mission, 2) training courses, and 3) the publication of guidance documents.¹¹⁶

The use of assistance to promote cooperation seeks to support Member States to implement their safeguards agreements and in turn, allows the IAEA to monitor ongoing nuclear activities.¹¹⁷ Within the region, Bahrain, Comoros, Djibouti, Iraq, Jordan, Kuwait, Libya, Mauritania, Morocco, and the United Arab Emirates have additional protocols in force.¹¹⁸ Iran and Tunisia have signed their additional protocols, whereby Iran has been implementing their progressively since January 2016, when the agreement entered into force, while Tunisia has yet to begin implementation.¹¹⁹ Algeria has approved of an agreement for an additional protocol but has yet to sign on to it.¹²⁰ Somalia is the sole Member State within the Middle East which has not yet concluded a CSA.¹²¹ To further

¹⁰² UNIDIR, *Multilateral Approaches to the Nuclear Fuel Cycle, Summary of the first study paper*, 2009.

¹⁰³ UNIDIR, *Nuclear Weapons Free Zone*, 2011, p. 40.

¹⁰⁴ IAEA, *IAEA Safeguards, Serving Nuclear Nonproliferation*, 2015.

¹⁰⁵ *Ibid.*

¹⁰⁶ *Ibid.*

¹⁰⁷ *Ibid.*

¹⁰⁸ *Ibid.*

¹⁰⁹ *Ibid.*

¹¹⁰ *Ibid.*

¹¹¹ *Ibid.*

¹¹² *Ibid.*

¹¹³ Henrique, *A Day in the Life of an IAEA Safeguards Inspector*, 2016.

¹¹⁴ *Ibid.*

¹¹⁵ IAEA, *Assistance for States*, 2016.

¹¹⁶ *Ibid.*

¹¹⁷ *Ibid.*

¹¹⁸ IAEA Board of Governors, *Application of IAEA Safeguards in the Middle East (GOV/2015/45-GC(59)/15)*, 2015 p. 2.

¹¹⁹ *Ibid.*

¹²⁰ *Ibid.*

implementation, the IAEA maintains a strong role in using cooperation and assistance as a means to fulfill implementation within the region.¹²² For example, the IAEA has negotiated several small quantities protocols within the region to ease the burden of reporting, while also hosting workshops to draw on regional expertise in relationship to safeguard implementation.¹²³

Once implemented, safeguards agreements are monitored by the IAEA through the use of mechanisms to verify compliance, which is done through on-site inspections and monitoring to evaluate the declared nuclear activities of the Member State in question.¹²⁴ Perhaps one of the largest success stories of the IAEA's work in the Middle East was with monitoring and verifying Iraq's nuclear program after 1991 when the SC adopted resolution 687.¹²⁵

Through that resolution, the IAEA established the Iraq Nuclear Verification Office (INVO), which lasted until 2007.¹²⁶ During its tenure, the office assembled teams of experts to better understand how Iraq's clandestine nuclear weapons program manifested, while also coordinating the destruction of any nuclear material or technology deemed harmful by the SC.¹²⁷ After the nuclear weapons program was disassembled, INVO remained committed to supervise Iraq's nuclear infrastructure.¹²⁸ As a result of INVO's work, the IAEA Director General was able to report in 2003 that no further evidence existed of Iraq trying to pursue a nuclear weapons program and was subsequently decommissioned in 2007.¹²⁹

Recent Developments in the Middle East

As previously mentioned, the history of instability and geopolitical volatility has caused safeguards agreements to be found compromised within Libya, Iraq, Syria, and Iran at some point within the past two decades.¹³⁰ The IAEA has attempted to support a variety of negotiations and initiatives in order to help maintain and reinforce safeguards agreements that assist in providing stability by reducing the overall risk of nuclear nonproliferation and building confidence between Member States.¹³¹ As of 2016, Libya and Iraq have been reported to have an additional protocol in force, with Iran provisionally implementing their own additional protocol.¹³² Syria remains the only state that has thus far not entirely addressed its noncompliance with safeguards, of which it was already accused in 2011.¹³³ Though Syria indicated its willingness to cooperate and accept inspectors in 2014, the IAEA decided against launching a mission due to the prevailing security situation on the ground.¹³⁴ Finding methods to cooperate with Syria might prove to be one of the largest challenges by the IAEA, especially if the security situation does not improve.¹³⁵

Establishing a Nuclear Weapons Free Zone

The establishment of a NWFZ in the Middle East has been one of the largest priorities and challenges within the international system.¹³⁶ This priority setting has also been observable in the General Assembly since the 1970s and the process was catalyzed during the NPT Review Conference in 1995, where Member States first set out tangible guidelines to negotiate a NWFZ.¹³⁷ However, certain disagreements concerning the NWFZ have persisted for over a decade and the negotiations were never convened.¹³⁸ During the 2015 NPT Review Conference, States parties tried again to advance the negotiations and asked the Secretary-General to call in a meeting in spring 2016 in order to

¹²¹ Ibid.

¹²² IAEA, *Iran and the IAEA: verification and monitoring under the JCPOA*, 2016.

¹²³ IAEA, *Status of Small Quantities Protocols*, 2016.

¹²⁴ IAEA, *Nuclear Verification*, 2013.

¹²⁵ IAEA, *About INVO*, 2003.

¹²⁶ Ibid.

¹²⁷ Ibid.

¹²⁸ Ibid.

¹²⁹ IAEA, *Iraq Nuclear Verification Office*, 2016.

¹³⁰ Arms Control Association, *Who Has What at a Glance*, 2016.

¹³¹ IAEA Board of Governors, *Application of IAEA Safeguards in the Middle East (GOV/2015/45-GC(59)/15)*, 2015.

¹³² Ibid.

¹³³ IAEA, *Implementation of the NPT Safeguards Agreement in the Syrian Arab Republic*, 2014.

¹³⁴ IAEA Board of Governors, *Application of IAEA Safeguards in the Middle East (GOV/2015/45-GC(59)/15)*, 2015.

¹³⁵ Ibid.

¹³⁶ Arms Control Association, *WMD-Free Middle East Proposal at a Glance*, 2015.

¹³⁷ Ibid.

¹³⁸ Ibid.

establish more grounded framework.¹³⁹ The measure however was rejected by the United States, United Kingdom, and Canada and to this day, there is still no agreed upon agenda or framework for a conference pertaining to the prohibition of nuclear weapons, or other WMDs, in the Middle East.¹⁴⁰

The IAEA has also further played a reinforcing role in supporting the process towards a NWFZ in the Middle East.¹⁴¹ One such example was in 2011, when the Agency hosted a forum entitled the “IAEA Forum on Experience of Possible Relevance to the Creation of a Nuclear-Weapon-Free Zone in the Middle East,” where experts and policymakers were invited to share their views and visions on a NWFZ in the Middle East.¹⁴² The event included presentations and workshops to share best practices of other regional agreements, such as the European Atomic Energy Community.¹⁴³

Case Study: Joint Comprehensive Plan of Action

Iran, State Party to the NPT since 1968 and part of the IAEA safeguards since 1974, was found to be in noncompliance with its safeguards agreements in 2006 due to their refusal to cooperate with a pending investigation from 2003.¹⁴⁴ Six countries, the United States, Russia, China, France, the United Kingdom, and Germany, also known as the P5+1, launched negotiations with Iran to resolve the matter.¹⁴⁵ After two full years of negotiations, the Joint Comprehensive Plan of Action (JCPOA) was agreed upon in the summer of 2015.¹⁴⁶ The plan detailed that sanctions and financial restrictions would be lifted from Iran while Iran agreed to halt the enrichment of uranium to certain levels, while also concluding a CSA and additional protocol.¹⁴⁷ The IAEA plays an intrinsic role within this agreement through monitoring Iran’s compliance and cooperating to implement the additional protocol.¹⁴⁸ Under the agreement, the IAEA monitors the reduction of centrifuges at major facilities and also supervises and verifies the activities at each fuel cycle for a certain amount of years, with some lasting up until 25 years.¹⁴⁹ This means Iran must comply with inspections of the whole production circle.¹⁵⁰ The IAEA also ensures that other locations, such as the Fordow Enrichment Facility, are transitioned into research facilities and no longer undertake any enrichment activities.¹⁵¹

After the terms were agreed upon, the IAEA also was central in the planning process towards officially implementing the agreement.¹⁵² In order for the JCPOA to commence, Iran was required to make reasonable efforts to show that it was preparing to comply with its provisions.¹⁵³ One prerequisite was the fulfillment of the “Roadmap for Clarification of Past and Present Outstanding Issues” agreement, which stipulated that Iran must resolve any outstanding questions or concerns the IAEA could have regarding potential military components of any part of the nuclear program.¹⁵⁴ The condition was fulfilled in December 2015, along with the necessary preparations by Iran to begin implementation of its safeguards agreement and the additional protocol.¹⁵⁵ The agreement officially came into action in the beginning of 2016 with the IAEA began monitoring 18 different facilities and nine different locations.¹⁵⁶

¹³⁹ Ibid.

¹⁴⁰ Ibid.

¹⁴¹ IAEA, *IAEA Forum on Experience of Possible Relevance to the Creation of a NWFZ in the Middle East*, 2015.

¹⁴² Ibid.

¹⁴³ Ibid.

¹⁴⁴ IAEA, *Iran and the IAEA*, 2016.

¹⁴⁵ Nuclear Threat Initiative, *Countries: Iran*.

¹⁴⁶ EU, *Joint Comprehensive Plan of Action*, 2015.

¹⁴⁷ Ibid.

¹⁴⁸ IAEA, *Iran and the IAEA: verification and monitoring under the JCPOA*, 2016.

¹⁴⁹ Nuclear Threat Initiative, *Countries: Iran*, 2016.

¹⁵⁰ Ibid.

¹⁵¹ Ibid.

¹⁵² Arms Control Association, *Timeline of Nuclear Diplomacy with Iran*, 2016.

¹⁵³ Nuclear Threat Initiative, *Countries: Iran*, 2016.

¹⁵⁴ Arms Control Association, *Timeline of Nuclear Diplomacy with Iran*, 2016.

¹⁵⁵ Ibid.

¹⁵⁶ IAEA, *Iran and the IAEA*, 2016.

Conclusion

Throughout the past few decades, the Middle East has become a region of concern in terms of nuclear nonproliferation, mostly due to geopolitical events and instabilities that have led to noncompliance with safeguard agreements. The IAEA and the whole international community have thus attempted to prevent further risks to proliferation by seeking to develop a NWFZ for the region and fully implement IAEA safeguards. Despite the persisting regional concerns and the instability, the Middle East has seen substantial progress in the past two years in regards to cooperating in instances of noncompliance, such as in the case of Iran.¹⁵⁷ However, cases such as Syria remain where facilitating efforts for cooperation remain difficult due to security concerns at the national level. Further cooperation with states having similar situations, such as Oman, could also manifest complications in maintaining safeguards. Moving forward, the IAEA should play an intrinsic role within the efforts to establish a NWFZ through the NPT Review process, formulating new methods for cooperation and offering assistance to Member States within the region.

Further Research

In considering what recommendations should be made to better implement IAEA safeguards in the Middle East, delegates should consider the following questions: How can the IAEA reinforce existing safeguards in the Middle East to further prevent from them being breached? How can the IAEA address national level stability concerns that hamper cooperation, monitoring, and verification? What lessons can be learned from safeguards success stories and how can they be applied to scenarios different from where they were implemented? What processes within the current NPT regime can the IAEA cooperate within and how can the Agency provide assistance, especially in relation to the topic?

Annotated Bibliography

Arms Control Association. (2015). *WMD-Free Middle East Proposal at a Glance* [Website]. Retrieved 20 July 2016 from: <https://www.armscontrol.org/print/4705>

The Arms Control Association provides a brief, informative source on the background behind the importance of applying IAEA safeguards in the Middle East. Specifically, it gives an overview behind some of the political processes that influenced the IAEA's work and practice in the region to date. Moreover, this source is useful as it provides an expansive list of documents, events and meetings in chronological order that help give a better understanding behind the history and deliberation of the topic. Above all, delegates can use this source to better understand how the international community has tried to shape nonproliferation activities, such as safeguards, in the Middle East.

International Atomic Energy Agency. (2011). *IAEA Forum on Experience of Possible Relevance to the Creation of a Nuclear-Weapon-Free Zone in the Middle East* [Report]. Retrieved 2 October 2016 from: <https://www.iaea.org/sites/default/files/petersen221111.pdf>

The forum on the relevance to the creation of the NWFZ in the Middle East provided input and recommendations from a wide array of international actors. The following document provides a clear and concise outline that will assist delegates in understand how the work of the IAEA is intrinsic towards the creation of a NWFZ in the Middle East. The recommendations within this synopsis also help delegates better grasp the types of actions the IAEA can assist with during the process.

International Atomic Energy Agency. (2015). *IAEA Safeguards, Serving Nuclear Nonproliferation* [Report]. Retrieved 20 July 2016 from: https://www.iaea.org/sites/default/files/safeguards_web_june_2015_1.pdf

This report comprehensively highlights the process of applying safeguards as a whole. Though it does not specifically focus on the Middle East, it is important to first understand the basics surrounding safeguards. It specifically discusses what safeguards are, how they are implemented, why they matter and future trends in their use. Delegates should use this to better understand

¹⁵⁷ IAEA, *IAEA Safeguards 2016*, 2016.

safeguards and how the frameworks behind. Overall, this source should serve as practical guidance when applying safeguards to the situation in the Middle East.

International Atomic Energy Agency. (2015). *IAEA Safeguards 2015: Ensuring the Peaceful Use of All Nuclear Material* [Report]. Retrieved 28 October 2016 from: https://www.iaea.org/sites/default/files/sg_infographic.pdf

A similar source to the 2015 Serving Nonproliferation Report, this IAEA info-graphics visualizes the practice of safeguards. It provides a holistic look into safeguards that words alone can struggle to convey and make what be a technical process much easier to understand. Delegates would be well served to look into this info-graphic and see how it can be applied nationally and how they may have to adjust it based on a country's domestic capacity.

International Atomic Energy Agency. (n.d.). *Rules and Procedures of the Board of Governors* [Website]. Retrieved 2 October 2016 from: <https://www.iaea.org/about/policy/board/rules-and-procedures-of-the-board-of-governors#item5>

The IAEA Board of Governors plays a crucial role within this topic. As seen with each situation where an instance of noncompliance was suspected, the Board of Governors was often briefed to take action on the matter. After gaining enough intelligence, they had to make a decision on how to move forward in conducting an investigation. To better understand the technicalities behind this process, delegates are encouraged to read through the Rules and Procedures section that outlines how the Board of Governors conducts their business.

International Atomic Energy Agency. (2016). *Iran and the IAEA: verification and monitoring under the JCPOA* [Report]. Retrieved 20 July 2016 from: <https://www.iaea.org/sites/default/files/5722627.pdf>

When approaching the Iran JCPOA, it is important to understand the IAEA's role within the process and implementing the agreement itself. This report provides a concise explanation of the IAEA's role in the JCPOA, while also providing a useful timetable of Iran's commitment under the agreement. Delegates can use this resource to better understand the specifics of a robust safeguards agreements, and the process behind staffing experts, scientists and professional to carry it out.

International Atomic Energy Agency, Board of Governors. (2016). *Application of IAEA Safeguards in the Middle East (GOV/2015/45-GC(60)/16)* [Report]. Retrieved 22 October 2016 from: https://www.iaea.org/About/Policy/GC/GC59/GC59Documents/English/gc59-15_en.pdf

The following report is the most up-to-date source, as of 27 October 2016, on the IAEA's policy towards applying safeguards in the Middle East. It provides a comprehensive overview of the situation at hand and describes the situation of safeguard compliance within countries where the Agency works. More importantly, it provides a status of the topic and the progress that has been made. It however also highlights areas for improvement and how the Agency needs to adjust its work. Delegates can utilize this resources to better understand where the IAEA's work has stood within the region, what is currently being done and what are plausible actions for the future.

James Martin Center for Nonproliferation Studies & Vienna Center for Disarmament and Nonproliferation. (2014). *Topic: Middle East Issues* [Website]. Retrieved 20 July 2016 from: https://www.nonproliferation.org/wp-content/uploads/2014/09/2014_IAEA_GC_QA_Middle_East.pdf

This document is an excellent source to use for understanding how applying IAEA safeguards in the Middle East became a topic of discussion within the IAEA. It covers some of the basic conferences that lead up to the first resolution on IAEA safeguards in the Middle East in 1991, providing a more in-depth historical approach to the topic. Further information is provided on the key countries and regions that had a stake in the process and how these negotiations have shaped current deliberations. This resource is

best served to use as a guiding framework to understand the process behind the negotiations of a NWFZ in the Middle East.

Nuclear Threat Initiative. (2016). *Countries: Iran* [Website]. Retrieved 2 October 2016 from: <http://www.nti.org/learn/countries/iran/nuclear/>

The following outline provides an in-depth explanation of the entire process and history behind the JCPOA and negotiations with Iran. It also provides a strong historic perspective of the events leading up to the IAEA deciding that Iran was in noncompliance with IAEA safeguards. Such information can be used to garner a stronger understanding of the historic context that has shaped the Middle East and its relationship to IAEA safeguards. Overall, this source provides a strong synthesis of the topic with specifics on key terms used during negotiations.

United Nations, Institute for Disarmament Research. (2011) *Nuclear-weapon-free zones* [Report]. Retrieved 2 October 2016 from: <http://www.unidir.org/files/publications/pdfs/nuclear-weapon-free-zones-en-314.pdf>

UNIDIR provides a wealth of research on most international peace and security topics at the United Nations. The following report provides an excellent overview of NWFZs, with two chapters dedicated specifically to a proposed NWFZ in the Middle East. More importantly, it uses very strong examples of how the IAEA's work has been used throughout this process and how it has already had a direct impact on the situation within the region itself. Delegates looking for a deeper analysis into the proposed NWFZ in the Middle East would be best served by this source.

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II. Nuclear Waste Management

“Radiation risks may transcend national borders, and international cooperation serves to promote and enhance safety globally.”³⁰²

Introduction

The applications of radioactivity include medicine, industry, agriculture, and of course power generation, all integral parts of modern society.³⁰³ However, given the risks that radioactivity poses, it is necessary to carefully evaluate how sources of radiation should be handled.³⁰⁴ Radiation can cause genetic changes in humans and plants, and in the case of humans, it can lead to cancer.³⁰⁵ In the context of this guide, radiation refers only to ionizing radiation, which means that the radiation is able to change atoms to ions.³⁰⁶ Atoms which emit such radiation are referred to as radionuclides.³⁰⁷ While there are a broad variety of sources of radiation, this topic focuses on the management of nuclear or radioactive waste.³⁰⁸ Radioactive waste is defined by the International Atomic Energy Agency (IAEA) glossary as “waste that contains, or is contaminated with, radionuclides at concentrations or activities greater than clearance levels as established by the regulatory body.”³⁰⁹ It is important to note also that materials with activity concentrations below clearance level, meaning the level below which the radiation is considered to not be harmful anymore, are radioactive, but they do not have to be treated as radioactive waste.³¹⁰

The main concern with nuclear waste is that it can be radioactive for several thousands of years, and therefore deposition of such waste has to be carefully evaluated.³¹¹ This long period of time is needed due to the nature of radioactive materials.³¹² When a radionuclide, which is an instable atom, emits radiation, it changes to an atom which can either emit further radiation, or become a stable atom.³¹³ The time it takes for radioactive material to emit radiation and therefore change to a different atom is referred to as half-life period, which specifies how long it statistically takes for half of the material to decay to the next type of atom.³¹⁴ These periods range between less than a second and more than ten million years.³¹⁵ The longer such materials are stored, the lower the radiation levels become, because will be more stable atoms over time.³¹⁶

A special form of radioactive waste is spent nuclear fuel (SNF), meaning fuel that has been removed from a nuclear power reactor and can no longer be used for energy generation.³¹⁷ Spent fuel is often, but not always, included in the discussion about nuclear waste management, but shall be considered in this guide, given that many waste management processes are also applicable to spent fuel.³¹⁸ Developing solutions for nuclear waste is an international effort; all Member States are interested in finding suitable options for handling such waste, to ensure that it will not become a burden for future generations.³¹⁹ This guide will discuss the international and regional framework and afterwards explain the current processes regarding nuclear waste within the international community.³²⁰ This will be the basis for an in-depth analysis of transport as well as storage and disposal of nuclear waste.³²¹ Before concluding,

³⁰² IAEA, *Fundamental Safety Principles*, 2006.

³⁰³ *Ibid.*

³⁰⁴ *Ibid.*

³⁰⁵ Conserve Energy Future, *Nuclear Waste Disposal*.

³⁰⁶ IAEA, *IAEA Safety Glossary*, 2007.

³⁰⁷ *Ibid.*

³⁰⁸ IAEA, *Classification of Radioactive Waste*, 2009.

³⁰⁹ IAEA, *IAEA Safety Glossary*, 2007.

³¹⁰ *Ibid.*

³¹¹ IAEA, *Disposal of Radioactive Waste*, 2011.

³¹² IAEA, *IAEA Safety Glossary*, 2007.

³¹³ *Ibid.*

³¹⁴ *Ibid.*

³¹⁵ Walker, *Barely Radioactive Elements*, 2013.

³¹⁶ IAEA, *IAEA Safety Glossary*, 2007.

³¹⁷ *Ibid.*

³¹⁸ IAEA, *Classification of Radioactive Waste*, 2009.

³¹⁹ IAEA, *Disposal of Radioactive Waste*, 2011.

³²⁰ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956; IAEA, *IAEA Safety Glossary*, 2007.

³²¹ IAEA, *Disposal of Radioactive Waste*, 2011.

the guide will also highlight aspects concerning the environmental challenges and development aspects of nuclear waste management.³²²

International and Regional Framework

The international framework on handling nuclear material overall, and nuclear waste specifically, is based on article III of *The Statute of the IAEA* (1989).³²³ Article III authorizes the IAEA “to establish or adopt standards of safety for protection of health and minimization of danger to life and property.”³²⁴ These safety standards, which are established in collaboration with pertinent United Nations (UN) organs and agencies, address all important aspects of handling radioactivity, like radiation, transport and waste safety.³²⁵ The safety standards series, which are overseen by the IAEA Department of Nuclear Safety and Security, are a collection of guides focusing on different subtopics, and serve as a basis for Member States to create national regulations on handling nuclear or radioactive material.³²⁶ Of these, the *Safety Fundamentals* are the foundation for all the other more specific guides and requirements, as they expound a total of ten principles clarifying responsibilities and requirements when operating with radioactive materials.³²⁷ For the specific question of nuclear waste, there are several guides focusing on different aspects.³²⁸ The first technical aspect to consider is the classification of different types of nuclear waste.³²⁹ The IAEA held a panel meeting on Standardization of Radioactive Waste Categories in 1967, and released the first classification of radioactive waste in 1970, but over the years different interpretations and standards were developed.³³⁰ Therefore, a new revised classification was released as a safety standard in 2009, which separates radioactive waste into six categories ranging from exempt waste, which can be handled as non-radioactive waste, to high-level waste (HLW), which needs to be carefully stored or disposed and is active for a long time.³³¹ These different kinds of radioactive waste require different kinds of handling, which will be discussed later in this guide.³³² The safety standard series, which include more than 120 guides, also focus specifically on aspects like storage, disposal, management systems for radioactive waste, waste facilities and several other questions.³³³

A second important document for nuclear waste management is the *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management* (JC), which entered into force on 18 June 2001 and is also a part of the *IAEA Action Plan on Nuclear Safety* released in 2011.³³⁴ The convention currently has 72 parties with 42 signatories, and was adopted to work towards improved worldwide safety concerning radioactive waste.³³⁵ It focuses on spent fuel as well as radioactive waste.³³⁶ The convention establishes safety guidelines similar to the IAEA safety standards and also focuses on the necessary facilities for handling radioactive waste.³³⁷ Following its adoption, the IAEA held a total of five review meetings, with the most recent one being held in May 2015.³³⁸ The review meetings, which require all contracting parties to submit a national report describing their work towards the goals of the JC, allow for discussion of different ways to address nuclear waste management and ensure that all nations continue the process towards ensuring the safe handling of nuclear waste.³³⁹ The final report of the

³²² World Nuclear Association, *International Nuclear Waste Disposal Concepts*, 2016.

³²³ UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956.

³²⁴ IAEA, *Fundamental Safety Principles*, 2006.

³²⁵ *Ibid.*

³²⁶ *Ibid.*

³²⁷ *Ibid.*

³²⁸ IAEA, *Classification of Radioactive Waste*, 2009.

³²⁹ *Ibid.*

³³⁰ IAEA, *Standardization of Radioactive Waste Categories*, 1970.

³³¹ IAEA, *Classification of Radioactive Waste*, 2009.

³³² *Ibid.*

³³³ IAEA, *Fundamental Safety Principles*, 2006.

³³⁴ IAEA, *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste management (INFCIRC/546)*, 1997; IAEA, *IAEA Action Plan on Nuclear Safety*, 2011.

³³⁵ IAEA, *Parties to Joint Convention*, 2016.

³³⁶ IAEA, *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste management (INFCIRC/546)*, 1997.

³³⁷ *Ibid.*

³³⁸ IAEA, *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: Fifth Review Meeting of the Contracting Parties: Final Summary Report (JC/RM5/04/Rev.2)*, 2015.

³³⁹ *Ibid.*

last meeting emphasizes the need to continue the work and also elaborates on good practices, which have been shared by Member States in their reports.³⁴⁰

A last aspect to consider as part of the international framework are the Sustainable Development Goals (SDGs) adopted by the General Assembly in 2015.³⁴¹ The benefits of nuclear energy and technology towards reaching the SDGs are immense.³⁴² Looking a goal three concerning health, the advancements made through radiation medicine for diagnosis as well as treatment of diseases are important parts of today's health care system.³⁴³ Furthermore, for goals seven and nine concerning energy, infrastructure and industrialization, nuclear energy can be an important tool to facilitate these processes.³⁴⁴ While there are several other goals relating to nuclear technology, none of them seem to be connected to nuclear waste management at first.³⁴⁵ However, seeing the dangers posed by radioactive material, it is of utmost importance to consider the management of this material after it is used as a tool towards the SDGs.³⁴⁶ Furthermore, whenever nuclear material is used, it is necessary to discuss the management of such waste in order to protect the environment, as stipulated by goals 14 and 15, allowing for an overall sustainable process.³⁴⁷

Role of the International System

With the international system still looking for proper solutions for nuclear waste management, the IAEA General Conference addressed this issue at their last session, which shows the timeliness of the issue.³⁴⁸ Chapter F of the report submitted by the Director General addresses the recent work of the IAEA concerning radioactive waste management, focusing on disposal of nuclear waste, long storage periods, and nuclear waste caused by emergencies like the Fukushima accident.³⁴⁹ The report emphasizes the importance of the IAEA working with Member States to develop national regulations, and also encourages work within regional organizations to improve nuclear safety.³⁵⁰

The IAEA Director General and the Organisation for Economic Co-operation and Development's (OECD) Nuclear Energy Agency (NEA) held a workshop in June 2016 on the question of Operational Safety of Geological Repositories for nuclear waste, to discuss how the safety of such disposal facilities underground can be guaranteed for hundreds of years.³⁵¹ The OECD is also actively searching for suitable disposal locations and carrying out reviews for Member States in this process.³⁵² Specifically, the NEA Radioactive Waste Management Committee, created in 1975, fosters cooperation between the 31 NEA countries.³⁵³ Its main goals are knowledge-sharing, helping to create national frameworks on a common basis, and ensuring that waste management strategies respect social requirements.³⁵⁴ The First Committee of the General Assembly also regularly addresses the issue of nuclear waste management, because it can affect the sovereignty of Member States.³⁵⁵ General Assembly resolution 70/59 on "Prohibition of the dumping of radioactive wastes," adopted in 2015, focuses on the need to avoid the uncontrolled and dangerous dumping of radioactive waste in unsuitable locations, where the containment of the radioactive material cannot be guaranteed.³⁵⁶ Likewise, the United Nations Environment Programme (UNEP) has a program area on environmentally sound management of radioactive waste.³⁵⁷ The program calls for promotion of improved

³⁴⁰ Ibid.

³⁴¹ UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.

³⁴² IAEA, *Nuclear Technology for the Sustainable Development Goals*, 2016.

³⁴³ Ibid.

³⁴⁴ Ibid.

³⁴⁵ Ibid.

³⁴⁶ UN General Assembly, *Transforming our world: the 2030 Agenda for Sustainable Development (A/RES/70/1)*, 2015.

³⁴⁷ Ibid.

³⁴⁸ IAEA, *Measures to Strengthen International Cooperation in Nuclear, Radiation, Transport and Waste Safety (GC(59)/6)*, 2015.

³⁴⁹ Ibid.

³⁵⁰ Ibid.

³⁵¹ OECD, *Joint NEA/IAEA Workshop on the Operational Safety of Geological Repositories*, 2016.

³⁵² OECD, *Japan's Siting Process for the Geological Disposal of High-level Radioactive Waste*, 2016.

³⁵³ OECD, *Radioactive waste management and decommissioning*, 2016.

³⁵⁴ Ibid.

³⁵⁵ UN General Assembly, *Prohibition of the dumping of radioactive wastes (A/RES/70/59)*, 2015.

³⁵⁶ Ibid.

³⁵⁷ UNEP, *Safe and Environmentally Sound Management of Radioactive Wastes*.

safety measures and the development of guidelines and codes of practice, which are important steps toward better nuclear waste management.³⁵⁸

Nuclear waste management is also considered at the regional and national level.³⁵⁹ The European Council adopted a council directive in 2011 to establish a framework for responsible radioactive waste management, emphasizing the importance of national policies to regulate nuclear waste management.³⁶⁰ Furthermore, the directive provides guidelines for these policies and also discusses transportation of nuclear waste.³⁶¹ The European Union (EU) is also trying to involve civil society in the processes of nuclear waste management.³⁶² As part of the Joint Research Centre (JRC), a science organization within the EU, the Energy – Transparency Centre of Knowledge (E-TraCK) has established a radioactive waste management project to work on waste management in Europe.³⁶³ While the JRC acts as a facilitator, the big part of the work within the project comes from a stakeholder network, which includes civil society, governments and the nuclear industry.³⁶⁴ Establishing dialogue between these parties to improve the management of radioactive waste can be a good example to utilize in other regions of the world.³⁶⁵

Another organization to improve international cooperation is the Association for Regional and International Underground Storage (Arius) established in 2002, which works on shared facilities for radioactive waste management.³⁶⁶ While initially focusing on cooperative efforts in Europe, the organization has expanded their reach to the Middle East and North Africa and South-East Asia.³⁶⁷ Arius is working closely with the IAEA concerning the safety standards on shared repositories, to contribute their expertise to these documents.³⁶⁸ The idea of shared repositories is currently a highly regarded option to improve radioactive waste management worldwide.³⁶⁹

Transport of Radioactive Waste

Managing radioactive waste often includes the need for transportation to more appropriate facilities.³⁷⁰ Furthermore, it is easier to collect the waste and create few bigger facilities to handle it, than operating several small ones.³⁷¹ The IAEA thus released a set of safety standards concerning the transport of nuclear waste, to be applied by all Member States.³⁷² The first factor when handling nuclear waste is ensuring that radioactive doses to persons in contact with the material are below the relevant limits.³⁷³ The IAEA has defined classifications for packages containing radioactive material, which depend on the type and volume of the radioactive material, and entail different safety requirements.³⁷⁴ The containers used to transport radioactive material can have sizes ranging from cylinders with a diameter of 70 centimeters, to truck-sized containers.³⁷⁵ To comply with international standards, those containers need to ensure radioactive security and containment during any possible accident, including conditions like fire, impact, wetting, pressure, heat, and cold.³⁷⁶

³⁵⁸ Ibid.

³⁵⁹ European Council, *Council Directive 2011/70/EURATOM of 19 July 2011 establishing a Community framework for the responsible and safe management of spent fuel and radioactive waste*, 2011.

³⁶⁰ Ibid., p. 5.

³⁶¹ Ibid.

³⁶² European Commission, *Radioactive waste management (E-TraCK-RWM)*, 2016.

³⁶³ Ibid.

³⁶⁴ Ibid.

³⁶⁵ Ibid.

³⁶⁶ Arius, *Origins of Arius*.

³⁶⁷ World Nuclear Association, *International Nuclear Waste Disposal Concepts*, 2016.

³⁶⁸ Arius, *Arius: The first 15 years*.

³⁶⁹ Ibid.

³⁷⁰ IAEA, *Regulations for the Safe Transport of Radioactive Material*, 2012.

³⁷¹ Ibid.

³⁷² Ibid.

³⁷³ Ibid.

³⁷⁴ Ibid.

³⁷⁵ World Nuclear Association, *Transport of Radioactive Materials*, 2016.

³⁷⁶ Ibid.

³⁷⁷

Disposal and Storage of Radioactive Waste

The main question concerning nuclear waste relies on its storage and disposal.³⁷⁷ Waste which is contaminated with radioactivity cannot be disposed of like other waste through burning or placing it in a landfill, because of the dangers caused by radiation.³⁷⁸ Disposal of radioactive waste is defined as “emplacement of radioactive waste into a facility or a location with no intention of retrieving the waste,” in other words, it is a permanent action.³⁷⁹ Storage, on the other hand, is temporary containment with the clear intention of retrieving the waste at a later time.³⁸⁰ It is necessary to contain the waste long enough to ensure that the radiation levels are low enough to no longer be dangerous for humans and the biosphere.³⁸¹ This level is referred to as clearance level and the waste is then referred to as exempt waste, which can be handled like other waste without radioactive properties.³⁸² The time this process takes depends on the kind of radioactive waste that needs to be stored or disposed.³⁸³

Storage

There are two main cases where storage of radioactive waste is used.³⁸⁴ The first case is for radionuclides with a rather short half-life, in the range of less than 100 days.³⁸⁵ This waste can later be cleared, meaning that it can be removed from regulatory control concerning radiation and be disposed like non-radioactive waste.³⁸⁶ The second case in which storage is necessary, concerns waste with high activities such as HLW or SNF.³⁸⁷ It is necessary to avoid highly radioactive material or radiation reaching the biosphere, and furthermore, it is important to provide enough failsafe cooling, as the heat caused by the radioactive decay could cause damage to the containers.³⁸⁸ This kind of waste can be impossible to dispose of right away, because a disposal facility cannot provide proper cooling.³⁸⁹ Active cooling systems should be avoided for disposal facilities, because those systems could fail.³⁹⁰ SNF, for example, has to be stored under water for 9-12 months before dry storage is possible.³⁹¹ Storage and disposal facilities need to be able to fulfill several criteria.³⁹² Passive cooling systems, like big water tanks without the need for pumping, would be the best option.³⁹³ If active cooling is necessary, it is important to install redundant systems to account for failure in the system, this means for example using a second set of pumps to automatically take over if the main pump fails.³⁹⁴

Disposal

While there are a variety of suitable ways to store nuclear waste around the world, the disposal of such waste presents several complications.³⁹⁵ There are three important aspects of deposition: isolating the waste from the biosphere, containing it until the radioactivity has decayed, and delaying the migration of radionuclides to the biosphere.³⁹⁶ In the 2011 *Safety Standards for Disposal of Radioactive Waste*, the IAEA recognizes six types of disposal, depending on the type of waste to be dealt with.³⁹⁷ The main types of disposal are: specific landfill disposal, near-surface disposal, disposal in caverns, vaults or silos between a few tens and a few hundred meters

³⁷⁷ IAEA, *Disposal of Radioactive Waste*, 2011.

³⁷⁸ Ibid.

³⁷⁹ IAEA, *IAEA Safety Glossary*, 2007.

³⁸⁰ Ibid.

³⁸¹ IAEA, *Disposal of Radioactive Waste*, 2011.

³⁸² IAEA, *Classification of Radioactive Waste*, 2009.

³⁸³ IAEA, *Disposal of Radioactive Waste*, 2011.

³⁸⁴ IAEA, *Storage of Radioactive Waste*, 2006.

³⁸⁵ Ibid.

³⁸⁶ Ibid.

³⁸⁷ Ibid.

³⁸⁸ Ibid.

³⁸⁹ Ibid.

³⁹⁰ IAEA, *Disposal of Radioactive Waste*, 2011.

³⁹¹ IAEA, *Storage and Disposal of Spent Fuel and High Level Radioactive Waste*, 2006.

³⁹² IAEA, *Storage of Radioactive Waste*, 2006.

³⁹³ Ibid.

³⁹⁴ Ibid.

³⁹⁵ IAEA, *Disposal of Radioactive Waste*, 2011.

³⁹⁶ Vira, *Concepts developed for disposal of HLW and/or SNF*, 2014.

³⁹⁷ IAEA, *Disposal of Radioactive Waste*, 2011.

below ground level, geological disposal, and borehole disposal.³⁹⁸ For all types of disposal it is important that the waste is contained in a way that does not require institutional control after the facility is closed.³⁹⁹ While the disposal of low-level waste (LLW) and intermediate-level waste (ILW) can be done with landfill or near-surface disposal, disposal of HLW is more complex.⁴⁰⁰ HLW, as mentioned before, is highly radioactive and contains several long-lived radionuclides, and therefore needs to be stored for a long time.⁴⁰¹ To ensure that this waste neither enters the biosphere nor harms humans through radiation, it is necessary to find locations that are deep enough below the ground, but still stable enough so the containers with the radioactive material will not be damaged.⁴⁰²

The different kinds of geological disposal all entail packing the waste as safely as possible with several layers of encapsulation.⁴⁰³ Those containers are then placed in the selected location, which is afterwards refilled to ensure that the containers do not move and heat dissipation is possible.⁴⁰⁴ Despite the general understanding of this seemingly simple process, no geological repository for HLW or SNF has been opened yet.⁴⁰⁵ The main problem is finding suitable sites to utilize for such repositories, because they have to be geologically stable, this means they must have both mechanical stability and be safe from intrusion of water.⁴⁰⁶ Several Member States are in the process of finding suitable locations, but no facilities are expected to start operation before 2020.⁴⁰⁷ Another problem with finding locations for disposal is that the public often objects to facilities being opened near them.⁴⁰⁸ Finland, Sweden and The United States of America have requested licenses for designated sites to be developed into disposal facilities for HLW under supervision of their national regulatory bodies, but the licensing process is still ongoing.⁴⁰⁹

A different option to dispose of nuclear waste is borehole disposal.⁴¹⁰ Borehole disposal entails drilling a hole into the ground and placing packed nuclear waste into depths of up to a few hundred meters.⁴¹¹ This disposal option is already used for LLW and ILW.⁴¹² Recently, the concept of deep borehole disposal (DBD) has been discussed as a viable option for HLW and SNF.⁴¹³ The newer possibilities of drilling large enough boreholes, four to six kilometers into the ground, to deploy the waste packages present several advantages.⁴¹⁴ Firstly, the depth would ensure that no radiation reaches the ground level, and avoids chemical contact with near-surface circulating groundwater, which is in contact with the biosphere and for example used as drinking water.⁴¹⁵ While there is water in deeper layers of the ground, this water is not in contact with the water in higher layers, which only circulates in depths up to one or two kilometers.⁴¹⁶ The drilling of such deep holes is still technically challenging and further development will be needed before the necessary number of deep boreholes can be constructed.⁴¹⁷ Finally, questions like how to deploy the waste into the hole, heat flow, proper container design and sealing of the borehole still need to be investigated.⁴¹⁸ While such techniques exist for near-surface and intermediate depths, some of these need to be adjusted and reevaluated before applying them to DBD.⁴¹⁹

³⁹⁸ Ibid.

³⁹⁹ Ibid.

⁴⁰⁰ Ibid.

⁴⁰¹ IAEA, *Disposal of Radioactive Waste*, 2011; OECD, *The disposal of high-level radioactive waste*, 1989.

⁴⁰² OECD, *The disposal of high-level radioactive waste*, 1989.

⁴⁰³ IAEA, *Storage and Disposal of Spent Fuel and High Level Radioactive Waste*, 2006.

⁴⁰⁴ Ibid.

⁴⁰⁵ Ibid.

⁴⁰⁶ Ibid.

⁴⁰⁷ Ibid.

⁴⁰⁸ Ibid.

⁴⁰⁹ Ibid.

⁴¹⁰ IAEA, *Borehole Disposal Facilities for Radioactive Waste*, 2009.

⁴¹¹ Ibid.

⁴¹² Ibid.

⁴¹³ Beswick et al., *Deep borehole disposal of nuclear waste: engineering challenges*, 2014.

⁴¹⁴ Ibid.

⁴¹⁵ Ibid.

⁴¹⁶ Ibid.

⁴¹⁷ Ibid.

⁴¹⁸ Ibid.

⁴¹⁹ Ibid.

Environmental Impact of Disposing of Nuclear Waste

When discussing the disposal of nuclear waste, the risks for the environment need to be taken into account.⁴²⁰ The long half-life periods are a key issue, as they cause the waste to be dangerous for thousands of years, so that even if the waste is sealed in containers and stored in geological disposals that are supposed to be unreachable by water, there are concerns that radioactive material might still reach water eventually, over that long period of time.⁴²¹ It is of utmost importance to avoid breaching of the containers that encapsulate the waste.⁴²² The pollution of groundwater would probably be the most dangerous result of improper storage, as this could lead to a rapid distribution of the radioactive material.⁴²³ The pollution would not only contaminate water in the area of the breach, but with the radioactive material entering the water cycle, it could reach rivers and oceans.⁴²⁴ Examples of the dangerous spreading of nuclear material can be seen when examining the consequences of nuclear accidents like the reactor catastrophe in Chernobyl in 1986.⁴²⁵ The explosion led to a spreading of nuclear material over big parts of Europe and caused an area of over 4000 square kilometers to be evacuated.⁴²⁶ Even though we are not able to fully understand all the health consequences of the explosion yet, devastating rises in cancer rates in the area around Chernobyl can be observed, and they portray the danger of radioactive pollution.⁴²⁷ In addition, several emergency workers, who were in contact with large amounts of radiation during the first days after the accident, died because of acute radiation syndrome.⁴²⁸ The accident, which was in part caused by a lack of security regulations at the time, led to an improved understanding of how dangerous mishandling of radioactive material can be.⁴²⁹

Development

With developing countries increasingly utilizing not only nuclear power, but also nuclear technology in medicine, research or mining operations, the question of nuclear waste management is also relevant for these Member States.⁴³⁰ A widespread lack of awareness of the importance of proper radioactive waste management makes international cooperation crucial, to create better regulations and a better understanding of the necessary measures.⁴³¹ The IAEA has undertaken successful initiatives to improve the handling of nuclear waste with programs like the Waste Management Advisory Programme (WAMAP) established in 1986.⁴³² This program helps Member States understand their needs for nuclear waste management, and also assists them in evaluating possible solutions.⁴³³ A recent idea that has emerged is to develop multinational cooperative repositories for radioactive waste as an option for developing countries to reduce both cost and the technical challenges entailed by the construction of geological repositories.⁴³⁴ Member States have already voiced their will to develop such international repositories, and the IAEA has begun addressing questions like financing, liability, public acceptance and legal matters.⁴³⁵ Shared repositories are an important initiative, not only due to the financial challenges posed by the storage of nuclear waste, but also because not all countries have suitable locations for the disposal of nuclear material.⁴³⁶ The main question to be answered is how the responsibility among Member States will be distributed.⁴³⁷ The work the IAEA has done on these issues showcases the possibilities available, but also evidences areas where further evaluation is

⁴²⁰ Conserve Energy Future, *Nuclear Waste Disposal*.

⁴²¹ Ibid.

⁴²² United States Environmental Protection Agency, *Radioactive Waste Disposal: An Environmental Perspective*.

⁴²³ Ibid.

⁴²⁴ Ibid.

⁴²⁵ Pollution Issues, *Disasters: Nuclear Accidents*, 2016.

⁴²⁶ World Nuclear Association, *Chernobyl Accident 1986*, 2016.

⁴²⁷ Pollution Issues, *Disasters: Nuclear Accidents*, 2016.

⁴²⁸ World Nuclear Association, *Chernobyl Accident 1986*, 2016.

⁴²⁹ Ibid.

⁴³⁰ Thomas, *Radioactive waste management in developing countries*, 1989.

⁴³¹ Thomas, *Management of radioactive wastes in developing countries: Growing needs*, 1992.

⁴³² Thomas, *Radioactive waste management in developing countries*, 1989.

⁴³³ Ibid.

⁴³⁴ IAEA, *Developing multinational radioactive waste repositories*, 2004.

⁴³⁵ IAEA, *Technical, institutional and economic factors important for developing a multinational radioactive waste repository*, 1998.

⁴³⁶ World Nuclear Association, *International Nuclear Waste Disposal Concepts*, 2016.

⁴³⁷ Ibid.

needed.⁴³⁸ Moreover, to make the use of these technological possibilities in a sustainable way, it is necessary to work towards a proper way of handling the waste created.⁴³⁹ It is necessary to promote and ensure sustainable handling of nuclear waste to avoid the dangerous influences on the environment and to ensure progress towards reaching the SDGs.⁴⁴⁰ Continuing to solve these questions on liability, evaluation of existing data on nuclear waste, and fostering the cooperation between Member States will be important aspects of the IAEA's work in the next years.⁴⁴¹

Conclusion

The IAEA has made clear that nuclear waste management has to happen “without imposing undue burdens on future generations.”⁴⁴² The advancements of nuclear technology are important parts of our present and it is necessary to understand the dangers that radioactive waste poses in order to handle it accordingly.⁴⁴³ The world is still searching for ways to properly dispose of HLW and SNF and a quick solution is not in sight.⁴⁴⁴ Member States therefore need cooperative efforts like shared repositories to find solutions for this issue.⁴⁴⁵ While looking for these solutions it is necessary to keep in mind the dangers not only for humankind, but for the environment as a whole, and to properly understand the consequences of leakage from a disposal facility.⁴⁴⁶ Likewise, it is important to support developing countries to allow them to utilize technical advancements through nuclear technology, by helping them handle their nuclear waste.⁴⁴⁷ The IAEA will have to work as a facilitator between the many parties involved to guide the current processes in a direction that not only allows radioactive waste to be dealt with for the current generation, but also ensures that future generations will not be harmed by the waste generated now.⁴⁴⁸

Further Research

When contemplating this issue, delegates should consider the following questions: how can the IAEA help with the development of disposal facilities? Can the safety of the designated geological disposal facilities be ensured? Is there a need to make international repositories more accessible? Are there other ways of making the use of nuclear technology easier for developing countries? Where is the IAEA's support needed in the process towards finding suitable repositories? How can technology transfer be fostered in this case? How can Member States be encouraged to work on national policies concerning nuclear waste? Is there a need for more involvement of civil society? How can the nuclear industry and governments work towards nuclear waste solutions that respect all interests?

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Beswick, A. J., et al. (2014). Deep borehole disposal of nuclear waste: engineering challenges. *Ice proceedings*, 167 (EN2). Retrieved 31 August 2016 from: <https://www.ice.org.uk/getattachment/events/deep-borehole-disposal-of-nuclear-waste-london/Deep-borehole-disposal-of-nuclear-waste.pdf.aspx>

Because the disposal of HLW and SNF is still an issue under discussion, understanding the possibilities of DBD is very important. This article discusses why DBD is a solid new option, made available by technical advancements. It then explains what major engineering challenges still need to be solved in order to use DBDs as standard practice. This includes not only the exact construction of the boreholes, but also aspects like container design, how the containers are inserted into the borehole, which geological constitutions are suitable for them, or how the heat caused by the radioactive decay can be managed. While the option of DBD might be a solution to parts of the nuclear waste management issue, there are still a lot of questions to be answered.

International Atomic Energy Agency. (1997). *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste management (INFCIRC/546)*. Retrieved 15 July 2016 from: <https://www.iaea.org/sites/default/files/infirc546.pdf>

The Joint Convention is one of the key documents for radioactive waste management. With 72 Member States being parties to the convention, the importance of this document is clear. The convention addresses general safety requirements for nuclear waste and discusses radioactive waste management facilities in detail. The general requirements for storage and disposal are also settled in the convention. Chapter 3 in particular explains the question of safety of radioactive waste management. Furthermore, the convention provides a guideline for the review meetings, which include reports from all parties to the convention.

International Atomic Energy Agency. (2004). Developing multinational radioactive waste repositories: Infrastructural framework and scenarios of cooperation. *IAEA TECDOC*, 1413. Retrieved 30 August 2016 from: http://www.arius-world.org/pages/pdfs_pub/IAEA-TECDOC-1413.pdf

This document, published by the IAEA, is a comprehensive analysis of the possibility of using multinational repositories for nuclear waste. The report describes the development already made and the problems faced historically when discussing the creation such facilities, mainly based on the question of who takes responsibility for the waste. It also discusses different options for multinational repositories, and takes the benefits and challenges into account. While there are several benefits for many countries, like cost reduction and more suitable locations for disposal, the problems cannot be neglected. These problems include defining legal foundations, transport, and the environmental impact within the country where the waste is disposed. Finally, the report explains the need for further studies as there are still unanswered questions concerning the mentioned problems with this initiative.

⁴³⁸ IAEA, *Developing multinational radioactive waste repositories: Infrastructural framework and scenarios of cooperation*, 2004.

⁴³⁹ UNCED, *Agenda 21*, 1992.

⁴⁴⁰ Ibid.

⁴⁴¹ IAEA, *Developing multinational radioactive waste repositories: Infrastructural framework and scenarios of cooperation*, 2004.

⁴⁴² IAEA, *The Principles of Radioactive Waste Management*, 1995.

⁴⁴³ Pollution Issues, *Disasters: Nuclear Accidents*, 2016.

⁴⁴⁴ IAEA, *Disposal of Radioactive Waste*, 2011.

⁴⁴⁵ Ibid.

⁴⁴⁶ IAEA, *Storage and Disposal of Spent Fuel and High Level Radioactive Waste*, 2006.

⁴⁴⁷ World Nuclear Association, *International Nuclear Waste Disposal Concepts*, 2016.

⁴⁴⁸ Beswick et al., *Deep borehole disposal of nuclear waste: engineering challenges*, 2014.

International Atomic Energy Agency. (2006). *Storage and Disposal of Spent Fuel* [Report]. Retrieved 19 July 2016 from: https://www.iaea.org/About/Policy/GC/GC50/GC50InfDocuments/English/gc50inf-3-att5_en.pdf

This document released by the IAEA General Conference is an overview of several aspects regarding nuclear waste storage and disposal. It discusses the challenges of disposal and storage of different kinds of nuclear waste. It explains different approaches to storing nuclear waste and also compares approaches taken by several Member States in this respect. Specifically, the options for different types of geological repositories are discussed in detail. While the differences may seem minor, it is important to understand them for proper selection of disposal sites and thus for the proposals to be presented in committee.

International Atomic Energy Agency. (2007). *IAEA Safety Glossary*. Retrieved 22 August 2016 from: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1290_web.pdf

With nuclear waste management as an issue that involves a great amount of technical terminology, the IAEA Safety Glossary is a great resource to help delegates fully understand the topic. The document includes short explanations of all the terms that come up in the context of nuclear waste. This is not a document to read through but rather a dictionary to use as a reference when researching the topic. Having this document at the ready to check terms will help delegates throughout their preparation.

International Atomic Energy Agency. (2011). *Disposal of Radioactive Waste. IAEA safety standards, SSR-5*. Retrieved 17 July 2016 from: http://www-pub.iaea.org/MTCD/publications/PDF/Pub1449_web.pdf

This publication is part of the safety standards on radioactivity published by the IAEA. This document in the series focuses specifically on the disposal of radioactive waste. After defining important terms concerning disposal, it discusses the requirements for disposal facilities in detail. It outlines the general safety needs and provides a good overview of areas of concern, including radiation shielding, mechanical stability and stability against water intrusion. The detailed discussion of disposal facilities provides an important basis for understanding the main issues concerning nuclear waste management.

International Atomic Energy Agency. (2015). *Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management: Fifth Review Meeting of the Contracting Parties: Final Summary Report*

(JC/RM5/04/Rev.2). Retrieved 17 July 2016 from: <http://www-ns.iaea.org/downloads/rw/conventions/fifth-review-meeting/summary-report-fifth%20review%20meeting-e.pdf>

The latest review meeting on the Joint Convention held in 2015 in Vienna produced this final report. The report provides a detailed overview of the developments since the last review meeting held in 2012. It explains important aspects of nuclear waste management, which have to be taken into account for successful management of nuclear material. Furthermore, the report outlines steps for better international cooperation to improve the handling of nuclear waste. The report gives the reader an overall understanding of how the progress towards the goals of the Joint Convention is advancing at the moment, and thereby allows delegates to understand the Joint Convention in more detail. At this most recent meeting, the progress towards improved national policies for radioactive waste management were especially highlighted, as well as general progress towards better handling of HLW and SNF.

International Atomic Energy Agency. (2015). *Measures to Strengthen International Cooperation in Nuclear, Radiation, Transport and Waste Safety (GC(59)/6)* [Report]. Retrieved 19 July 2016 from: https://www.iaea.org/About/Policy/GC/GC59/GC59Documents/English/gc59-6_en.pdf

This report by the Director General of the IAEA to the Board of Governors and the General Conference includes two chapters about safety of radioactive waste

management and the safe decommissioning of radioactive material. It also addresses the question of nuclear transport. The report provides a good overview about the most recent processes in this area. The other chapters help understand the action currently taken by the IAEA concerning the questions of radiation and nuclear safety.

Organisation for Economic Co-operation and Development. (2016). *Japan's Siting Process for the Geological Disposal of High-level Radioactive Waste*. Retrieved 28 August 2016 from: <http://www.oecd-nea.org/rwm/pubs/2016/7331-japan-peer-review-gdrw.pdf>

This peer review released by the OECD on the siting process to establish a geological disposal facility for HLW in Japan is a good example how international cooperation can help ensure the safety of nuclear waste management. While the review was requested by the Japanese government itself and was not a result of any international regulation, it still allows the international community to gain insight into the processes undertaken in Japan. The report analyzes the concepts developed by the relevant Japanese departments and evaluates the safety of all steps needed for a nuclear waste management facility. The report shows how reviews conducted by international actors can help to improve the existing national processes and thus improve nuclear safety worldwide.

World Nuclear Association. (2016). *Radioactive Waste Management* [Website]. Retrieved 17 July 2016 from: <http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-waste-management.aspx>

This website provides a great overview of many aspects connected to nuclear waste. It discusses the sources and types of nuclear waste, which helps to understand why the requirements for safe handling of this material differ widely. The website compares different ways of handling SNF, which either involves reprocessing the fuel for further use, or direct disposal. The progress towards deposition of HLW and SNF in different countries is also a big part of the analysis. The last section of this page focuses on international as well as regional regulations for nuclear waste management. Reading this source will allow delegates to get a good understanding of the issue of nuclear waste management as a whole.

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