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INTERNATIONAL ATOMIC ENERGY AGENCY
BACKGROUND GUIDE 2017

Written by: Tobias Dietrich, Anke Schwarzkopf,
Daniel Berlinguette-Poulin, and Adam Wolf

NATIONAL MODEL UNITED NATIONS

Dear Delegates,

Welcome to the 2017 National Model United Nations New York Conference (NMUN•NY)! We are pleased to introduce you to our committee, the International Atomic Energy Agency (IAEA). This year's staff is: Directors Tobias Dietrich (Conference A) and Anke Schwarzkopf (Conference B), and Assistant Directors Daniel Berlinguette-Poulin (Conference A) and Adam Wolf (Conference B). Tobias recently finished his M.Sc. in Nanoscience and will begin working at his local baseball club later this year. This will be his third year on NMUN•NY staff. Anke completed her M.A. in International and European Relations at Linköping University in 2014 and currently works in political research. This will be her fifth year on staff. Daniel is currently finishing a B.A. in Political Science at Laval University and intends to start an M.A. in International Relations next fall. This is his second year on NMUN•NY staff. Adam graduated with a B.A. in International Relations from the University of Wisconsin Oshkosh and is currently working for the Alliance for Peacebuilding in Washington, D.C.

The topics under discussion for IAEA are:

I. Application of IAEA Safeguards in the Middle East
II. Improving Science and Technology Activities through Technical Cooperation
III. Nuclear Waste Management

The IAEA is an independent intergovernmental organization of the United Nations, and plays a critical role in supervising the production and nonproliferation of nuclear weapons. The IAEA provides assistance and support for the development and use of nuclear technologies for non-military usage, and it establishes standards and guidelines for the use of nuclear material, equipment, and facilities. It is important for delegates to understand the crucial role the IAEA has in achieving a safer and more peaceful world, while at the same time taking advantage of the advancements offered by nuclear energy.

This Background Guide serves as an introduction to the topics for this committee. However, it is not intended to replace individual research. We encourage you to explore your Member State's policies in depth and use the Annotated Bibliography and Bibliography to further your knowledge on these topics. In preparation for the Conference, each delegation will submit a Position Paper by 11:59 p.m. (Eastern) on 1 March 2017 in accordance with the guidelines in the Position Paper Guide and the NMUN•NY Position Papers website.

Two essential resources for your preparation are the Delegate Preparation Guide and the NMUN Rules of Procedure available to download from the NMUN website. The Delegate Preparation Guide explains each step in the delegate process, from pre-Conference research to the committee debate and resolution drafting processes. The NMUN Rules of Procedure include the long and short form of the rules, as well as an explanatory narrative and example script of the flow of procedure. In tandem, these documents thus serve as essential instruments in preparing for the Conference and as a reference during committee sessions.

Please take note of information in the Delegate Preparation Guide on plagiarism and the prohibition of pre-written working papers and resolutions. Additionally, please review the NMUN Policies and Codes of Conduct on the NMUN website regarding the Conference dress code; awards philosophy and evaluation method; and codes of conduct for delegates, faculty, and guests regarding diplomacy and professionalism. Importantly, any instances of sexual harassment or discrimination based on race, gender, sexual orientation, national origin, religion, age, or disability will not be tolerated. Adherence to these policies is mandatory.

If you have any questions concerning your preparation for the committee or the Conference itself, please contact the Under-Secretaries-General for the Peace and Security Department, Claudia Sánchez (Conference A) and Clarissa Manning (Conference B), at usg.ps@nmun.org.

We wish you all the best in your preparations and look forward to seeing you at the Conference!

Sincerely,

Conference A

Tobias Dietrich, *Director*
Daniel Berlinguette-Poulin, *Assistant Director*

Conference B

Anke Schwarzkopf, *Director*
Adam Wolf, *Assistant Director*

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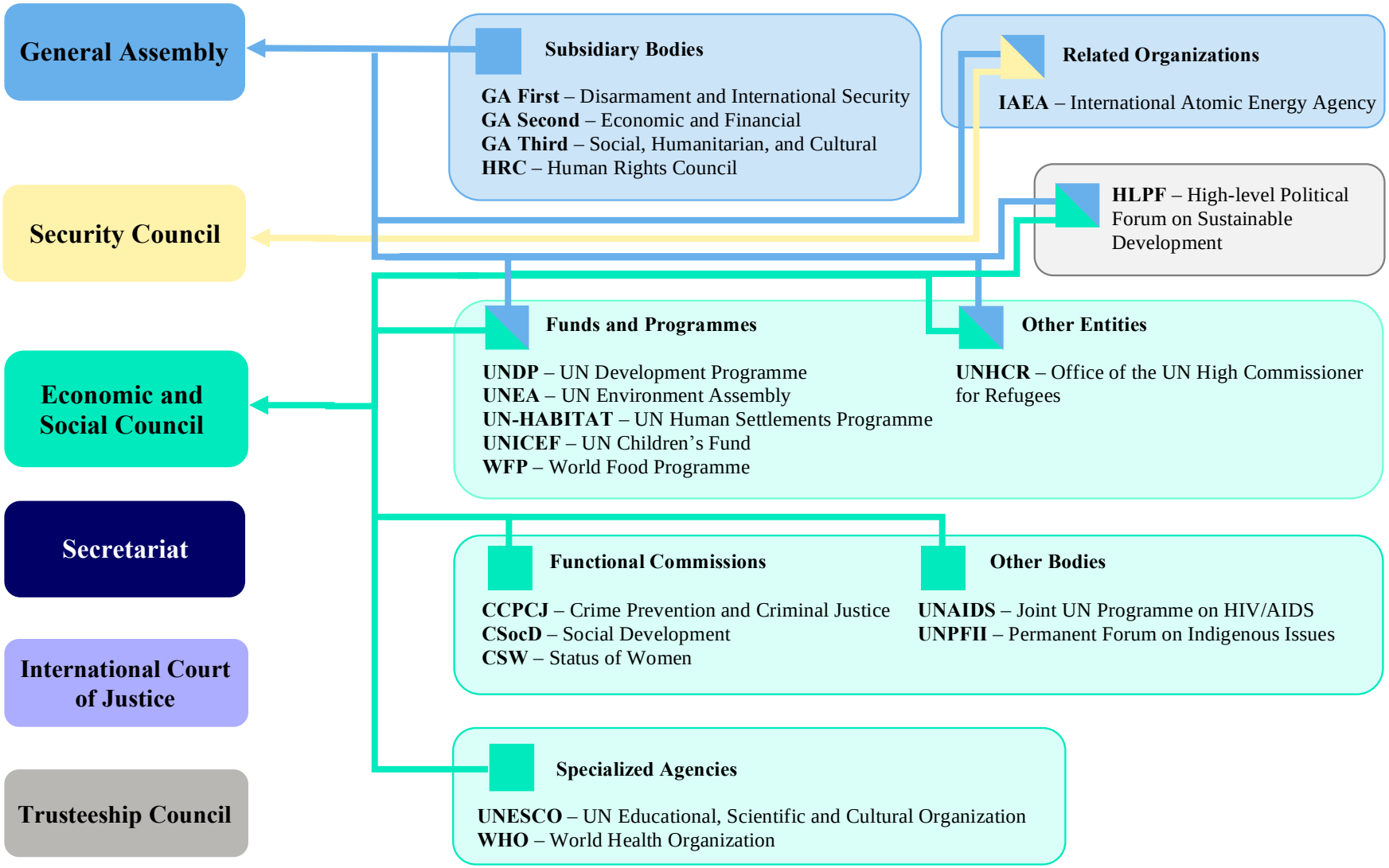
United Nations System at NMUN•NY

This diagram illustrates the UN system simulated at NMUN•NY and demonstrates the reportage and relationships between entities. Examine the diagram alongside the Committee Overview to gain a clear picture of the committee's position, purpose, and powers within the UN system.



Abbreviations

AFRA	*African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology*
ARASIA	*Cooperative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology*
ARCAL	*Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean*
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	*Joint Comprehensive Plan of Action*
JRC	Joint Research Centre
LFA	Logical Framework Approach
LLW	Low-level waste
NEA	Nuclear Energy Agency
NPT	*Treaty on the Non-Proliferation of Nuclear Weapons*
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	*Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific*
RSA	*Revised Supplementary Agreement*
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 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]

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

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

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[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

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[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, procession, 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.

Annotated Bibliography

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.

[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.*

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.

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]

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

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[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

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[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

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[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]

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[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. Improving Science and Technology Activities through Technical Cooperation

"The IAEA makes peaceful nuclear technology available to its Member States in many fields including energy, human health, food production, water management and environmental protection – all important areas recognized under the Sustainable Development Goals (SDGs)."[158]

Introduction

Technical cooperation (TC) can be defined as any activity achieved through the collaboration of two or more actors aiming at increasing people's or institutions' capacities in a certain field.[159] This approach is largely spread among the United Nations (UN) and other entities as an effective way to obtain specific results otherwise less easily achievable.[160] The International Atomic Energy Agency (IAEA) is no exception, as the work of its Department of Technical Cooperation, mainly performed by the Technical Cooperation Programme (TCP), directly contributes to an increase in Member States' capabilities concerning nuclear energy and other fields of nuclear technology.[161] This has resulted in positive achievements in multiple areas throughout the years, such as breakthroughs in the fight against cancer and other diseases.[162] With more than 120 countries benefiting from technical assistance, the IAEA plays a vital role in socioeconomic development across the globe.[163] The good management of technical cooperation is therefore crucial to ensure the deliverance of its full potential.[164] In a constantly changing world, the IAEA has to adapt its programs to emerging challenges and opportunities.[165]

This guide will first discuss the International and Regional Framework of the topic by presenting core documents serving as the backbone of the modern conception of technical cooperation inside the IAEA.[166] Then, the Department of Technical Cooperation and the Technical Cooperation Programme will be explained, as well as the partners of the IAEA on the matter.[167] Finally, two areas of intervention of the IAEA in regards to technical cooperation will be highlighted. A case study on the Ebola outbreak will close the discussion.[168]

International and Regional Framework

The 1956 *Statute of the IAEA*, founding document of the Agency, is based on three pillars: nuclear verification, safety and security, and the transfer of technology.[169] Technology transfer, made possible by technical cooperation, is implicitly mentioned in articles II and III of the Statute.[170] Article II states that the Agency must attempt to improve the use of atomic energy for peace, health and prosperity around the globe.[171] It adds that any assistance must not be used to further any military purpose.[172] In other words, positive socioeconomic outcomes must be the only objectives behind the assistance of the IAEA to its Member States.[173] Article III presents the spectrum of intervention of the IAEA and how these actions must be undertaken, explaining situations where assistance to Member States is to be banned, and also emphasizes the importance of respecting the sovereignty of Member States.[174] During the first years of existence of the IAEA, technical cooperation was small in scale and short in duration, mainly focusing on training and creating institutions and facilities allowing for the use of nuclear science

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[158] IAEA, *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*, 2015.
[159] IAEA, *Department of Technical Cooperation*, 2016.
[160] Ibid.
[161] Ibid.
[162] IAEA, Technical Cooperation – *Success stories*, 2016.
[163] IAEA, *Department of Technical Cooperation*, 2016.
[164] Ibid.
[165] IAEA, *Technical Cooperation - History*, 2016.
[166] UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956; IAEA, *Technical Cooperation - History*, 2016.
[167] IAEA, *Department of Technical Cooperation*, 2016.
[168] Centers for Disease Control and Prevention, *2014 Ebola Outbreak in West Africa*, 2016.
[169] UN Conference on the Statute of the IAEA, *The Statute of the IAEA*, 1956.
[170] Ibid.
[171] Ibid.
[172] Ibid.
[173] Ibid.
[174] Ibid.

and technology.[175] However, as Member States started raising their contributions to the program, realizing the benefits they could obtain by increasing their capacities in this field, the need for larger multi-year projects arose and led to a change in the technical cooperation field at the end of the 1970s.[176]

In 1979, the IAEA adopted the *Revised Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency*.[177] This document holds its pertinence until today for its vital content on technical assistance.[178] Section A of the document first states the nine principles that are meant to govern the provision of all technical assistance by the IAEA, once again mentioning that technical assistance is to be first and foremost allocated to least developed countries (LDCs).[179] Section B looks at the eligibility of Member States to receive this kind of support, and section E lists the different forms of technical assistance and highlights the transition that took place from short-term projects to integrated, multi-year programs.[180]

About a decade later, involved Member States had reached their ambitions on nuclear capacity and infrastructure.[181] Consequently, technical cooperation activities had to evolve to cope with Member States' new desire to obtain socioeconomic benefits in their use of nuclear science and technology.[182] In 1997, a new strategy was elaborated and then conciliated into a single document adopted by the Board of Governors of the IAEA: the *Technical Cooperation Strategy*.[183] A shift occurred from projects aiming solely at increasing capacity in nuclear authorities and institutions, towards projects placing emphasis on collaboration with counterpart organizations, to use this capacity for productive and sustainable human development.[184] The new strategic goal was now to reach substantial socioeconomic impact around the world by supporting and contributing to the achievement of national sustainable development priorities.[185] Three principal tools were introduced to carry out this goal: Model Projects to attain standards of quality in project design; Country Programme Frameworks to set common objectives between the IAEA and a Member State; and Thematic Plans to target nuclear and isotopic techniques taking sustainable development into account.[186]

Five years later, *The Technical Co-operation Strategy – The 2002 Review* revised the 1997 Strategy by updating important concepts and defining new objectives, outcomes and performance indicators for future technical cooperation activities.[187] For example, the review established the six main fields of technical cooperation intervention: human health, agricultural productivity and food security, water resources management, environmental protection, physical and chemical applications of radiation and radioisotopes, and sustainable energy development.[188] Additionally, modifications were made to the concept of Model Projects.[189] This concept evolved into a central criterion used for the prioritization and selection of TC projects.[190] A project respects this criterion if it addresses an area of real need in which there is a national program enjoying strong government commitment and support.[191]

Every five years, the IAEA drafts a medium term strategy detailing the current and near-future objectives and priorities of the Agency.[192] The *IAEA Medium Term Strategy (2012-2017)* provides guidance on the Agency's

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[175] IAEA, *Technical Cooperation – History*, 2016.
[176] IAEA, *Technical Cooperation – History*, 2016.
[177] IAEA, *The Revised Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency (INFCICR/267)*, 1979.
[178] Ibid.
[179] Ibid.
[180] Ibid.
[181] IAEA, *Technical Cooperation – History*, 2016.
[182] Ibid.
[183] IAEA, *Technical Co-operation Strategy*, 1997.
[184] Ibid.
[185] Ibid.
[186] Ibid.
[187] IAEA, *The Technical Co-operation Strategy: The 2002 Review (GOV/INF/2002/8/Mod.1)*, 2002.
[188] Ibid.
[189] Ibid.
[190] Ibid.
[191] Ibid.
[192] IAEA, *Medium Term Strategy 2012-2017*, 2010.

current activities and strategic goals.[193] The document addresses technical cooperation in section D: "Providing effective technical cooperation."[194] For the 2012-2017 period, the Agency will continue its work on technology transfer and partnership facilitation, develop institutional and human resources in Member States, and promote best practices in project formulation, management, monitoring, and evaluation.[195] The needs of LDCs will continue to be prioritized, as well as projects linked to positive socioeconomic outcomes and, in a broader view, to sustainable development.[196] South-South and North-South cooperation are therefore brought forward as effective tools to establish TC.[197]

The Agency is a direct contributor to the achievement of the Sustainable Development Goals (SDGs) adopted by the United Nations in 2015.[198] When looking at the 17 goals, there is a very close overlap with the work of the IAEA.[199] Indeed, fields like energy, human health, food production, water management and environmental protection are all areas recognized under the SDGs in which the IAEA is largely involved.[200] Nine of these goals are of particular importance for the IAEA: SDGs 2, 3, 6, 7, 9, 13, 14, 15 and 17.[201] Taking two examples, the IAEA TCP relates to SDG 2: Zero hunger, due to the use of nuclear techniques to shield plants against insect pests, therefore increasing the number of crops available for consumption.[202] These techniques contribute to the expansion of more performant, disease-resistant and/or drought-tolerant plant varieties.[203] Furthermore, SDG 13: Climate action, is addressed by the IAEA by the use of procedures resulting in better flood control, the implementation of innovative irrigation techniques, and the creation of highly resistant wheat seeds.[204] These are only a few examples showing the large and effective contribution technical cooperation can make toward the achievement of the SDGs.[205]

Role of the International System

The Department of Technical Cooperation is one of six departments of the IAEA.[206] Led by Deputy Director General Dazhu Yang since July 2015, the department is responsible for shaping and delivering the IAEA's development mandate.[207] It consists of: the Office of the Deputy Director General, four regional Divisions (Africa, Asia and the Pacific, Europe, and Latin America), the Division of Programme Support and Coordination (TCPC), and the Programme of Action for Cancer Therapy (PACT).[208] Based on regional and national needs, Country Programme Frameworks are established, leading to the implementation of relevant projects tackling national objectives.[209] These projects aim to increase the self-reliance of Member States, mobilize resources, build partnerships and enhance collaboration and cooperation.[210] As for the TCPC, its mandate focuses on increasing quality and transparency in the different steps of the TC programme cycle through timely, accurate and effective design.[211] It does so by developing strategies, guidelines and procedures, carrying out financial monitoring and control, as well as producing and managing data and information management systems.[212] The department also creates tools for project management, monitoring, training, self-evaluation and quality assurance.[213] The main activities of the TCPC include building partnership opportunities, coordinating communication, and reporting to

[193] Ibid.
[194] Ibid.
[195] Ibid.
[196] Ibid.
[197] Ibid.
[198] IAEA, *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*, 2015.
[199] Gaspar, *The Role of Nuclear Technology in the Post-2015 Development Agenda*, 2015.
[200] IAEA, *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*, 2015.
[201] Ibid.
[202] Ibid.
[203] Ibid.
[204] Ibid.
[205] Ibid.
[206] IAEA, *Human Resources – Department of Technical Cooperation*, 2016.
[207] Ibid.
[208] Ibid.
[209] IAEA, Technical Cooperation – *Country Programme Frameworks*, 2016.
[210] Ibid.
[211] IAEA, *Department of Technical Cooperation*, 2016.
[212] IAEA, *Human Resources – Department of Technical Cooperation*, 2016.
[213] Ibid.

Member States.[214] The PACT, on the other hand, supports Member States in the improvement of cancer care by incorporating radiotherapy into national cancer control programs.[215] Radiotherapy refers to the use of ionizing radiation to treat illnesses.[216] The PACT's goals are to establish international partnerships, catalyzing public and private resources, expanding capacities in cancer control through the use of radiation technologies, and ensuring that cancer services are accessible and affordable.[217]

The TCP is the IAEA's principal mechanism for delivering services to Member States.[218] It aims to help countries, in collaboration with key actors, develop their proficiency for the safe, peaceful and secure employment of nuclear technology in support of sustainable socioeconomic growth.[219] Although all Member States are admissible for assistance, special attention is given to LDCs.[220] It is important to note that TC projects are only established when the use of nuclear technology presents an advantage over other approaches.[221] Moreover, countries are not automatically entitled to receive technical assistance once they become members of the Agency.[222] In fact, the signature of the *Revised Supplementary Agreement* (RSA) is an essential condition to its deliverance.[223] This document is a contract, binding signatories to a series of modalities, which include the engagement not to use nuclear technology for military purposes.[224] The IAEA General Conference officially reviews technical cooperation with the adoption of an annual resolution presenting recommendations, calling for actions for the year to come in areas such as the strengthening of TC activities and the effective execution of the TCP.[225]

The IAEA uses the Logical Framework Approach (LFA) for the planning and monitoring of the program .[226] This methodology, widely spread among international organizations, helps Member States create feasible projects by defining a project's entire course and identifying possible problems and related solutions, before the project is put into action.[227] Every aspect of a TC project is therefore evaluated, including the identification of priorities, the roles and responsibilities of the concerned actors, and the project cycle.[228] The funding of the program is provided by the Technical Cooperation Fund (TCF).[229] The fund is sustained through Member States' voluntary contributions, payments of national participation costs for each project, and additional budgetary contributions, including government cost-sharing and in-kind contributions.[230] An annual resolution is adopted to endorse the allocation of the TCF.[231] A recent complement to the fund was added in 2010 through the creation of the Peaceful Uses Initiative (PUI), allowing the Agency to gather extra-budgetary contributions to support TC projects in areas of peaceful application of nuclear technology.[232] The PUI also allows the IAEA to be quicker and more flexible when responding to unexpected or unforeseen events.[233] For example, the Ebola and Zika outbreaks were dealt with in part with money coming from the PUI.[234] More generally, the TCP guides its actions through widespread concepts among the United Nations such as "capacity-building, networking, knowledge-sharing, and partnership facilitation."[235]

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[214] IAEA, Technical Cooperation – *Division of Programme Support and Coordination*, 2016.
[215] IAEA, *Department of Technical Cooperation*, 2016.
[216] Cancer Research UK, *What radiotherapy is*, 2016.
[217] IAEA, *About PACT*, 2014.
[218] IAEA, *Technical cooperation programme*, 2016.
[219] Ibid.
[220] Ibid.
[221] Ibid.
[222] Ibid.
[223] IAEA, *Revised Supplementary Agreement Concerning the Provision of Technical Assistance*.
[224] Boureston & Lacey, *Nuclear Technical Cooperation: A Right or a Privilege?*, 2007.
[225] IAEA, *Strengthening of the Agency's technical cooperation activities (GC(60)/RES/11)*, 2016.
[226] IAEA, *Designing IAEA Technical Cooperation Projects using the LFA: A Quick Reference Guide*, 2012.
[227] Ibid.
[228] Ibid.
[229] IAEA, Technical Cooperation – *Funding the programme*, 2016.
[230] Ibid.
[231] IAEA, *Technical Cooperation Fund Allocation for 2016 (GC(59)/RES/6)*, 2015, p. 1.
[232] IAEA, *What is the Peaceful Uses Initiative (PUI)*, 2016.
[233] Ibid.
[234] Ibid.
[235] IAEA, *What we do*, 2016.

IAEA maintains close links with more than a dozen organizations within the UN system.[236] Among them, the Food and Agriculture Organization of the UN (FAO) and the World Health Organization (WHO) have particularly close relationships with IAEA.[237] For example, IAEA has worked in close collaboration with FAO through the Joint FAO/IAEA Division of Nuclear Techniques in Food and Agriculture since 1964.[238] Its mission is take part in the achievement of peace, health and prosperity across the planet, particularly to global food security and sustainable agricultural development.[239]As for the WHO, it acts as a key partner when tackling human health issues.[240] The cooperation between the Pan-American Health Organization/World Health Organization (PAHO/WHO) and IAEA on issues such as radiation medicine and radiological safety since 2012 is a notable example.[241] At the moment, the management of the Zika outbreak brings together IAEA and WHO on a regular basis.[242]

IAEA holds relationships with the European Commission since 2005, mainly regarding nuclear safety.[243] Regional and interregional projects have been taking place since that year, with the signature of contribution agreements.[244] Additionally, Member State institutions and the IAEA have worked together to establish more than 20 collaborating centers covering the six areas of intervention of the Agency.[245] Aside from IAEA, there are several international organizations fostering TC.[246] A good example is the World Association of Nuclear Operators (WANO), which was founded in 1989 after the reactor catastrophe in Chernobyl.[247] WANO unites operators of nuclear power plants, "to maximize the safety and reliability of nuclear power plants" through mutual support and exchange of information.[248] Likewise, there are several regional and cooperative agreements on TC, such as the *African Regional Cooperative Agreement for Research, Development and Training related to Nuclear Science and Technology* (AFRA), the *Regional Cooperative Agreement for Research, Development and Training Related to Nuclear Science and Technology for Asia and the Pacific* (RCA), the *Regional Cooperation Agreement for the Promotion of Nuclear Science and Technology in Latin America and the Caribbean* (ARCAL), and the *Cooperative Agreement for Arab States in Asia for Research, Development and Training related to Nuclear Science and Technology* (ARASIA).[249] These agreements contribute to the effort of strengthening and enlarge the contribution of nuclear science and technology to socioeconomic development in different regions of the globe.[250]

Technical Cooperation for Sustainable Development

Health

The WHO designates cancer as one of the leading causes of death worldwide.[251] Based on their projections, 70% of all cancer deaths in 2030 will happen in low and middle income countries.[252] To prevent these numbers from becoming reality, better prevention, detection and treatment are needed.[253] In the fight against cancer, radiation therapy plays a crucial role.[254] However, proper infrastructure, advanced equipment and trained specialists are in most cases not available for developing countries.[255] The IAEA has been active in this field for the past 50 years, lending assistance by providing radiotherapy machines, in-depth training by IAEA professionals, and expert

[236] IAEA, *United Nations system*, 2016.
[237] IAEA, *Joint FAO/IAEA Programme: Nuclear Techniques in Food and Agriculture*, 2016; *PAHO/WHO*, 2016.
[238] IAEA, *Partnerships*, 2016.
[239] Joint FAO/IAEA Programme, *Introducing the Joint FAO/IAEA Division*, 2014.
[240] IAEA, *PAHO/WHO*, 2015.
[241] Ibid.
[242] IAEA, *Zika*, 2016.
[243] IAEA, *Partnerships*, 2016.
[244] Ibid.
[245] IAEA, *Collaborating Centres*, 2016.
[246] World Nuclear Association, *Cooperation in Nuclear Power*, 2016.
[247] Ibid.
[248] World Association of Nuclear Operators, *Our Mission & Principles.*
[249] IAEA, *Regional/Cooperative Agreements*, 2016.
[250] IAEA, *Partnerships*, 2016.
[251] IAEA, *Human Health: Using nuclear techniques to improve health around the world.*
[252] Ibid.
[253] Ibid.
[254] Ibid.
[255] Ibid.

guidance, especially through PACT since its creation in 2004.[256] With the help of the WHO, the International Agency for Research on Cancer and other organizations working on the field, the IAEA now supports a coordinated global response by the creation of national cancer control programs in countries in need.[257]

Similarly, the spread of infectious diseases is often triggered by the lack of adequate equipment and properly trained medical personnel.[258] In LDCs, this lack is the cause for too many potentially avoidable deaths.[259] The best solution to tackle this issue is through the use of techniques such as nuclear imaging, allowing for a faster diagnosis and treatment of a disease.[260] With an early diagnosis comes a greater chance of successful treatment, and the avoidance of spending money on ineffective treatment.[261] In hospitals and laboratories, nuclear medicine capabilities are put into place and personnel is trained to provide proper and secure services to their patients.[262]

Agriculture and Food

A second big area for technical cooperation is agriculture and food security.[263] A safe, nutritious and reliable supply of food is vital for the well-being of the world population.[264] Problems like low crop and livestock productivity, increased cost of fertilizer and seeds, desertification, salinity and climate change endanger ecosystems and populations.[265] On this issue, the IAEA's TCP supports Member States in the implementation of modern and competitive plant breeding programs.[266] TC projects aim to address these four main issues: control and eradication of insect pests, livestock productivity, crop, land and water management, as well as food safety.[267]

Insect pests pose a major threat to crops, and pest management practices that uphold natural balance and diminish reliance on pesticides are key to the fight against infestations.[268] Nuclear technology can play a positive role on pest suppression, containment and eradication.[269] One of the successful techniques used by the IAEA is the sterile insect technique, which is part of a global pest management approach.[270] The technique entails breeding, sterilizing and releasing male insects into the wild.[271] These male insects will compete with wild males and breed with wild females, ensuring that pest numbers decrease over time.[272]

Food security is partly a result of proper land use and healthy soils.[273] Indeed, integrated land and water management practices improve agricultural production while enhancing soil productivity and its resilience against desertification and other impacts of climate change and variability.[274] IAEA TC projects focus on crop performance, soil conservation and fertilizer usage.[275] By enhancing crop varieties, reducing soil erosion and optimizing fertilizer and water use, TC projects also contribute to food security efforts.[276] Food safety is compromised by chemical and microbiological contamination.[277] On this issue, nuclear applications and isotope techniques can be used to develop analytical methodologies for food traceability and quality assurance.[278] "IAEA technical cooperation projects help

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[256] Ibid.
[257] Ibid.
[258] Ibid.
[259] Ibid.
[260] Ibid.
[261] Ibid.
[262] Ibid.
[263] IAEA, *Agriculture and Food Security: The IAEA Contribution*.
[264] Ibid.
[265] Ibid.
[266] Ibid.
[267] Ibid.
[268] Ibid.
[269] Ibid.
[270] Ibid.
[271] Ibid.
[272] Ibid.
[273] Ibid.
[274] Ibid.
[275] Ibid.
[276] Ibid.
[277] Ibid.
[278] Ibid.

countries to trace food origin, detect adulteration and prove the authenticity of food products, monitor residues of chemical contaminants such as veterinary drugs and pesticides and identify the presence of toxins."[279] The establishment of educational seminars, training courses and food control laboratories are also examples of the work of the Agency on this matter.[280]

Lastly, malnutrition has damageable impacts on healthcare systems.[281] Under-nutrition and over-nutrition are responsible for potentially life-threatening problems to humans.[282] On one hand, under-nutrition is the cause of ten million child deaths per year, the vast majority of these deaths occurring in developing countries.[283] On the other hand, over-nutrition endangers the lives of more than a billion overweight children and adults worldwide.[284] It is important to note that good nutrition is not only related to the quantity of food available for an individual, but also to the quality of the food.[285] The IAEA's nutrition intervention programs focus on the nutritious aspect of the food provided to populations.[286] The IAEA providing assistance and training to Member States, thus ensuring that countries acquire the knowledge to use specific nuclear techniques in the objective of tackling food insecurity.[287]

Case Study: Ebola

The Ebola outbreak affected several countries in West Africa in 2014 and 2015, inflicting serious damage to the population of Liberia, Sierra Leone and Guinea.[288] As of April 2016, more than 11,310 people have died because of the disease, almost all of them from these three countries.[289] As a result of the urgent situation, the IAEA, in partnership with the FAO and in close collaboration with the WHO, established a TC project to address the emergency.[290] Its objective was to enhance the current abilities to diagnose diseases in a reasonable timer manner ,to better foresee risks of outbreaks and establish preventive and control measures.[291] This IAEA project was active for two years, and made use of nuclear-derived techniques to trace the propagation of viruses more effectively, including Ebola.[292] These techniques were employed because they were the only option to provide the high sensitivity and specificity required in this situation.[293] To ensure the safety of the scientists in their application of the techniques, the IAEA held trainings for scientists, veterinarians and field workers.[294] Moreover, the IAEA provided assistance by consolidating national and regional networks to circulate information about these outbreaks more efficiently.[295]

Conclusion

Technical cooperation has been an essential component of the International Atomic Energy Agency since its very beginning.[296] First introduced by the *Statute of the IAEA*, TC has gone through a series of evolutions with the adoption of additional core documents.[297] Over the years, accomplishments on the ground have been made by the Department of Technical Cooperation and more specifically through the TCP, contributing to the transformation of theoretical concepts into concrete projects.[298] As it has been seen in the fields of human health and agriculture, TC

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[279] Ibid.
[280] Ibid.
[281] IAEA, *Human Health: Using nuclear techniques to improve health around the world*.
[282] Ibid.
[283] Ibid.
[284] Ibid.
[285] Ibid.
[286] Ibid.
[287] Ibid.
[288] Centers for Disease Control and Prevention, *2014 Ebola Outbreak in West Africa*, 2016.
[289] Ibid.
[290] Assumpcao, *Early Warning for Ebola: Strengthening Africa's Capacity to Anticipate Risk of Outbreaks*, 2015.
[291] Ibid.
[292] Ibid.
[293] Dixit, *From Lab Coats to Hazmat Suits: IAEA Trains Scientists to Work Safely With Ebola*, 2015.
[294] Ibid.
[295] Assumpcao, *Early Warning for Ebola: Strengthening Africa's Capacity to Anticipate Risk of Outbreaks*, 2015.
[296] IAEA, Technical Cooperation – *History*, 2016.
[297] Ibid.
[298] IAEA, *Department of Technical Cooperation*, 2016.

has much to offer Member States seeking to increase their nuclear technology capacities.[299] The TCP builds bridges between the IAEA and UN funds, programs and specialized agencies, as well as other actors, with the objective of contributing to the development of the safe, peaceful and secure use of nuclear technology.[300] Active in most regions around the world, the IAEA touches the daily life of millions of girls, boys, women and men by its actions on multiple fields, and having a direct impact on the achievement of a sustainable future.[301]

Further Research

When pursuing their research on this topic, delegates should ask themselves the following questions: In what ways can the IAEA improve its Technical Cooperation Programme? How can the Agency's technical cooperation activities be strengthened? What is to be done in each of the six fields of intervention of the TC Programme? In what ways can the IAEA improve collaboration with its partners? In what areas will the 2017-2022 Medium Term Strategy resemble or differ from its predecessor? What additional efforts can be made to fulfill the Sustainable Development Goals? What is the future of the Technical Cooperation Fund? What roles should the Peaceful Uses Initiative play in the future? What should be the next steps of the Agency in battling the Zika virus outbreak? Taking these questions into consideration will assist delegates in the course of their research and towards developing pertinent propositions on the topic.

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International Atomic Energy Agency. (n.d.). *Revised Supplementary Agreement Concerning the Provision of Technical Assistance*. Retrieved 9 September 2016 from: https://ola.iaea.org/ola/documents/RSA/RSAmaster%26SBAA.pdf

> *This document plays a key role in the realization of technical cooperation projects. Member States wanting to receive technical assistance from the IAEA are asked to sign this agreement first. It details commitments related to security, which Member States must follow in order to receive support from the Agency. These commitments are meant to prevent the manufacturing of nuclear weapons and nuclear explosive devices. Delegates can use this document to understand the technical and legal obligations affiliated with the provision technical cooperation by the IAEA.*

International Atomic Energy Agency. (1979). *The Revised Guiding Principles and General Operating Rules to Govern the Provision of Technical Assistance by the Agency (INFCIRC/267)* [Report]. Retrieved 7 September 2016 from: https://www.iaea.org/sites/default/files/publications/documents/infcircs/1979/infcirc267.pdf

> *This report details crucial information on principles and rules framing technical assistance. From technicalities surrounding the eligibility of states to receive technical assistance, to the sources and forms of the latter, this report will serve as a reference document for delegates wishing to grasp the overall framework of technical cooperation. The ten guiding principles meant to govern the provision of technical assistance by the Agency are listed, accompanied by general operating rules to follow in their implementation.*

International Atomic Energy Agency. (1997). *Technical Co-operation Strategy (GOV/INF/824)* [Report]. Retrieved 7 September 2016 from: https://www.iaea.org/technicalcooperation/documents/Official-docs/TC-Strategy.pdf

> *This report presents the newer strategy the IAEA adopted towards technical cooperation after three decades of delivering this service. The new strategic goal of obtaining positive socioeconomic benefits with the use of nuclear energy is introduced, as well as its modalities and expected results. Delegates can utilize this document to create resolutions espousing the spirit of the Agency on technical cooperation, therefore better representing what is produced in reality.*

International Atomic Energy Agency. (2002). *The Technical Co-operation Strategy – The 2002 Review (GOV/INF/2002/8/Mod.1)* [Report]. Retrieved 6 September 2016 from: https://www.iaea.org/technicalcooperation/documents/Official-docs/TC-Strat-2002-Rev.pdf

[299] IAEA, *Agriculture and Food Security: The IAEA Contribution*.
[300] IAEA, *Department of Technical Cooperation*, 2016.
[301] IAEA, *Human Health: Using nuclear techniques to improve health around the world*.

This Report, read in conjunction with the former, presents a comprehensive framework of the strategy currently being employed by the IAEA towards technical cooperation. Building on its predecessor, this document is primarily known for introducing the six areas of intervention of the Agency, areas still used today to categorize technical cooperation into different sectors. These areas are: human health, agricultural productivity and food security, water resources management, environmental protection, radiation technology, and energy. Delegates can use this document as a guideline to incorporate the new strategy of the IAEA into their work in committee.

International Atomic Energy Agency. (2010). *Medium Term Strategy – 2012-2017* [Report]. Retrieved 5 September 2016 from: https://www.iaea.org/sites/default/files/mts2012_2017.pdf

This core IAEA document presents guidance on the work of the Agency over the designated period, including in the field of technical cooperation. Section D of the report focuses on priorities and objectives of the Agency towards technical cooperation over the five-year period, providing a general view on what is expected to be realized during this time. To name a few priorities, the IAEA focuses on South-South and North-South cooperation, the development of institutional and human resources in Member States, and the support of stakeholders in the safe applications of nuclear technologies. Delegates can use this document to seize how much attention must be given to specific areas of technical cooperation, therefore guiding the proposals they will present in committee.

International Atomic Energy Agency. (2012). *Designing IAEA Technical Cooperation Projects using the Logical Framework Approach: A Quick Reference Guide* [Report]. Retrieved 10 September 2016 from: https://www.iaea.org/technicalcooperation/documents/Brochures/LFA-ref.pdf

This report details the methodology that the IAEA's Technical Cooperation Programme employs to plan and design projects. This methodology, known as the LFA, is applied by the vast majority of agencies dealing with technical cooperation. The guide helps Member States to effectively plan and determine every aspect of a technical cooperation project, including the identification of priorities, the roles and responsibilities of the concerned actors and the project cycle. Delegates will want to read this document to get a full understanding on how technical cooperation projects are thought out and implemented.

International Atomic Energy Agency. (2015). *Atoms for Peace and Development: How the IAEA supports the Sustainable Development Goals*. Retrieved 10 September 2016 from: https://www.iaea.org/sites/default/files/sdg-brochure_forweb.pdf

This document is linked with the implementation of the Sustainable Development Goals by the United Nations. After presenting a general view on how the SDGs are in direct correlation with the work of the Agency, a specific emphasis is placed on specific goals to indicate how the IAEA is going to contribute to reaching them. Technical cooperation is one of the main methods by which these goals will be attained. Bearing in mind the relevant SDGs will allow delegates to formulate resolutions that will contribute to their realization.

International Atomic Energy Agency. (2016). *Strengthening of the Agency's Technical Cooperation Activities (GC(60)/RES/11)* [Resolution]. Retrieved 27 October 2016 from: https://www.iaea.org/About/Policy/GC/GC60/GC60Resolutions/English/gc60res-11_en.pdf

This resolution, adopted during the last Annual Regular Session of the IAEA General Conference, presents the latest details on the status of technical cooperation. It also details recommendations and calls for action in the different sectors of TC. Delegates will utilize it and the latest Technical Cooperation Report to produce resolutions reflecting with the current challenges and objectives of the IAEA. Delegates can also analyze its format and structure to guide them in the writing of their own resolutions.

International Atomic Energy Agency. (2016). *Technical Cooperation Report for 2015*. Retrieved 8 September 2016 from: https://www.iaea.org/About/Policy/GC/GC60/GC60InfDocuments/English/gc60inf-4_en.pdf

This annual report provides in-depth information on every aspect of technical cooperation within the IAEA. It includes, inter-alia, the activities and achievements conducted by region and by thematic sector, as well as a financial overview of the TC Programme. Delegates should keep this

report for reference, since it provides detailed and up-to-date information on every aspect of TC and thereby allows for a better understanding of the current focus of TC within the IAEA.

United Nations, Conference on the Statute of the International Atomic Energy Agency. (1956). *The Statute of the International Atomic Energy Agency*. Retrieved 8 September 2016 from: https://www.iaea.org/sites/default/files/statute.pdf

Articles II and III of the Statute act as the founding pillars of technical cooperation. While Article II presents a broad view of the issue, Article III provides specific details on how technical cooperation must be administered. Delegates can use the Statute to reiterate the original intention of the Agency on technical cooperation, which is that assistance provided by the IAEA aims to promote the peaceful use of atomic energy. The work produced in committee must reflect the core values and objectives underpinning this document.

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III. 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,

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[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

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[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]

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[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.

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 trough 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 a 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

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[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]

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[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

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[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.*

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[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. (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/infcirc546.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.

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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