Following the use of nuclear weapons during the attack on Hiroshima and Nagasaki in the Second World War, the world was uneasy with the power of nuclear technology. In response to this, United States President Dwight Eisenhower gave his famous “Atoms for Peace” Address to the General Assembly of the United Nations in 1953. In his speech, President Eisenhower explained his vision of an international agency that would work towards reversing the fear incited by the trend of atomic military build-up by using atomic energy towards peaceful pursuits. These pursuits would benefit all of mankind through applications in various fields, such as agriculture and medicine. This vision was realized when 81 states met at the United Nations Headquarters in New York and unanimously approved the Statute of the International Atomic Energy Agency (IAEA).

The dual mission of the IAEA that is outlined in Article II of the Statute can be summarized “to promote and control the Atom.” The safeguards of the IAEA are the agency’s strongest power when it actuates any decisions within the scope of its mission, which are backed by the Treaty of the Non-Proliferation of Nuclear Weapons (NPT). The NPT lists the IAEA as the body responsible for upholding the agreements made in the treaty. This delegation of power to the IAEA empowers the safeguards to the level of legal obligations. The reinforcement of these powers into the enforcement of the safeguards is exemplified by the fact that States continue to fund the regular budget of the IAEA.

Despite the agreements made by member states to use atomic energy solely for peaceful purposes, collaboration in presence of the ongoing arms race between the United States and the Soviet Union made it difficult. The tensions that ensued reached a climax in the

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Cuban Missile Crisis. After this high point of confrontation passed, new opportunities for expansion of powers appeared for the IAEA. The development of other areas of involvement relevant to nuclear energy can be summarized into nuclear safety, nuclear security, and technical cooperation. The primary difference in the official directives and their associated activities that fall under the previous three areas of involvement and those that are categorized under the enforcement of safeguards comes down to empowerment. Nuclear safety, nuclear security, and technical cooperation are divisions of engrossment whose work is not founded upon treaty-based obligations. Therefore, they are not empowered to the same extent as the enforcement of safeguards and work under these divisions is carried out through state-secretariat civic intercommunication and external developments.6

Currently, the IAEA has 171 member states which are all represented in the General Conference where they each have one vote.7 The General Conference (GC) is one of the two policy-making bodies in the IAEA. The GC meets annually to decide on the budget of the agency, decide on issues raised by the Board of Governors, the Director General, and member States.8 The Board of Governors is composed of 35 members from different member states of the IAEA and are tasked with examining the IAEA’s financial statements, programme, and budget, considering applications for membership, approving safeguard agreements, publishing the IAEA’s safety standards, and appointing the Director General of the IAEA with approval from the GC.9 The members of the Board of Governors are typically experts in nuclear energy.

I. Shielding Nuclear Power from Natural Disasters

Statement of the Issue:

The possibility of radiological release is one of the prominent concerns when it comes to nuclear power plants but the most significant risk factors that contribute to this possibility are not ones that can be found within the walls of plants such as human error or mechanical failure. Instead, the major risk factors are those that lie outside of the plant, which lie completely out of the realm of human control. Natural disasters, such as earthquakes, volcanic eruptions, tsunamis, floods, and hurricanes are constantly exerting their pressures on nuclear power plants (NPPs) around the world.10

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History:

The threat that natural forces pose on NPPs was realized in 1977 when an earthquake, with an epicenter in Romania, was felt during the construction of additional reactor units for an NPP in Kozloduy, Bulgaria. One of the two original reactor units was manually shut down, while the other reactor continued its operations until the next morning. The seismic activity only produced superficial damages to the plant such as making small changes in the positions of the main equipment of the nuclear systems, but the functional capability was not altered. This event, while fortunately not catastrophic, could only be described as being lucky as the magnitude of the earthquake was significantly greater than the maximum magnitude the NPP was designed to handle. Due to the Kozloduy NPP’s adoption of the Soviet Union’s internal safety rule, which required the NPP to be thirty percent stronger than the required strength per calculations, the NPP managed to avoid a nuclear meltdown. This incident led to the realization that measures needed to be developed to reduce the possibility of natural disasters.

One of the most recent incidents in which a plant was affected by a natural disaster was the Fukushima-Daiichi incident. On March 11th, 2011, the seismic energy released by the Great East Japan Earthquake generated a tsunami that exposed several design flaws in the NPP. The earthquake disabled the electric power transmission to the NPP that stripped it out of all off-site power. The NPP proved to be able to handle the seismic consequences as the backup generators were utilized to run the necessary cooling systems. The flooding due to the tsunami damaged systems that were fundamental for the safety functions of the plant such as the cooling and electrical systems. Within the first three days, all three cores whose cooling systems were disabled melted. In the following three days, a large amount of radioactive material was released. No civilian deaths have been linked to the release of the radioactive waste but over 100,000 people had to be evacuated from their homes.

When the Fukushima-Daiichi plant was designed and sited in 1960, the design accounted for tsunamis using the 1960 Chile tsunami as a basis. During the initial planning of the plant, the countermeasures put in place with respect to tsunamis were acceptable given the current scientific knowledge, but in 1993, updated information regarding the increased potential of tsunamis and earthquakes in Fukushima was made known to both the plant operators and government regulators, yet no actions were taken from either side. Additionally, the existing tsunami countermeasures did not meet the IAEA guidelines which accounted for these changes but the relevant government regulation body, Nuclear & Industrial Safety Agency (NISA), still permitted the plant to remain in operation.

In the foreword of the report on the incident by the IAEA Director General, the major factor that led to the negative outcomes of the Fukushima-Daiichi incident was the notion that the power plant would never face a disaster of this magnitude that was unchallenged by the plant operators or the government.\textsuperscript{14} As a result, Japan was not prepared to handle such a threat.

The IAEA established the Incident and Emergency Centre (IEC) in 2005 in response to an increase in nuclear applications and elevated concerns over pernicious usage of nuclear material that necessitated the formation of an international emergency response agency.\textsuperscript{15} The IEC considers itself to be the centerpiece of the international emergency preparedness, communication, and response to nuclear incidents irrespective of the cause. With respect to natural disasters, the IEC’s actions can be divided into warning and assessing. Various technical committees and subcommittees in the IEC work towards determining the various characteristics of potential natural disasters that are integral to providing advance warnings and preventing nuclear accidents. The IEC also is heavily involved in the assessment of health risks in the aftermath of nuclear accidents. Additionally, they are heavily involved in the continuous improvements of the International Safety Standards.\textsuperscript{16}

The International Safety Standards of the IAEA are a product of the foundational Statute of the IAEA.\textsuperscript{17} The Safety Standards are composed of three publications: the Safety Fundamentals, Safety Requirements, and Safety Guides. The Fundamentals establish the objective of the axiom and the purpose of the axiom, the requirements exist to provide guidelines of how to keep the people and the environment safe, and the guides serve as recommendations on how the Fundamentals and the Guides can be implemented.

Analysis:

With respect to the agency’s activities to promote nuclear safety, one of its major criticisms is the inability to proactively affect the adoption of their safety recommendations. One cited reason is the lack of authority the IAEA has when it comes to nuclear safety activities. This lack of authority can be associated with the decreasing share of activities that fall under the article in the IAEA’s Foundational Statute where it requires the agency to establish safety standards for the sake of protecting life and reducing damage to property.\textsuperscript{18} During the inception of the IAEA, it was expected that the IAEA would be inspecting installments for complying with the safety standards published with authority over the matter that would be analogous to the enforcement of safeguards. These expectations were never realized due to there being no compulsion by the NPT to make the standards legally binding. Furthermore, the IAEA’s


Fundamental Safety Principles clearly outlines that jurisdiction over nuclear installments resides solely within the relevant State and a multilateral body with such jurisdiction would violate this. Furthermore, legally mandating universal standards to be followed would also make it significantly more difficult to update and improve. Recommending these standards as opposed to legally requiring that they comply does allow them to remain changeable and thus safer, but it also yields the problem of government regulators and plant operators from implementing it. This has led to incidents such as the Three Mile Island and the aforementioned Fukushima-Daiichi accidents. Despite the lack of authority that the IAEA has, Western nuclear power vendor governments often request newcomer states to carry out IAEA reviews prior to the completion of projects. This approach relies on the assumption that suspicions will develop within the populace when such a request is rejected.

In the name of maintaining national sovereignty over jurisdiction of NPPs, the Board of Governors rejected the multilateralization of safety regulations. As a result, the IAEA abandoned their agenda to legally empower the Agency with jurisdiction over compliance of safety standards in the 1970s. Instead, the IAEA sought to improve its influence and scope over the matter by involving itself in opportunistic responses to severe accidents through contributing to the establishment of a global legal framework despite not having any authority to do so. The issue with this approach is that it is retroactive as opposed to proactive which violates the obligation the IAEA has to prevent nuclear accidents.

Conclusion:

The largest risk to NPPs are not man-made errors, such as carelessness, but natural disasters, which are unavoidable. While many countries that have harnessed nuclear power have taken precautionary measures, previous incidents have highlighted that the effectiveness of these countermeasures are not being constantly evaluated and updated. While the responsibility of governance and protection of NPPs have been left to countries, as all member states of the IAEA have historically been against multilateral administration, upholding this decision has led the Agency only becoming involved in improving the natural disaster protection standards of NPPs when prompted by incidents where current safety standards have proved to be ineffective. This reactive approach to nuclear safety can be considered to be ineffective in carrying out one of the foundational pillars of the IAEA. Moreover, it represents a conflict of interests that does not prioritize safety and needs to be both addressed and resolved by the international community especially as many more countries seek to empower themselves with nuclear energy.

Questions a Resolution Must Answer:

1. How can states be incentivized to continuously improve the existing structural designs and safety protocols to prevent accidents caused by natural disasters?

2. What obstacles need to be overcome for the IAEA to be proactive in complying with current scientific knowledge regarding potential natural disasters damaging NPPs and how can they be done without violating national sovereignty?

3. Is it possible to avoid providing legal authority to a multilateral body to increase compliance with the International Safety Standards? If it is not, what amendments are necessary and how can infringement on national sovereignty be limited?

Resources:


"Treaty on the Non-Proliferation of Nuclear Weapons (NPT ...."

History of the International Atomic Energy ... - Publications - IAEA." 1 Sep. 1997,  

"Why Does the IAEA Do What It Does? - Carnegie Endowment ...." 6 Nov. 2017,  


"Protection Against Extreme Earthquakes and Tsunamis ... - IAEA."  

"Bulgaria - HoNESt | History of Nuclear Energy and Society."  

"The Fukushima Daiichi Accident | IAEA - International Atomic ...."

"Fukushima Daiichi Accident - World Nuclear Association."  

"Incident and Emergency Centre | IAEA."  


"Dealing with natural and industrial disasters | IEC e-tech ...."  