International Atomic Energy Association

Addressing the Threat of Nuclear Terrorism

Bahrain

Prevention and Response to Nuclear Terrorism

Ever since the Cold War, the threat of a nuclear devastation has loomed over the world;

however, the chance of nuclear war has diminished and has been replaced with the growing threat of nuclear terrorism. As extremism has become more organized and powerful, the ability of these organizations to obtain nuclear material or attack a nuclear facility has become a huge threat to international security.[[1]](#endnote-1) Bahrain has remained involved in the attempt to counter nuclear terrorism including the support of the Global Initiative to Counter Nuclear Terrorism.[[2]](#endnote-2) Furthermore, Bahrain emphasizes the need to pursue preventive measures, such as increased security at nuclear facilities, along with actions to prepare a country in the event that a nuclear terrorist attack does occur.

Although a terrorist organization may not have the means to acquire or produce enriched uranium or other nuclear material, it could still carry out a nuclear terrorist attack by targeting a nuclear facility. Most nuclear facilities are built in such a way that prevents collapse due to an exterior explosion; however, they do not guarantee structural integrity in the event of a series of explosions. Additionally, many facilities could fall victim to a collapse via cyber attack.[[3]](#endnote-3) For these reasons, Bahrain has set forth a comprehensive plan that will allow countries to pursue stronger, more organized security at nuclear facilities. The plan’s main focus includes three concentric levels of security. Each level will have an increase in the amount of security measures it has as it gets closer to the center of the facility. The outermost level will have minimal security measures and be focused on detection through surveillance equipment and a patrol of the facilities perimeter. The second level will have a sharp rise in security as it will include armed guards; all people entering this area will first undergo a screening process. The final area will include all vital equipment and be heavily guarded with a redundancy of the previous security measures. Additionally, all facilities will include two locally hired resident inspectors, approved by the IAEA. The security forces employed at these facilities could be military based or a licensed private security force. Finally, it is critically important that all vital safety and regulatory systems operate without the internet. Doing so will ensure that a nuclear facility cannot fall victim to a cyber attack. It should also be noted that security measures should, at least in part, extend to dry-cask storage facilities for nuclear material as these often times receive minimal security despite their potential to be used in the creation of dirty bombs, a weapon consisting of both traditional explosives and radioactive material.[[4]](#endnote-4)

These dirty bombs may pose an even greater threat than a nuclear warhead due to the fact that a terrorist organization is vastly more capable of producing a dirty bomb than they are of acquiring a standard nuclear weapon. A dirty bomb is unlikely to kill any person outside of the initial explosion, yet it could spread radiation within a few kilometers of the initial explosion. Additionally, a dirty bomb can be made from nuclear material as minutely radioactive as those used for medical purposes.[[5]](#endnote-5) Therefore, Bahrain views it critically important that countries heavily regulate all uses of nuclear material to ensure it does end up being sold via black market to terrorist organizations. This includes requiring medical or research facilities to obtain a license if they wish to use nuclear material. Doing such will ensure against unauthorized use and theft as a facility must demonstrate its ability to prevent against such if they wish to gain a license. Bahrain also finds it imperative that countries take immediate action to garner all nuclear material from abandoned nuclear or medical facilities. This has become an issue in the former soviet satellite states who were left with unattended nuclear facilities following the collapse of the Soviet Union. Smugglers are suspected of obtaining material from these facilities with the intent of selling them to extremists groups.[[6]](#endnote-6) Therefore it is vital that all countries that may have an abandoned facility retrieve all nuclear material that still resides there.

Despite our best efforts to strengthen preventative measures, a nuclear terrorist attack, almost certainly via dirty bomb, is bound to happen. Countries must provide themselves with the proper response in the event of such a disaster. In order to ensure the safety of their civilians, Bahrain strongly encourages countries to equip certain first responders, especially those in urban areas where terrorist attacks are usually targeted, with geiger counters and potassium iodide tablets to help those who may have been exposed to radiation. Potassium Iodide, which is on the World Health Organization’s list of essential medicines, can prevent thyroid cancer if ingested quickly enough after exposure to radiation.[[7]](#endnote-7) Furthermore, countries should ensure that those exposed to radiation following an attack have access to showers and clean clothes as most immediate radiation can simply be washed off. Significant damage comes instead from internal contamination which usually results from the ingestion of contaminated food.[[8]](#endnote-8) Thus, countries must also prevent against such by providing food to the affected area. Although, this emergency response seems excessive, many of its implications already exist, in some form, in most developed nations around the world. Current emergency protocols just require some expansion in order to properly prepare a country for a nuclear terrorist attack.

Bahrain has been and intends to remain involved in efforts to prevent terrorists organizations from obtaining the ability to carry out a nuclear terrorist attack. However, as nuclear information proliferates, Bahrain finds it equally important to expand effort from just prevention to prevention and response.

International Atomic Energy Association

Nuclear Energy as an Alternative Source of Energy

Bahrain

Alternative Methods of Nuclear Energy

Since the 1957 creation of both the International Atomic Energy Association and the establishment of the first commercial nuclear reactor, nuclear energy has proliferated widely across the world, providing countries with a clean and sustainable source of energy.[[9]](#endnote-9) Bahrain has expressed the desire to develop a nuclear program and hopes to do so by the end of 2017. By implementing nuclear power, Bahrain, a small oil and gas producer, hopes to meet the demand for energy in its rapidly growing economy.[[10]](#endnote-10) Furthermore, Bahrain believes that all countries, themselves included, should pursue Thorium based reactors as well as alternative means of disposing the nuclear waste that is produced by nuclear reactors.

Almost all nuclear reactors use the uranium isotope U-235 as its fissile material, but U-235 is extremely rare in nature as it only makes up .7% of uranium atoms; the rest is almost entirely U-238.[[11]](#endnote-11) The natural scarcity of U-235 and the growing proliferation of nuclear energy has led to fears that uranium will become extremely rare eventually; however, the fear is unjustified considering that uranium ore is as common as tin. Despite this, it has raised questions on alternative elements that could be used for nuclear element.[[12]](#endnote-12) One such element that has proven to be an excellent alternative is thorium. Reactors running off of thorium use the isotope Th-232 with U-233 as a starting fuel. These reactors hold many benefits over uranium based reactor including the scarcity of the element; thorium is suspected of being three to four times more common than uranium.[[13]](#endnote-13) Additionally, the Th-232 fuel cycle can result in U-233 and the U-233 can then be used to start the fissile reaction of Th-232. Thorium itself can also result from the incineration of weapons grade plutonium (Wpu). Another major benefit of thorium reactors: they produce two-thirds less nuclear waste.[[14]](#endnote-14) Considering permanent nuclear waste disposal has proven to be extremely challenging, this reason alone should be enough to encourage countries to pursue thorium reactors. Some have done just that including the Thorium High Temperature Reactors in Germany and the United States; however, the most celebrated design is the Liquid Fluoride Thorium Reactor (LFTR), which utilizes the Th-232 to U-233 recycle method mentioned previously.[[15]](#endnote-15) If countries with developed or developing nuclear programs pursued LTFRs there would be a mix of both uranium and thorium based reactors, ensuring that nuclear energy would remain sustainable for far longer.

The disposal of nuclear waste has become a huge issue as high-level nuclear waste takes thousands of years to completely lose its radioactivity and thus requires deep burial for permanent disposal. The problem is compounded by the fact that only one country, Finland, has one of these disposal sites. Thus some countries have held nuclear waste in non-permanent facilities without any long-term plan for permanent removal while others are suspected of dumping waste into the ocean.[[16]](#endnote-16) Because of this, Bahrain emphasizes the need for multinational deep burial sites overseen by the IAEA. These burial sites would ideally operate on a regional level with all countries in region that have nuclear reactors having access to the facility. Doing so will ensure the safe disposal of highly toxic waste while also fostering regional cooperation between nations in regards to nuclear energy. All countries choosing to use the facility will fund the construction and maintenance of the program. In return for housing the facility, the host country would receive discounted rates on imported energy from the countries using the disposal site. Such a burial site would only be necessary for high-level nuclear waste whereas intermediate and low level nuclear waste only require a shallow burial with minimal screening, and could easily be built by any country with a nuclear program.[[17]](#endnote-17) Bahrain feels that these multinational disposal facilities are necessary in order to prevent the mistreatment of nuclear waste that has been displayed in the past.

Bahrain would also like countries to pursue the recycling of spent nuclear fuels. Currently, most recycling comes from plutonium recovered from spent nuclear fuel which is then in turn turned into mixed oxide (MOX) fuel which serves as a replacement to low-enriched uranium used in light water reactors. However, the recycling of spent U-238 is widely unused and Bahrain feels that countries should begin to do so as fertile U-238 can be recycled into plutonium which could be used as a fissile material. Then, the fissile plutonium could eventually be recycled into MOX fuel.[[18]](#endnote-18) Countries employing this recycling method would get the most out of their nuclear material and thereby save money.

Although nuclear energy has provided the world with a clean, sustainable source of energy, nuclear energy is by no means perfect. Bahrain stresses the importance of considering alternatives in regards to reactors themselves and how we deal with the waste they produce.

International Atomic Energy Association

Measures to Implement and Enforce the Nuclear Program in Iran

Bahrain

The Peaceful Progression of Iran’s Nuclear Program

Bahrain and Iran’s relations have been marked with tensions as Bahrain has accused Iran of starting protests amongst its Shia population while Iran in turn has accused Bahrain of oppressing the Shias. In January, Bahrain went as far as to threaten to end foreign relations with the country after a group of protesters attacked the Saudi Arabian embassy in Tehran; however, they ultimately did not go through with the threat.[[19]](#endnote-19) Despite the tumultuous relations between Bahrain and Iran, Bahrain believes that Iran has the sovereign right to develop its nuclear program, as long as it is for peaceful purposes, and any addition or amendment to the Joint Comprehensive Plan of Action (JCPOA) must take into consideration the needs and rights of Iran. This stance stems from Bahrain's desire to have its own nuclear program. By recognizing Iran’s sovereign right to develop a program, Bahrain hopes that other countries will do the same to them.x

One addition to the JCPOA that would help all parties involved is the inclusion of a plan for Iran to deal with the disposal of its nuclear waste. There is no reference to the disposal of nuclear waste other than section B-11 which only applies to the spent fuel of heavy water reactors.[[20]](#endnote-20) Without a plan for the disposal of nuclear waste, Iran could fall into the problem that many other countries face: not having a permanent solution for the disposal of its high-level nuclear material. If the disposal is done incorrectly it could have detrimental effects on the environment. For these reasons, Bahrain has set forth a plan Iran could take to dispose of its nuclear waste. In the initial ten years that the IAEA is heavily monitoring Iran’s nuclear program, the agency and Iran should pursue the construction of a deep burial site for high-level nuclear waste. Iran has the geological requirements for such a facility and by doing so they would ensure that their nuclear program could be sustained for many years to come. Iran has also proven its ability to construct underground nuclear facilities with its Fuel Enrichment Plant in Natanz.[[21]](#endnote-21) If Iran feels unfit to undergo such a project they could choose to store their high-level nuclear waste in dry-cask storage for up to fifty years; however, the nuclear waste will eventually need a permanent means of disposal and Bahrain feels it would be better to pursue such preemptively rather than late.

Additionally, Bahrain would like the IAEA and Iran to pursue Liquid Fluoride Thorium Reactors (LFTRs) if Iran chooses to build additional reactors. Bahrain has expressed support for LFTRs in the past as they are an excellent alternative to uranium based reactors. The reactors operate off of a Th-232 fuel cycle which requires U-233 for the initial reaction. The Th-232 fuel cycle results, in part, in U-233 which makes the LFTR somewhat self-sustaining. Thorium reactors also produce two-thirds less nuclear waste than traditional uranium based reactors. Additionally, thorium is far more common in nature, leading to a far lower mining cost than uranium.xiv If Iran were to build a LFTR or renovate an existing reactor into such, they would ensure that their nuclear program remains sustainable for a very long time. Diversifying their nuclear reactors would make the program as a whole more sustainable.

Seeing as a major fear of Iran’s nuclear program prior to the JCPOA was that an Iranian possession of a nuclear weapon would lead to a nuclear arms race in the region, Bahrain would like to put the Middle-East Nuclear Weapons Free Zone (MENWFZ). The idea for a nuclear weapons free zone in the middle east has existed for nearly 35 years, yet it never went into fruition mostly due to the fact that few countries in the region had an interest in or an established nuclear program. Now that numerous states in the region are pursuing or have nuclear programs it would be a perfect time to implement the MENWFZ. Additionally, many countries would be in support of the plan as it would clear up the ambiguity of Israel’s nuclear program. For that same reason it will almost certainly be met with Israeli opposition. Even if Israel excludes itself from the MENWFZ, Bahrain feels its implementation will be a huge step in preventing a nuclear arms race in a region already riddled with conflict.[[22]](#endnote-22)

The Joint Comprehensive Plan of Action must adhere to Iran’s sovereign rights while Iran must in turn pursue a peaceful nuclear program. This balance is critical in ensuring the success of this agreement.

1. http://www.cnn.com/2016/03/31/politics/nuclear-summit-obama-isis/ [↑](#endnote-ref-1)
2. http://www.nti.org/gsn/article/bahrain-joins-counterterrorism-effort-signs-nuclear-energy-deal-with-united-states/ [↑](#endnote-ref-2)
3. http://www.cnn.com/2016/04/01/opinions/nuclear-terrorism-threat-cirincione/ [↑](#endnote-ref-3)
4. http://www.ucsusa.org/nuclear-power/nuclear-plant-security#.WB5RbmorLbg [↑](#endnote-ref-4)
5. http://www.nrc.gov/reading-rm/doc-collections/fact-sheets/fs-dirty-bombs.html [↑](#endnote-ref-5)
6. http://www.theatlantic.com/international/archive/2015/10/moldova-nuclear-weapons-isis/409456/ [↑](#endnote-ref-6)
7. http://www.who.int/medicines/publications/essentialmedicines/EML\_2015\_FINAL\_amended\_NOV2015.pdf?ua=1 [↑](#endnote-ref-7)
8. http://www.npr.org/sections/health-shots/2011/03/17/134627643/decontamination-after-radiation-exposure-simpler-than-you-may-think [↑](#endnote-ref-8)
9. http://www.eia.gov/kids/energy.cfm?page=tl\_nuclear [↑](#endnote-ref-9)
10. https://www.alarabiya.net/articles/2010/12/22/130501.html [↑](#endnote-ref-10)
11. http://machinedesign.com/whats-difference-between/whats-difference-between-thorium-and-uranium-nuclear-reactors [↑](#endnote-ref-11)
12. http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/uranium-resources/supply-of-uranium.aspx [↑](#endnote-ref-12)
13. http://energyfromthorium.com/plan/ [↑](#endnote-ref-13)
14. http://www-pub.iaea.org/mtcd/publications/pdf/te\_1450\_web.pdf [↑](#endnote-ref-14)
15. http://www.world-nuclear.org/information-library/current-and-future-generation/thorium.aspx [↑](#endnote-ref-15)
16. http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/radioactive-waste-management.aspx [↑](#endnote-ref-16)
17. http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/nuclear-wastes/storage-and-disposal-of-radioactive-wastes.aspx [↑](#endnote-ref-17)
18. http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/fuel-recycling/processing-of-used-nuclear-fuel.aspx [↑](#endnote-ref-18)
19. http://www.aljazeera.com/news/2016/01/iran-accuses-saudi-arabia-fuelling-tensions-160104074825179.html [↑](#endnote-ref-19)
20. http://www.state.gov/documents/organization/245317.pdf [↑](#endnote-ref-20)
21. http://www.bbc.com/news/world-middle-east-11927720 [↑](#endnote-ref-21)
22. http://www.un.org/en/conf/npt/2010/pdf/daisyalliance.pdf [↑](#endnote-ref-22)