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Cover Page Footnote

The paper includes a portion of the author's Mphil thesis (submitted to IR- NDU in 2017).

Assessing Nuclear Security Risks in Pakistan

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Abstract

Pakistan's nuclear program and perceived nuclear security concerns have attracted global attention. The varying concerns range from the potential theft of nuclear weapons or materials to the unauthorized use of a nuclear device to terrorist groups taking control of the Pakistani government. The enduring debate, however, has oscillated between these doomsday scenarios and some optimistic considerations, where various quarters have shared their satisfaction over Pakistan's nuclear security regime and its ability to deal with the emerging challenges. To address the evolving nature of these threats, Pakistan is constantly improving its nuclear security infrastructure. It has established a comprehensive legislative and institutional structure, nuclear security systems, and has also undertaken various international obligations. To further improve nuclear security perceptions, Pakistan should adopt a more transparent approach and learn from international best practices.

Keywords: Nuclear security, IAEA, nuclear, terrorism, physical protection

1. Introduction

Similar to programs in other states with nuclear weapons, Pakistan's nuclear program has attracted international discussion regarding its potential security risks and challenges. In its nascent stage, the nuclear program and its security details were kept secret; however, as the program matured and Pakistan became an overt nuclear weapon state in 1998, the country focused on allaying international concerns regarding its nuclear program by sharing the details of its various security measures. Nonetheless, over the past few decades, Pakistan's civilian and military nuclear infrastructure has significantly expanded, subsequently increasing the perceived nuclear security risks and the corresponding security measures. Thus, the debate over security concerns has also continued unabatedly, in particular after the fall of Kabul. After this event, Western

scholars began to express a renewed interest in critically assessing Pakistan's nuclear security, sharing fears of a fresh wave of terrorism in nuclear Pakistan [1].

This paper considers varying views on Pakistan's nuclear security and assesses the perceived nuclear security risks in light of a national threat assessment. The paper further investigates the country's existing nuclear security regime and provides recommendations to improve the system, as well as Pakistan's international perceptions.

2. Pessimists vs. Optimists

An analysis of nuclear security concerns over Pakistan's nuclear program suggests that the debate has remained sharply divided between pessimists and optimists [2]. Pessimists describe a doomsday scenario, expressing concerns about the likelihood of Pakistani nuclear weapons and/or nuclear material falling into the hands of terrorist groups. The risks highlighted by the pessimists range from scenarios such as terrorist groups taking control of Pakistani government and military, theft of a nuclear weapon or material with the help of an insider, or the unauthorized use of tactical nuclear weapons leading to an escalation of war between India and Pakistan. Such concerns go back as early as 1976—even before Pakistan developed a full-fledged nuclear program—when military intelligence historian, Roberta Wohlstetter, warned against the potential risks of nuclear terrorism in view of the country's developing nuclear infrastructure [3]. The debate has continued ever since, demonstrating a massive increase in alarmist and pessimistic views after 9/11. For instance, soon after 9/11, former special assistant to the US president for national security, Jon Wolfsthal, warned against the spillover effects of instability in Afghanistan and the alleged close collaboration between Pakistan and the Taliban government in Kabul [4]. Discussing other contingency plans by the United States, Wolfsthal suggested that Pakistan should seek guidance from the International Atomic Energy Agency (IAEA). Likewise, in the aftermath of terrorist attacks on certain military installations in Pakistan, such as the Pakistan Ordnance Factory in Wah, professor Shaun Gregory wrote a series of articles on the growing challenge of securing Pakistan's nuclear arsenal [5]¹. Even after the wave of terrorism had subsided significantly in Pakistan because of the Pakistani military's 2014 Zarb e Azb operation, Rahmatullah Nabil, the former head of Afghanistan's national directorate of security, expressed similar concerns about the security of Pakistan's nuclear weapons [6]. He criticized Pakistan's inability to control terrorist groups moving in the country and challenged the army's ability to secure its nuclear arsenal. Marred by many factually inaccurate arguments, he went on to suggest a United Nations (UN) and/or American intervention to secure Pakistan's nuclear arsenal. After a brief respite, this pessimistic line of argument has reemerged after the American withdrawal from Afghanistan, with Western scholars once again sharing their concerns [1]. As will be discussed in the following sections, these pessimist narratives have built upon the deteriorating regional security situation in general and fail to take into account the existing and developing nuclear security measures in Pakistan.

¹ Also see Gregory, S. Terrorist Tactics in Pakistan Threaten Nuclear Weapons Safety. *CTC Sentinel* 2011, 4 (6).

The optimists, on the other hand, consider the doomsday scenarios overblown and express confidence in the existing security measures taken by the relevant state institutions in Pakistan. Instead of focusing on speculated risks alone, the optimists—mostly senior officials—have considered the existence of technical and physical security measures in Pakistan. For example, Naeem Salik and Kenneth N. Luongo, while recognizing the prevalent security risks posed by terrorist groups, expressed appreciation for Pakistan's institutional development and physical protection measures in and around nuclear installations. In particular, they highlighted how militant attacks on Pakistan's military installations, such as an attack on the Kamra air base, had rung alarm bells across the world. However, Salik and Luongo emphasized the fact that not only were all those attacks thwarted at the periphery, but also, none of those facilities possessed nuclear weapons or fissile material in the first place² [7]. Similarly, former US Department of Defense official, Lawrence J. Korb, after his maiden visit to Pakistan, reiterated the confidence that high US officials—such as General David Petraeus, Admiral Michael Mullen, and then-President Obama—have placed in Pakistan's nuclear security measures. Korb challenged the prevailing doomsday scenarios, stating, “given the strategic location of Pakistan and the fact that it has nuclear weapons, it's easy to see why some might embrace a worst-case scenario. But based on my visit, I don't buy it at this time” [8].

Nuclear security measures within Pakistan's civilian nuclear facilities have received international praise for being in line with the international norms and standards. On the sidelines of the 70th United Nations General Assembly, the director general of the IAEA, Yukia Amano, expressed his appreciation for Pakistan's “impressive nuclear security record over more than four decades of operating nuclear power plants” [9]. The incumbent director general of the IAEA, Rafael Grossi, shared similar views during his recent visit to Pakistan [10]. The Stanley Center for Peace and Security referred to Pakistan's first nuclear security training center as a “model example” [10], praising its provision of technical assistance, training, and education to operators, regulators, law enforcement agencies, and frontline officers. The training center is now part of Pakistan's Center of Excellence for Nuclear Security, and the IAEA's director general has described it as an “impressive center” during his opening speech to the IAEA's 2016 Nuclear Security Conference [11]. Pakistan has also received satisfactory feedback from the follow-up mission of the Integrated Regulatory Review Service in 2022 for its effective nuclear regulatory body [12]. The widening perception gap between the optimistic and pessimistic views regarding Pakistan's nuclear security measures and their efficacy has been carefully highlighted by weapons of mass destruction and terrorism studies scholar, Charles P. Blair. In his insightful analysis, Blair observed that “optimists and pessimists consider valid variables but fail to evaluate all the critical factors necessary for a methodologically robust and defensible threat assessment of Pakistan's nuclear assets” [2]. Blair laid emphasis on a holistic threat

² Also see Luongo, K.; Salik, N. Challenges for Pakistan's Nuclear Security, 2013. Arms Control Today, Arms Control Association. <https://www.armscontrol.org/act/2013-02/challenges-pakistan%E2%80%99s-nuclear-security>.

assessment while taking into account the chance of attack and the asset's value and vulnerability.

3. Threat Assessment and Perceived Nuclear Security Risks

A country's nuclear security arrangements should be based on a comprehensive threat assessment conducted by the designated state agencies to ensure prevention, detection, and response. The IAEA defines a threat assessment as "an attempt to characterize and quantify threats through the process of identifying or evaluating adversaries or actions that have the potential to harm persons, property, society or the environment" [13]. A state's threat assessment leads to the determination of a design basis threat (DBT), which is defined as "attributes and characteristics of potential insider and/or external adversaries, who might attempt unauthorized removal or sabotage, against which a physical protection system is designed and evaluated" [14].

Nuclear security risks in Pakistan have evolved significantly over the past few decades. In the initial phase of nuclear weapons development, Pakistan remained cautious to protect and secure its clandestine nuclear weapons program from the potential risks of espionage and threats of sabotage from external adversaries. Especially after Israel's 1981 aerial bombing of an Iraqi nuclear facility, Pakistan feared a similar attack on its nuclear facilities. These perceived threats against a secretive nuclear weapon program created a persistent nuclear security consciousness among strategic planners in Pakistan. Thus, necessary measures were put in place to deal with such risks. However, the secretive nature of the program prevented the state from sharing the security measures that were in place.

However, in the aftermath of the 9/11 attacks in the United States, the nature of the threat evolved, as did the threat perception. The risk of non-state actors potentially carrying out nuclear terrorism became more prominent at the global level. Currently, Pakistan and India are among the top 10 countries hit by the menace of terrorism [15]. Global concerns regarding Pakistan's nuclear assets have heightened owing to the country's internal terrorists activities and its positioning as a frontline state in the war on terror. However, following a 2014 military operation, Pakistan witnessed a remarkable decline in terrorist activities. In 2019, the number of terror-related deaths in Pakistan reduced significantly—recorded to be the lowest since 2006 [15]. Nevertheless, despite a reduced risk of terrorism in the past 2 years and an upgrade in security measures at the nuclear facilities, pessimism regarding Pakistan's nuclear security risks remains. The pessimism has resurged, especially after the United States withdrew from Afghanistan. In view of prevailing pessimism, the following section is an assessment of some commonly perceived nuclear security risks in Pakistan.

a. Internal Instability and Risk of State Failure

One of the most commonly perceived threats with respect to nuclear security in Pakistan relates to internal instability and the potential risks of state failure. When contemplating the security situation in Pakistan, many analysts have predicted the "collapse of the Pakistani state" [16] and "Islamabad's vulnerability to an Islamic coup" [17]. Contrary to these speculations, however, Pakistan has experienced a marked

decline in terrorist activities in the past 5 years and has exhibited resilience in its war against terrorism. Warnings against extremists taking over the country were issued in view of growing anti-US sentiments in the country following the US military's 2001 intervention in Afghanistan [18]. These sentiments provided space to radical terrorist groups that resulted in the rise of Tehrik-Taliban Pakistan (TTP). The TTP managed to establish its stronghold in the northwestern tribal belt and carried out significant attacks on military assets in Pakistan. However, following a successful military operation, the TTP was pushed back significantly. The threat of the TTP has resurfaced after the Taliban's control in Afghanistan and the Taliban's inability to effectively control the terrorist activities of the TTP inside Pakistani territory [19]. The TTP has started a fresh wave of terrorism in Pakistan; nevertheless, the TTP's ability to attack critical infrastructure in mainland Pakistan is still limited.

Additionally, religious extremism has remained another major concern. Political statistics indicate that the majority of the population has generally supported more moderate political parties in Pakistan. Playing upon the growing anti-US sentiments after the US attack on Afghanistan, the right-wing religious parties formed an alliance under Muttahidda Majlis Amal in Pakistan and managed to form a government in two provinces in the 2002 elections. In spite of that, this trend was reversed after the 2008 and 2013 elections, when moderate/liberal political parties came to power [20]³. Regardless, with the gradual rise of right-wing political parties, especially Tehrik-e-Labbaik, Pakistan in previous elections, this concern of religious extremism is taking root once again [21].

b. Nuclear Weapons or Materials Falling into the Wrong Hands

In view of Al-Qaeda's proclaimed interest in acquiring nuclear weapons, as well as the admission of two former Pakistani nuclear scientists having spoken with Osama Bin Laden in 2002 [22], concerns exist for a probable and active connection between Pakistan's nuclear establishment and the terror network. Although both scientists denied transferring any sensitive information, this revelation had a far-reaching effect on the credibility of Pakistan's nuclear security measures. Additionally, the disclosure of AQ Khan's covert nuclear supply network in 2004 exposed the weaknesses in export control measures; recurrent concerns also regarded the possibility of terror outfits gaining access to the nuclear black market. In light of these challenges, Pakistan has tightened its regulations and introduced new export control laws in accordance with international best practices. It has also incorporated numerous measures for screening and improving personnel.

c. Loss of Control or Unauthorized Use of Nuclear Weapons

Pakistan's nuclear weapons program has remained shrouded in secrecy to protect it from external threats; however, that, in turn, has raised international concerns regarding

³ Also see Pickering, T. R.; Hills, C.; Abramowitz, M. The Answer in Pakistan. The Washington Post, Nov 14, 2007.

the adequacy and effectiveness of its command and control system and physical protection measures. Physical security measures around sensitive military facilities consist of multilayered perimeter security. These layers involve the employment of human and technological installations, including fences, electronic sensors, closed-circuit cameras, air defenses, and counterintelligence teams. Weapons are said to be stored in demated form at separate locations and secured by permissive action links to avoid the risk of unauthorized use [23].

The perception of nuclear security risks in Pakistan is largely based on what, according to Charles Blair, is the supply side of the equation, such as the growing number of nuclear targets in the country and the increasing capacity of the terrorist groups [2]. Nonetheless, most scholars, in discussing nuclear security risks in Pakistan, ignore the demand side (i.e., the motivation and actual capability of a terrorist group to carry out an attack on a nuclear facility or make an attempt to steal a nuclear weapon or fissile material) [2]. Additionally, almost all pessimists tend to ignore the changing dynamics in the response level from the Pakistani side. These changes have significantly reduced the level of threats and displayed improved security measures.

4. Nuclear Security Regime in Pakistan

The IAEA describes the national nuclear security regime as a set of systems that is built through the implementation of relevant international legal instruments, information protection, physical protection, material accounting and control, detection of and response to trafficking in such material, national response plans, and contingency measures [14]. Under the definition of nuclear security, it is the responsibility of the state to establish, implement, and maintain a physical protection system aimed at materializing the objectives of nuclear security (i.e., to prevent, detect, and respond to theft, sabotage, illegal transfer, unauthorized access, or other malicious acts involving nuclear and/or radioactive material). Pakistan's nuclear security regime comprises five parts, including national legislation, regulatory framework, institutional development, nuclear security infrastructure, and international cooperation [23]. In the following sections, each of these is discussed in detail.

a. Legislative and Institutional Structure

The legislative and institutional structure is composed of national laws, regulations, and institutions governing the security of nuclear material, radioactive material, associated facilities, and activities. The legislative process involves the assessment of a nuclear program and plans, laws, and the regulatory framework, as well as seeking input from stakeholders. The process also assesses the relationship between various national laws and ensures oversight by relevant international conventions and treaties in national legislation.

According to the Pakistan Atomic Energy Commission ordinance promulgated in 1965, all nuclear installations in Pakistan are owned and operated by the federal government through the Pakistan Atomic Energy Commission. The Government of Pakistan enacted the Pakistan Nuclear Safety and Radiation Protection ordinance in 1984, which also contained the provision for nuclear security and required the licensee "to organize and

ensure the physical protection of the nuclear material in use and storage and during transport and of nuclear facilities, including radioactive waste belonging to these facilities” [24].

An independent nuclear regulatory body was established under the Pakistan Nuclear Regulatory Authority (PNRA) ordinance in 2001 to ensure safe and secure civilian nuclear activities in the country. PNRA regulates the safety and security of all civilian nuclear infrastructures, including nuclear power plants and radioactive materials used in industries and hospitals. PNRA issues guidance on improving nuclear security and enhances regulatory vigilance through training, technical assistance, and the deployment of radiation detection equipment at entry and exit points [25]. The 2001 PNRA Ordinance clause 16.2(f) empowers the PNRA as the competent authority to ensure that physical protection measures around nuclear facilities are adequate from a regulatory perspective. PNRA, in this regard, has enforced a regulation entitled “Regulations on Physical Protection of Nuclear Material(s) and Nuclear Installation(s) PAK/925” [26].

After overt nuclearization, Pakistan paid significant attention to the institutional development to establish command and control systems and oversee other military nuclear activities. Pakistan announced the establishment of the National Command Authority (NCA) in 2000 to oversee all strategic organizations, exports controls, the safety and security of nuclear materials, and installations. The NCA has a three-tiered structure. The first tier is composed of the Employment Control Committee and the Developmental Control Committee. The second tier features the Strategic Plans Division (SPD), which serves as the permanent secretariat of the NCA. SPD is responsible for the management of strategic assets, coordination among various nuclear organizations, and management of budgetary and administrative issues. The third tier is the Strategic Force Command that maintains administrative and technical control over strategic assets. The operational control of the delivery systems lies with the NCA. The NCA Act, which passed in 2010, covers all strategic organizations and empowers the NCA to criminalize enlisted infringements of laws pertaining to nuclear security.⁴

Additionally, a comprehensive export control legislation was enacted in 2004, followed by the creation of the Strategic Export Control Division under the Ministry of Foreign Affairs. The Export Control Act maintained control over export, re-export, trans-shipment, and the transit of things such as goods, technologies, materials, and equipment. The act also prohibited the diversion of controlled goods and technologies [27]. The export control lists were prepared according to the guidelines of the Nuclear Suppliers Group, Missile Technology Control Regime, and Australia Group, and they covered all exports relevant to chemical, biological, and nuclear materials. Pakistan has

⁴ For details on Pakistan nuclear infrastructure and institutions, see Khan, F. *Eating Grass: The Making of the Pakistani Bomb*. Stanford University Press: 2020.

also passed new laws and regulations to strengthen cybersecurity requirements at its nuclear facilities.⁵

b. Nuclear Security Systems

Pakistan's nuclear security efforts have grown parallel to the expanding civilian and military nuclear infrastructure, as well as increasing external and internal security risks. Numerous systems and measures are in place to implement national laws and various international commitments. They cover all aspects of nuclear security, including prevention, detection, response, and material protection control and accounting programs [23].

The physical protection system of a state should be based on the state's current evaluation of the threat. In this regard, the DBT is used as a regulatory tool for planning, designing, and evaluating a physical protection system. Various organizations—such as the operators, regulators, and intelligence agencies—are involved in the process of development of the DBT in Pakistan.⁶ NCA, as an overarching body, also establishes a quality assurance policy in accordance with regulatory requirements and in coordination with all relevant organizations.

To meet its growing security needs, the most notable developments in Pakistan are the creation of a separate security division under SPD, the establishment of the Physical Protection and Security Directorate under PNRA, and the Pakistan Center of Excellence for Nuclear Security (PCENS), which comprises a training academy, PNRA's National Institute for Nuclear Safety and Security, and the Pakistan Institute for Engineering and Applied Science. PCENS offers an elaborate training program that covers diverse areas, such as protective force and physical protection, security and intelligence, material control and accounting, and delay and response [23]. The Security Division of SPD has 20,000 personnel, who are responsible for the security of all sensitive nuclear sites in the country. The division also constitutes an elite response force to deal with emergencies at any nuclear facility. Pakistan is in the process of updating its physical protection measures according to the provision established by the amended Convention on Physical Protection of Nuclear Material and Facilities (A/CPPNM) and the Nuclear Security Recommendations on Physical Protection of Nuclear Material and Nuclear Facilities (INFCIRC/225/Revision 5) [28].

Additionally, Pakistan has established the Nuclear Emergency Management System to handle and respond to nuclear and radiological emergencies in the country. The Nuclear and Radiological Emergency Support Centre and the Nuclear and Radiological Emergency Coordination Center have been established to provide guidance and coordinated response in case of an emergency [29]. Moreover, the National Nuclear Detection Architecture directorate has recently been established under the Federal

⁵ Regulation 19 of PNRA Regulation 925 on the Physical Protection of Nuclear Material and Nuclear Installations [26] provides detailed requirements of cyber security including protection of computers, communication systems, and networks.

⁶ The NCA undertakes the national threat assessment and identifies necessary elements of physical protection for all nuclear facilities.

Board of Revenue of Pakistan. This new directorate is responsible for the detection of nuclear material and radioactive materials at customs checkpoints [30].

c. International Obligations

The international nuclear security regime comprises international conventions, United Nations Security Council resolutions, and IAEA resolutions. Pakistan has undertaken numerous international obligations and commitments, which are part of the country's national nuclear security regime. Pakistan is a party to the Convention on the Physical Protection of Nuclear Material and Facilities (CPPNM) and has ratified its 2005 amendment. As a party to the A/CPPNM, the scope of the convention has been extended to the nuclear facilities as well, and it also covers risks of sabotage. Additionally, Pakistan is a party to the Nuclear Safety Convention, the Convention on Early Notification of a Nuclear Accident, and the Convention on Assistance in Case of a Nuclear Accident or Radiological Emergency. Following the ratification of the A/CPPNM, Pakistan also joined the Nuclear Security Contact Group in 2019. This group helps facilitate a sustainable and cooperative engagement for nuclear security [23]. Pakistan has been working with the Global Initiative to Combat Nuclear Terrorism (GICNT) for the development of GICNT guidelines with the express intent to join the International Convention on Suppression of Acts of Nuclear Terrorism [31].

Pakistan also adheres to the UNSCR-1540, which requires all states to take effective measures to account for, secure, and physically protect sensitive materials against non-state actors and threats, such as those required by the CPPNM and those recommended by the IAEA Code of Conduct on the Safety and Security of Radioactive Sources. Under Resolution 1540, Islamabad has been fulfilling its obligations and has submitted four national reports to the 1540 secretariat. As an active member of the IAEA, Pakistan partakes in several committees on safety and security, including the Advisory Group on Nuclear Security and Nuclear Security Guidance Committee [32], and also participates in the International System of Occupational Exposure and the IAEA programs for updating basic safety standards and radiation protection practices. Beside the IAEA, Pakistan is a member of the UN Scientific Committee on the Effects of Atomic Radiation and was actively engaged in the Nuclear Security Summit process from 2010 to 2016 to showcase its national effort toward this global norm [33].

Pakistan has been implementing the IAEA–Pakistan nuclear security cooperation program since 2006. Several projects have been successfully implemented in nuclear security, such as managing sealed radioactive sources, locating and securing orphan radioactive sources, establishing state-of-the-art physical protection labs, and providing detection equipment at entry and exit points at the international border [34].⁷ PNRA, in close collaboration with the IAEA, is upgrading security measures at all nuclear medical centers with category I radioactive sources according to the requirements of the IAEA Code of Conduct on the Safety and Security of Radioactive Sources [28]. Additionally, security systems and measures at civilian nuclear power plants and research reactors

⁷ For details on Nuclear Security Action Plan project's yearly activities, see PNRA's annual reports, which are available at <https://www.pnra.org/report.html>.

are also being upgraded according to the nuclear security recommendations contained in INFCIRC 225/Rev.5 and other IAEA nuclear security documents [31].

Pakistan has also remained engaged with the United States in a cooperative, bilateral nuclear security dialogue. The program dates back to 2001, when reportedly, the United States launched a \$100 million program and offered its assistance to counter growing risks of nuclear terrorism by Al-Qaeda or other terrorist groups [35]. The same report suggested that the United States offered advanced technological support and training and held review meetings to assess the ongoing security situation. Although the existence of such cooperation is acknowledged by Pakistan and the United States, contradictory views exist on the nature of the nuclear security cooperation.

5. Improving Nuclear Security Perceptions

Nuclear security remains a national responsibility; however, states are encouraged to share best practices and outline national efforts more transparently. Sharing is considered an important step in improving mutual confidence between states and the international community. Pakistan has shared great details of its nuclear security efforts in the civilian nuclear infrastructure and takes responsibility for maintaining its safe and secure operation. Additionally, Pakistan has provided a broad overview of methods and techniques used for the security of nuclear weapons. Nonetheless, the limited information sharing is largely considered insufficient, and Pakistan's military program continues to be viewed with great concern in some quarters. The information gap and absence of effective official communications about Pakistan's nuclear activities have led to increased safety and security concerns about Pakistan's nuclear facilities, materials, and technology.

Notably, the aforementioned confidence between a state and the international community must be mutual. Although international pressure incentivizes states to take additional security measures, persistent criticism based on imprecise information leads to misperceptions. Reports of alleged US preparations to take out Pakistan's nuclear arsenal and US military incursions inside Pakistani territory have exacerbated Pakistan's apprehensions and led to greater secrecy and dispersal [36]. Similarly, there is a need to create a balance between awareness and overemphasizing nuclear risks, as the latter may result in making known (and even more attractive) to the potential perpetrators an erstwhile unknown nuclear target.

To allay international concerns and enhance confidence in internal nuclear security measures, Pakistan should shed some light on its existing efforts and consider the following measures to increase transparency and address certain international apprehensions.

- The International Physical Protection Advisory Service (IPPAS) is an important advisory tool that helps members strengthen their national nuclear security regimes. IPPAS is a peer-reviewed mission that is carried out at the request of the host states. Pakistan has recently hosted an IPPAS workshop and may consider inviting an IPPAS mission, as well [37]. The areas an IPPAS covers can

be controlled by the host state, so little danger exists of such a mission revealing anything sensitive.

- Under the IAEA safeguards, Pakistan is operating its civilian nuclear facilities in a safe and successful manner. Pakistan's wide-ranging research and development in the civilian nuclear sector is largely underappreciated primarily because its military nuclear program receives more negative spotlight. Although taking necessary measures is important to increase international confidence in the safety and security of its military infrastructure, Pakistan should highlight its development on the civilian side separately. In this regard, Pakistan should completely delineate its civilian setup from the military.
- One reason Pakistan has been the target of negative attention is insufficient information exchange. Although valid concerns exist for maintaining secrecy over military activities, Pakistan should be more open in sharing information about security measures, especially in the civilian nuclear activities. Under the A/CPPNM, which requires the states to establish cooperation and develop an information-sharing mechanism for the physical protection of civilian nuclear material and facilities, Pakistan can take proactive measures to become more transparent and share necessary information with the IAEA.
- Pakistan should follow up on its announcement to sign the International Convention for Suppression of Acts of Nuclear Terrorism for greater transparency about its nuclear program.

6. Conclusion

As Pakistan continues to expand its civilian and military nuclear program, its nuclear security regime will have to expand and strengthen at the same pace. The nature of the threats and nuclear security risks in the country are evolving at a fast pace; thus, a demand exists for significant upgrades for the means and methods of nuclear security and physical protection. Although concerns for Islamabad's ability to deal with emerging threats shall remain, to maintain its reputation as a responsible nuclear state, Pakistan must continue to critically evaluate and update its nuclear security infrastructure.

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