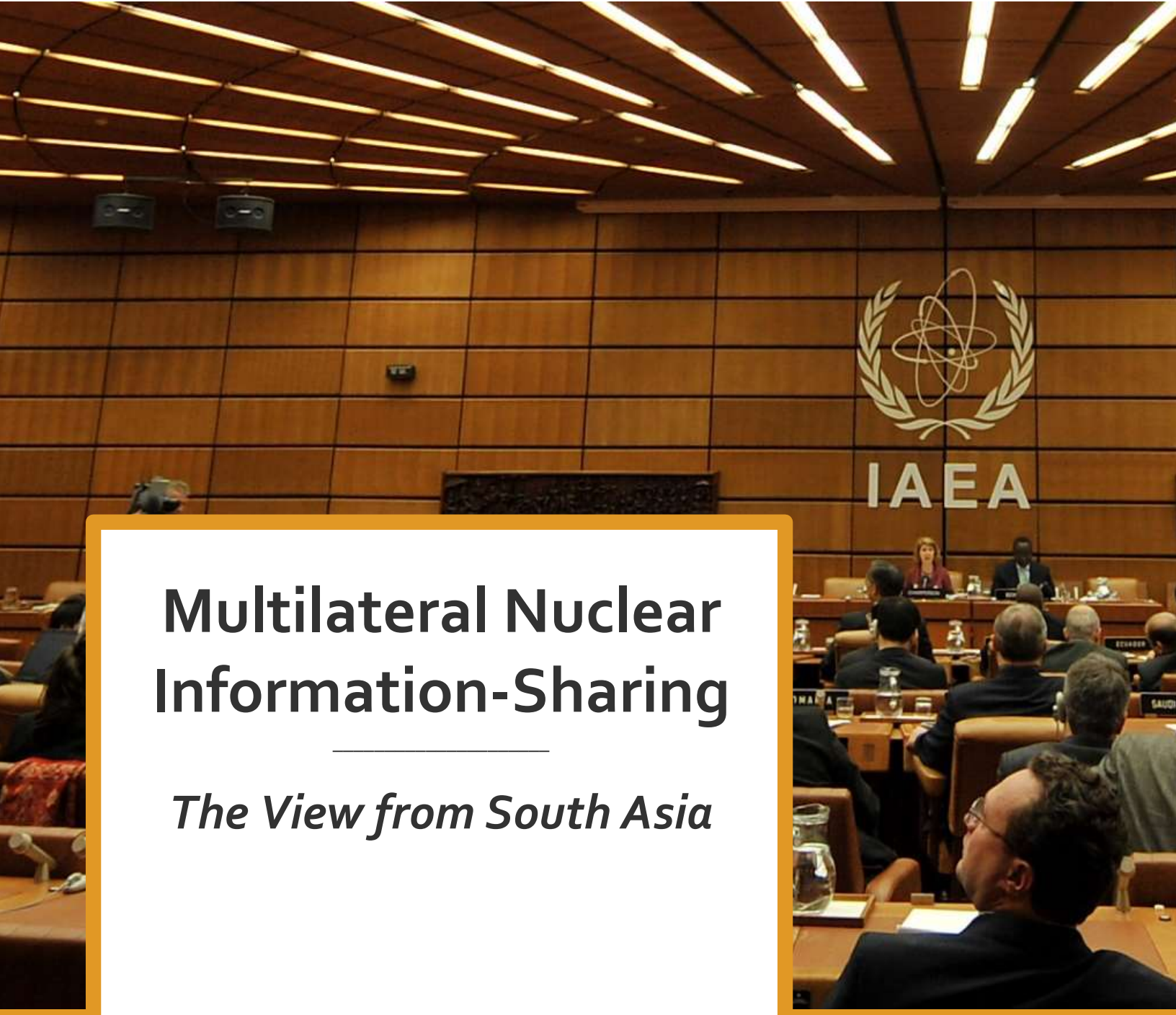

Multilateral Nuclear Information-Sharing

The View from South Asia

March 2019

STIMSON

SAV

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Forward

Policy debates around participation in multilateral information-sharing mechanisms highlight fundamental tensions between safety, national security, and international security. Assuring other states that fissile materials are securely managed against the global threats of illicit proliferation and nuclear terrorism is a widely recognized priority. Yet, there are compelling security incentives for nuclear-armed states to keep information about their fissile material stocks secret. In South Asia, these tensions are further complicated by the unique histories of nuclear weapons in India and Pakistan and South Asian participation in global nuclear governance. Are voluntary information-sharing mechanisms regarding nuclear issues valuable?

In the series of essays that follow, Muhammad Faisal, Maimuna Ashraf, Hina Pandey, and Pooja Bhatt respond to a recent paper by nuclear scholars Sharon Squassoni and Cindy Vestergaard. The paper proposes that South Asian states voluntarily report on their civilian plutonium holdings through participation in an existing multilateral mechanism, the Guidelines for the Management of Plutonium or INFCIRC/549. Contributors assess whether and how participation in multilateral information sharing on nuclear materials can enhance and/or hamper Indian and Pakistani national interests.

The Stimson Center is grateful to George Washington University and the Carnegie Corporation of New York for their support of this report and related work. These essays were originally published by *South Asian Voices*, an online policy platform for strategic analysis on South Asia hosted by the Stimson Center. We are grateful to the editors and managers of *South Asian Voices*, Akriti Vasudeva and Emily Tallo, for their critical feedback on each of these essays and cultivation of the series. We also thank Eyal Hanfling for his contributions to the research, editorial, and design work of this report and Kirk Lancaster for key editorial support.

Cindy Vestergaard & Hannah Haegeland

March 2019

From the Editors of *South Asian Voices*

It gives us great pleasure to share this collection of essays, originally featured on *South Asian Voices (SAV)*, with a wider audience.

SAV is an online policy platform for strategic analysis on South Asia. Hosted by the Stimson Center in Washington, D.C., *SAV* aims to facilitate debate among analysts and academics on South Asia's security, political, and economic affairs. Contributors put forth empirically driven analysis, challenge misperceptions, and engage in respectful, thoughtful commentary to enhance understanding of the region. The essays in this report further *SAV*'s mission of featuring a rich diversity of viewpoints on and pragmatic approaches to mitigating nuclear challenges on the subcontinent.

In this collection, *SAV* contributors from India and Pakistan conduct critical inquiry of an under-discussed topic: the potential benefits of and obstacles to South Asian participation in voluntary information-sharing about fissile materials. Through these essays, Hina Pandey, Pooja Bhatt, Muhammad Faisal, and Maimuna Ashraf explore different arguments for and against diversifying India and Pakistan's engagement with the global nuclear order through an existing multilateral information-sharing mechanism. Their contributions build on a broader ongoing dialogue about South Asia's place in the international order. As with much of the analysis featured on *SAV*, the result is a sequence of pieces that—while often in tension with one another—represent the multiplicity of perspectives in the subcontinent.

If these thought-provoking essays have piqued your interest, please visit the *South Asian Voices* website (www.southasianvoices.org) for more strategic analysis on South Asia.

Akriti Vasudeva and Emily Tallo

March 2019

INFCIRC/549 Historical Reporting by Country[1]

Reporting Type[2]	Countries and Years Reported[3]	
Unirradiated separated plutonium (Pu): in manufacturing/fabrication and product stores at reprocessing plants	**Belgium** (1996-2016)	**Japan** (1996-2016)
	China (1996-2016)	**Russia** (1996-2016)[4]
	France (1996-2016)	**United Kingdom** (1996-2016)
	Germany (1997-2016)	**United States** (1996-2016)
Pu in unirradiated mixed oxide (MOX) fuel elements	**Belgium** (1996-2016)	**Russia** (1996-2016)
	China (1996-2016)	**Switzerland** (1997-2016)
	France (1996-2016)	**United Kingdom** (1996-2016)
	Germany (1997-2016)	**United States** (1996-2016)
	Japan (1996-2016)	
Highly Enriched Uranium (HEU)[5]	**France** (2001-2016)	**Germany** (2001-2016)
	United Kingdom (1999-2016)	
Pu held at sites in foreign countries	**Belgium** (1997-2016)	**Russia** (1996-2016)
	China (1996-2016)	**Switzerland** (1997-2016)
	France (1996-2016)	**United Kingdom** (1996-2016)
	Germany (1997-2016)	**United States** (1996-2016)
	Japan (1996-2016)	
Pu in spent fuel at civil reactor sites[6]	**Belgium** (1996-2016)	**Russia** (1996-2016)
	France (1996-2016)	**Switzerland** (1997-2016)
	Germany (1997-2016)	**United Kingdom** (1996-2016)
	Japan (1996-2016)	**United States** (1996-2016)

[1] Table by Eyal Hanfling, a Research Assistant in the Stimson Center South Asia Program. The information in the table was collected from *notes verbales* and letters submitted by participating INFCIRC/549 states to IAEA and made publicly available by the IAEA online. A country is marked as having reported for a given year if it submitted an information circular that included annual figures from December of that year. Sometimes, countries reported holdings retroactively for multiple years. There are a number of inconsistencies and irregularities which may explain gaps in reporting— Belgium did not follow the traditional reporting structure in 1998; China, France, and the U.K. did not report on stocks from 1997, and Germany and Switzerland did not report on their stocks from 1996. "Communication Received from Certain Member States Concerning Their Policies Regarding the Management of Plutonium," International Atomic Energy Agency (IAEA), https://www.iaea.org/publications/documents/infcircs/communication-received-certain-member-states-concerning-their-policies-regarding-management-plutonium.

[2] Only the United States has reported on plutonium declared "as excess to national security needs." (United States, INFCIRC/549/Add.6/20, October 12, 2017). The original information circular, INFCIRC/549 contains a section titled "Guidelines for the Management of Plutonium," which is used to classify the different reporting types for the purposes of this table. "Communication Received from Certain Member States Concerning their Policies Regarding the Management of Plutonium, (INFCIRC/549)" International Atomic Energy Agency (IAEA), March 16, 1998, https://www.iaea.org/sites/default/files/infcirc549.pdf.

[3] For an introduction to civil plutonium stocks, see: David Albright, Serena Kelleher-Vergantini, and Daniel Schnur, "Civil Plutonium Stocks Worldwide End of 2014," Institute for Science and International Security, November 16, 2015, https://isis-online.org/uploads/isis-reports/documents/Civil_Plutonium_Stocks_Worldwide_November_16_2015_FINAL.pdf.

[4] Russia only reported unirradiated separated plutonium in product stores at reprocessing plants.

[5] Reported HEU materials are divided into the following categories: HEU in enrichment plants, HEU at fabricating plants/processing facilities, HEU at civil reactors, HEU at other locations (e.g., laboratories), and HEU (irradiated) at civil reactors. Only the United Kingdom also reports on civil depleted, natural, and low enriched uranium (DNLEU) in the civil nuclear fuel cycle.

[6] All countries except China reported on plutonium in spent fuel at civilian reactor sites.

Credit: IAEA Imagebank

Guidelines for the Management of Plutonium: India's Case

By Pooja Bhatt

Since India and Pakistan became nuclear-armed powers in 1998, the contentious and escalatory dynamics between these two rivals have been a point of concern not just for South Asia, but also the rest of the world. Yet while the international community often directs its attention to nuclear competition in South Asia, intervening diplomatically in times of crisis, another issue of concern regarding sensitive nuclear issues has begun surfacing: concerns over the need to secure weapons-usable civilian nuclear materials from unauthorized use. While the Nuclear Security Summits made progress[7] towards minimizing and, where possible, eliminating the civil use of highly-enriched uranium (HEU), the same restrictions have not been applied to separated plutonium, though the insecurity of reactor-grade plutonium also poses dire security risks.[8]

Globally, separated plutonium stockpiles have continuously increased[9] due to the expansion of commercial nuclear energy programs, particularly since the process of separating plutonium has outpaced the reuse of

[7] "Fact Sheet: Joint Statement on HEU Minimization" (The White House, April 1, 2016), The Nuclear Security Summit 2016, http://www.nss2016.org/document-center-docs/2016/4/1/fact-sheet-joint-statement-on-heu-minimization.
[8] Charles D. Ferguson, "Risks of Civilian Plutonium Programs," Nuclear Threat Initiative, July 1, 2004, https://www.nti.org/analysis/articles/risks-civilian-plutonium-programs/.
[9] David Albright and Christina Walrond, "Civil Separated Plutonium in the INFCIRC/549 States – Taking Stock" (Institute for Science and International Security, September 17, 2010), http://isis-online.org/isis-reports/detail/civil-separated-plutonium-in-the-infcirc-549-states-taking-stock/.

this plutonium into nuclear power reactors. In South Asia, both India[10] and Pakistan[11] continue to develop their nuclear energy programs. Much like other developing countries, India has rising energy requirements,[12] which it intends to meet in part with an immense nuclear energy initiative. Over the years, the share of the nuclear energy has been small due to the unavailability of uranium and other technical issues related to its indigenous nuclear program. However, India has developed a unique fuel cycle[13] to exploit its natural thorium reserves. To this end, New Delhi has continued to push forward with its plan to increase the share of nuclear energy output as an alternative source of energy; by 2050, the country aims to supply 25 percent of its electricity from nuclear power.[14]

To address concerns on the insecurity of civilian plutonium stockpiles in the context of South Asia's emerging nuclear energy sector, scholars Sharon Squassoni and Cindy Vestergaard propose[15] that India and Pakistan report their civilian plutonium stockpiles under the auspices of an existing nonbinding and voluntary framework, INFCIRC/549,[16] or "Guidelines for the Management of Plutonium." Under these guidelines, the signatory countries agree to manage their civilian plutonium "in ways consistent with its national decisions on the nuclear fuel cycle and which will ensure the peaceful use or the safe and permanent disposal of plutonium." At present, India possesses an estimated 400 kilograms[17] of separated civilian plutonium under IAEA safeguards; this is the material that India would report were it to adhere to the guidelines laid out in INFCIRC/549. However, the argument for whether India should voluntarily exchange information on its civilian plutonium holdings needs to be examined on the grounds of India's preexisting nuclear security and transparency commitments for its civilian facilities and stockpiles as well as the nonbinding nature of the INFCIRC/549.

India's Preexisting Nuclear Security Commitments

The waiver India obtained[18] from the Nuclear Suppliers Group (NSG) in 2008—backed by support from the United States—brought India into the fold of the global nonproliferation regime, enabling[19] New Delhi to engage in international nuclear trade and the technical advancement of its peaceful nuclear program,

[10] Rajesh Kumar Singh, "India, France Pledge to Push Forward on Jaitapur Nuclear Power Project," *Livemint*, March 10, 2018, https://www.livemint.com/Industry/X05B03Vct56Y72VqAzr4fM/India-France-pledge-to-push-forward-on-Jaitapur-nuclear-pow.html.
[11] "Pakistan Plans to Build Several New Nuclear Reactors - Official," *Reuters*, October 31, 2017, https://www.reuters.com/article/pakistan-nuclearpower-idUSL8N1N668Q.
[12] "India's Energy Consumption to Grow Faster than Major Economies," *The Economic Times*, January 27, 2017, https://economictimes.indiatimes.com/industry/energy/oil-gas/indias-energy-consumption-to-grow-faster-than-major-economies/articleshow/56800587.cms.
[13] "Nuclear Power in India," World Nuclear Association, February 2019, http://www.world-nuclear.org/information-library/country-profiles/countries-g-n/india.aspx.
[14] "Nuclear Power in India."
[15] Sharon Squassoni and Cindy Vestergaard, "Charting Nuclear Security Progress in South Asia" (Stimson Center, December 1, 2017), https://www.stimson.org/content/charting-nuclear-security-progress-south-asia.
[16] "INFCIRC/549 - Communication Received from Certain Member States Concerning Their Policies Regarding the Management of Plutonium" (International Atomic Energy Agency, March 16, 1998), https://www.iaea.org/sites/default/files/infcirc549.pdf.
[17] Squassoni and Vestergaard, "Charting Nuclear Security Progress in South Asia," 5.
[18] Wade Boese, "NSG, Congress Approve Nuclear Trade with India," *Arms Control Today*, October 6, 2008, https://www.armscontrol.org/act/2008_10/NSGapprove.
[19] Subrata Ghoshroy, "Taking Stock: The US-India Nuclear Deal 10 Years Later," *Bulletin of the Atomic Scientists*, February 16, 2016, https://thebulletin.org/2016/02/taking-stock-the-us-india-nuclear-deal-10-years-later/.

though the country is not a signatory of the Nuclear Nonproliferation Treaty (NPT). In return,[20] India agreed to allow safeguards from the International Atomic Energy Agency (IAEA) on a select number of its nuclear facilities that are classified as "civilian." 14 of India's 22 nuclear facilities are covered[21] under IAEA's inspections and nuclear safeguards.

Though voluntary information sharing mechanisms on sensitive issues like nuclear materials management as envisaged by INFCIRC/549 are valuable, India's preexisting IAEA commitments present the first argument against India adhering to INFCIRC/549. With the majority of India's civilian nuclear reactors already under the IAEA's watch, why should India join an agreement for the voluntary exchange of information regarding its civilian plutonium stockpile? There is no real incentive for India to declare its civil inventories of plutonium separately.


Credit: IAEA Imagebank

Furthermore, India has already sufficiently demonstrated its commitment to addressing the concerns of potential theft of fissile material by non-state actors. Remaining true to its nonproliferation goals, India submitted[22] its current nuclear security architecture (including legal, cyber, and personnel) at the 2016 Nuclear Security Summit and affirmed its willingness to strengthen nuclear security in the future

[20] "U.S. and India Release Text of 123 Agreement," U.S. Department Of State Archive, August 3, 2007, https://2001-2009.state.gov/r/pa/prs/ps/2007/aug/90050.htm.
[21] Sharon Squassoni, "India's Nuclear Separation Plan: Issues and Views" (Congressional Research Service, December 22, 2006), https://fas.org/sgp/crs/nuke/RL33292.pdf#page=2.
[22] "India's National Progress Report, Nuclear Security Summit 2016" (Ministry of External Affairs, Government of India, April 2, 2016), https://mea.gov.in/bilateral-documents.htm?dtl/26590/Indias_National_Progress_Report_Nuclear_Security_Summit_2016.

under INFCIRC/897,[23] or the "Joint Statement on Strengthening Nuclear Security Implementation." In other words, India has already made significant multilateral commitments to bolster nuclear security as well as transparency of its civil nuclear program. Adherence to the INFCIRC/549 guidelines thus offers no distinct benefit to New Delhi.

INFCIRC/549 as a CBM: Nonbinding, Unverifiable, and Insufficient

Vestergaard and Squassoni argue that INFCIRC/549 could be a useful confidence-building measure (CBM) to "build trust and improve understanding of capabilities" between the two South Asian nuclear-armed rivals. However, the voluntary and nonbinding nature of the guidelines may fail to advance mutual trust between India and Pakistan in any significant way. Indeed, the absence of disciplinary actions against those who fail to comply with the guidelines opens INFCIRC/549 up to the following question: would exchanging regular notes on civilian plutonium stocks actually improve transparency between the two rivals?

To this point, not only are there no disciplinary actions against those who fail to comply by the guidelines in their reporting, but the standards for voluntarily reporting stocks often vary from country to country. Furthermore, there is no way of verifying the accuracy of the information reported. For instance, Japan failed[24] to report 640 kg of civilian plutonium in two INFCIRC/549 reports due to a clerical error. The error was discovered—and promptly submitted to the IAEA—because of Japan's atypical transparency in reporting its fissile materials, but the omission highlights there is no mechanism in the guidelines to verify the accuracy of reports. Therefore, if India or Pakistan wanted to mislead or omit some information about their civilian plutonium stockpiles in their annual INFCIRC/549 reports, they could easily do so.

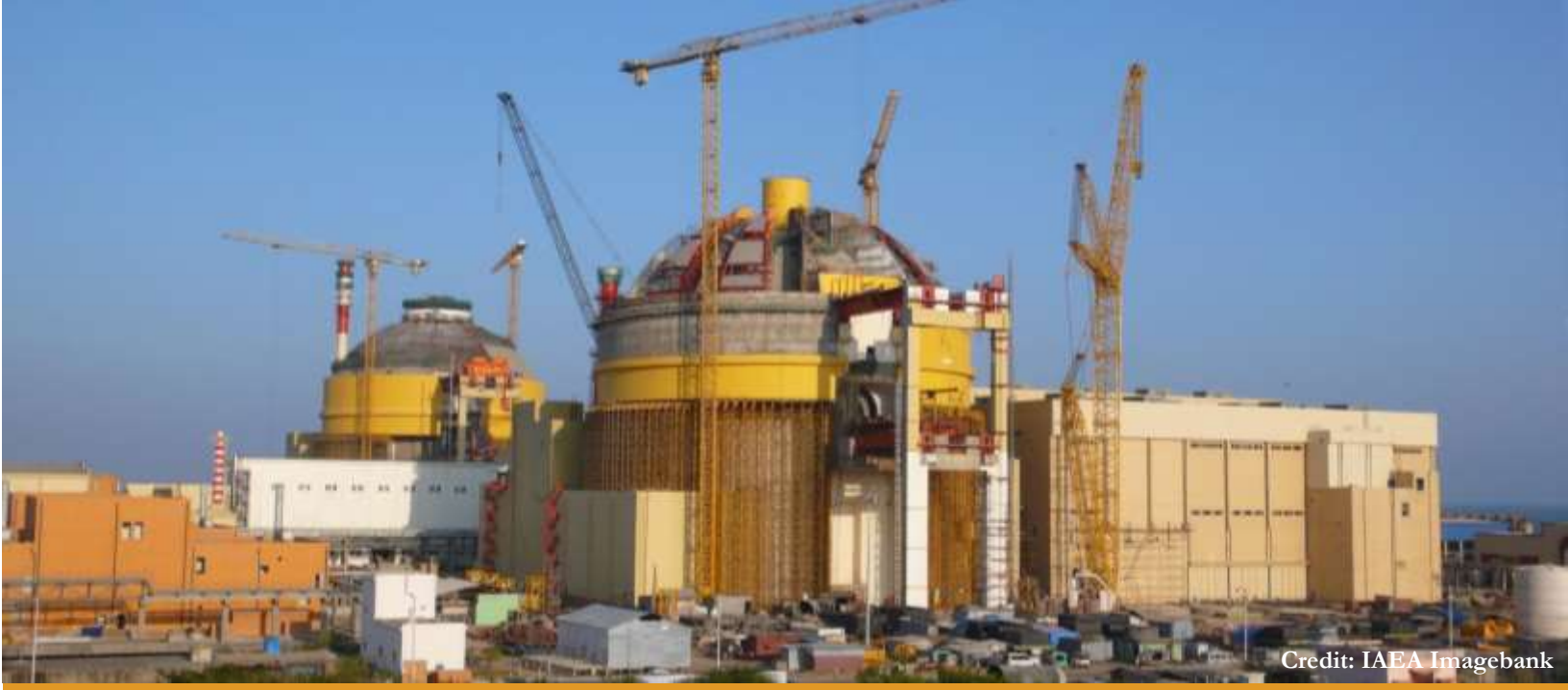
Given the pitfalls of INFCIRC/549, the intentions of the guidelines would be better applied to South Asia in another manifestation. India and Pakistan already voluntarily exchange[25] official lists of their nuclear facilities every year since 1988 under a bilateral confidence-building agreement[26] to not attack each other's nuclear facilities. Additionally, both comply by their pact[27] to reduce the risks from accidents relating to nuclear weapons. Therefore, information sharing measures on sensitive nuclear issues at the bilateral level already exist. Despite loopholes, the two countries have largely kept their commitments[28] under these agreements over the years. Since this system of sharing information already exists and successfully so, it may be more fitting for the declaration of civilian plutonium to be added to these existing agreements than for India to begin participating in an additional mechanism like INFCIRC/549.

[23] "INFCIRC/897 - Communication of 20 June 2016 from the Permanent Mission of India Concerning Its Commitment to the Joint Statement on Strengthening Nuclear Security Implementation" (International Atomic Energy Agency, June 24, 2016), https://www.iaea.org/sites/default/files/infcirc897.pdf.
[24] Pavel Podvig, "How Fissile Material Falls through the Cracks," *Bulletin of the Atomic Scientists*, July 7, 2014, https://thebulletin.org/2014/07/how-fissile-material-falls-through-the-cracks/.
[25] "Agreement on the Prohibition of Attack Against Nuclear Installations and Facilities," December 31, 1988, Federation of American Scientists, https://fas.org/nuke/guide/india/doctrine/nucl.htm.
[26] "Agreement On Reducing The Risk From Accidents Relating To Nuclear Weapons," February 21, 2007, Stimson Center, https://www.stimson.org/agreement-on-reducing-the-risk-from-accidents-relating-to-nuclear-weap.
[27] "Agreement On Reducing The Risk From Accidents Relating To Nuclear Weapons."
[28] "Agreement on the Prohibition of Attack Against Nuclear Installations and Facilities."

Conclusion

In view of the above analysis, it is not evident how INFCIRC/549 can be an effective vehicle to address issues of nuclear security and increase transparency on civilian nuclear stocks within India and Pakistan. Rather, the concept of a CBM to increase transparency with regard to civilian plutonium holdings may be better suited to a bilateral agreement between the two countries. It is important to bear in mind that, historically, India has been pragmatic in its approach towards these existing nuclear regimes. For instance, New Delhi has signed[29] the Additional Protocol, which entered into force in July 2014. However, it has agreed to join preliminary talks for the Fissile Material Cutoff Treaty (FMCT) on the grounds that it will not sign anything that is not "universal and non-discriminatory"[30] in nature, implying India's participation is contingent upon Pakistan's reciprocity. It has also stood in opposition to the Nuclear Nonproliferation Treaty[31] (because it divides the world into nuclear haves and have nots, instead of pitching in for complete nuclear disarmament) and the Comprehensive Test Ban Treaty (CTBT)[32] (since nuclear powers like the United States have not ratified it) due to their discriminatory nature. This indicates that India will continue to show its keenness for signing multilateral information sharing agreements based on the virtue of equal participation of all members, as well as their practicality and effectiveness. INFCIRC/549, though a good idea, fails to be a sufficient antidote for the transparency woes surrounding global civilian plutonium stockpiles, and that is why India will stay away from it.

[29] "India's Additional Protocol Enters Into Force," International Atomic Energy Agency, July 25, 2014, https://www.iaea.org/newscenter/news/indias-additional-protocol-enters-force.
[30] Sachin Parashar, "FMCT: India Sticks to Stand, Pak Dithers," *The Times of India*, September 24, 2010, https://timesofindia.indiatimes.com/india/FMCT-India-sticks-to-stand-Pak-dithers/articleshow/6616997.cms.
[31] "India Rules out Joining NPT as Non-Nuclear Weapon State," *The Hindu*, October 13, 2017, https://www.thehindu.com/news/national/india-rules-out-joining-npt-as-non-nuclear-weapon-state/article19855611.ece.
[32] Ruhee Neog, "CTBT at 20: Why India Won't Sign the Treaty," *South Asian Voices*, September 23, 2016, https://southasianvoices.org/ctbt-at-20-why-india-wont-sign-the-treaty/.


Credit: IAEA Imagebank

India's Reservations about Voluntary Reporting of Civilian Plutonium Stocks

Hina Pandey

The canvas of global nuclear issues is immense, encompassing three parallel and significant subsets: deterrence, nonproliferation, and nuclear security. However, in the last year or so, most international attention has been directed towards proliferation issues[33] and deterrence[34] while nuclear security has largely been ignored. Though some progress was made with regard to maintaining global nuclear security through the nuclear security summits, the momentum seems to have been lost amidst a host of other nuclear concerns.

A recent proposal[35] by Sharon Squassoni and Cindy Vestergaard has put the focus back on nuclear security in the context of reducing nuclear risks in South Asia. In "Charting Nuclear Security Progress in South Asia," they make a case for India and Pakistan voluntarily submitting reports about their fissile material under an existing international mechanism[36] called the "Guidelines for the Management of Plutonium" or INFCIRC/549, supported by the International Atomic Energy Agency (IAEA). Simply put, the authors suggest that to enhance nuclear security in South Asia, more attention needs to be given to mitigating the risks emanating from the stockpiles of civilian plutonium. According to the guidelines,[37] if a government chooses to participate in this reporting mechanism, they would provide information about their policies adopted in managing plutonium, including quantities of plutonium produced, received, shipped, lost, or even

[33] Steve Holland, "Trump Issues Ultimatum to 'fix' Iran Nuclear Deal," *Reuters*, January 11, 2018, https://www.reuters.com/article/us-iran-nuclear-decision-idUSKBN1F108F.
[34] "Putin on New US Nuclear Stance: If Attacked, Russia Will Use Nukes," RT International, March 1, 2018, https://www.rt.com/news/420171-nukes-us-russia-attack/.
[35] Squassoni and Vestergaard, "Charting Nuclear Security Progress in South Asia."
[36] "INFCIRC/549."
[37] Ibid.

removed from inventory. Though the idea has value, it is important to recognize that participation in such an initiative would not be free from challenges and India may have several reservations.

Voluntary Mechanisms: Promoting Transparency and Norm-Building

Such voluntary reporting of fissile material can be useful in reducing the threat of nuclear terrorism, mainly of terrorist networks actively seeking a radioactive source of material for advancing their objectives. This issue received significant attention during the Nuclear Security Summit (NSS) discussions, resulting[38] in the securing and accounting of vulnerable highly enriched uranium (HEU) from various countries between 2010 and 2016. Since the NSS process did not address[39] a possible threat from plutonium adequately, Squassoni and Vestergaard argue for the accounting of civilian plutonium. Since civilian plutonium stockpiles have "eluded restrictions,"[40] annual reporting could be useful in conveying that the nuclear material is accounted for, which will further improve confidence in the maintenance of nuclear security globally.

Specifically, it can be said that this proposal, if acted upon, is likely to: i) ensure nuclear transparency on the part of the reporting nation; ii) further solidify the adherence to a nuclear security norm, raising the reporting country's nuclear security profile; and iii) contribute to maintaining nuclear security in South Asia through an additional step. The idea has merit because it adds to the nuclear security architecture in the region, which is still at a nascent stage. If India and Pakistan participate in this initiative, South Asia will have its first nuclear transparency measure for civilian plutonium.

India's Reservations on INFCIRC/549

Existing safety and security measures are sufficient

Squassoni and Vestergaard's proposal calls for India to report on its stockpiles of reactor-grade plutonium separated from the spent fuel of safeguarded pressurized heavy-water reactors. However, since this material is already under safeguards,[41] it is accounted for as civilian plutonium and there is no need for India to report it under INFCIRC/549 separately. Additionally, the IAEA and the World Association of Nuclear Operators have regularly reviewed[42] India's civilian nuclear facilities' safety record. India's Safeguards Agreement[43] with the IAEA, approved by its 35-nation Board of Governors, states that it respects "…health, safety and physical protection and related security provisions in force in India…" This demonstrates that the IAEA has confidence in India's nuclear safety and security related mechanisms related to civilian plutonium. Thus, the need to voluntarily declare civilian plutonium through INFCIRC/549 might be superfluous for India, especially if the logic of reporting is to bolster multilateral initiatives to prevent materials theft for nuclear

[38] "Joint Statement on Countries Free of Highly Enriched Uranium (HEU)" (The White House, Office of the Press Secretary, March 24, 2014), https://obamawhitehouse.archives.gov/the-press-office/2014/03/24/joint-statement-countries-free-highly-enriched-uranium-heu.
[39] Squassoni and Vestergaard, "Charting Nuclear Security Progress in South Asia."
[40] Ibid., 1.
[41] "India: Country Profile," International Panel on Fissile Materials, February 12, 2018, http://fissilematerials.org/countries/india.html.
[42] Rakesh Sood, "Charting the Course for Nuclear Security: An Indian Perspective" (Carnegie India, March 23, 2016), https://carnegieindia.org/2016/03/23/charting-course-for-nuclear-security-indian-perspective-pub-63100.
[43] "INFCIRC/754 - Agreement between the Government of India and the International Atomic Energy Agency for the Application of Safeguards to Civilian Nuclear Facilities" (International Atomic Energy Agency, May 29, 2009), 2. https://www.iaea.org/sites/default/files/publications/documents/infcircs/2009/infcirc754.pdf.

terrorism. Since the responsibility of physical protection of the fissile material primarily lies with the possessing country, the need to repeatedly declare that India's civilian nuclear material remains safe may not be viewed by the government with a sense of urgency. Furthermore, India is already party[44] to all 13 global instruments countering international terrorism. Thus, India might view its existing participation with regard to the management of civilian plutonium as sufficient.

It is difficult to imagine significant benefits to be gained by India from signing onto the INFCIRC/549 other than raising its own nuclear security profile. But in New Delhi's conception, even a raised nuclear profile like this may not really help India achieve an important goal— membership in the Nuclear Suppliers Group (NSG). New Delhi believes its NSG membership is held up due to political reasons related to Chinese opposition and not because of its nuclear record. Also, if being party to all 13 instruments combating terrorism hasn't helped India's record, then how can one measure like INFCIRC/549 do so? Another point is that binding nuclear security measures at least facilitate an exchange of information and best practices; as a non-binding and purely voluntary mechanism, INFCIRC/549 doesn't even provide that benefit. Finally, it is true that INFCIRC/549 is not only a reporting mechanism but also incorporates guidelines on the physical protection of nuclear material, their responsible handling, and transfers. But India is already contributing to these measures by participating[45] in the Convention of Physical Protection of Nuclear Material (CPPNM)[46] and its amendment.

Not Effective Against Nuclear Terrorism

Squassoni and Vestergaard contend that INFCIRC/549 bolsters international nuclear security against the threat of nuclear terrorism. While it can be argued that the mechanism does this in a broader sense by propagating a culture of nuclear transparency that helps states keep one other accountable, it does not help in a material sense. It does not provide a mechanism for timely identification of nuclear materials theft, for example. India already participates[47] in the IAEA's Incident and Trafficking Database (ITDB),[48] which reports on cases of illicit trafficking and unauthorized activities involving nuclear and radioactive materials and analyzes them for information to better equip states to prevent such incidents. And unlike INFCIRC/549, ITDB is for all nuclear material, including plutonium, uranium, and thorium. Thus, India already participates in a much stronger mechanism to deal with threats of nuclear terrorism than INFCIRC/549.

[44] "India's National Progress Report, Nuclear Security Summit 2016."
[45] "On India's Accession to the Convention on the Physical Protection of Nuclear Material, 1980." (Ministry of External Affairs, Government of India, January 22, 2002), https://www.mea.gov.in/press-releases.htm?dtl/12627/On+Indias+accession+to+the+Convention+on+the+Physical+Protection+of+Nuclear+Material+1980.
[46] "Convention on the Physical Protection of Nuclear Material," International Atomic Energy Agency, October 17, 2014, https://www.iaea.org/publications/documents/conventions/convention-physical-protection-nuclear-material.
[47] "IAEA Incident and Trafficking Database: Fact Sheet" (International Atomic Energy Agency, 2016), https://www-ns.iaea.org/downloads/security/itdb-fact-sheet.pdf#page=7.
[48] "Incident and Trafficking Database (ITDB)," International Atomic Energy Agency, October 10, 2016, https://www.iaea.org/resources/databases/itdb.

Culture of Nuclear Transparency Needs Time to Develop

India acquired its nuclear capability only two decades ago in 1998, while other participating countries such as the United States, the United Kingdom, and China took almost four decades after acquiring nuclear weapons to accept the multilateral sharing of information. Moreover, the implementation of any such voluntary transparency measure is to be assessed in the light of the nuclear safety and security culture within the country, especially since Guideline 14 of INFCIRC/549[49] requires the publication of information on holdings of plutonium. India's integration into the global nuclear security architecture began only 12 years ago and thus, the culture of transparency is still evolving in South Asia.

Different Risk Perception of Plutonium

It is true that the global stockpile of separated civilian plutonium grew rapidly[50] between 1996 to 2005, at an average rate of about 50 tons a year; however, it has slowed down to 2 tons a year between 2005 and 2014. Additionally, it must be noted that when assessing the risks from civilian plutonium, specifically its theft for nuclear terrorism, it is important to ask a pertinent question: how is a terrorist likely to use civilian plutonium? Making an explosive device from plutonium is even more challenging[51] than using uranium to produce an improvised explosive device.

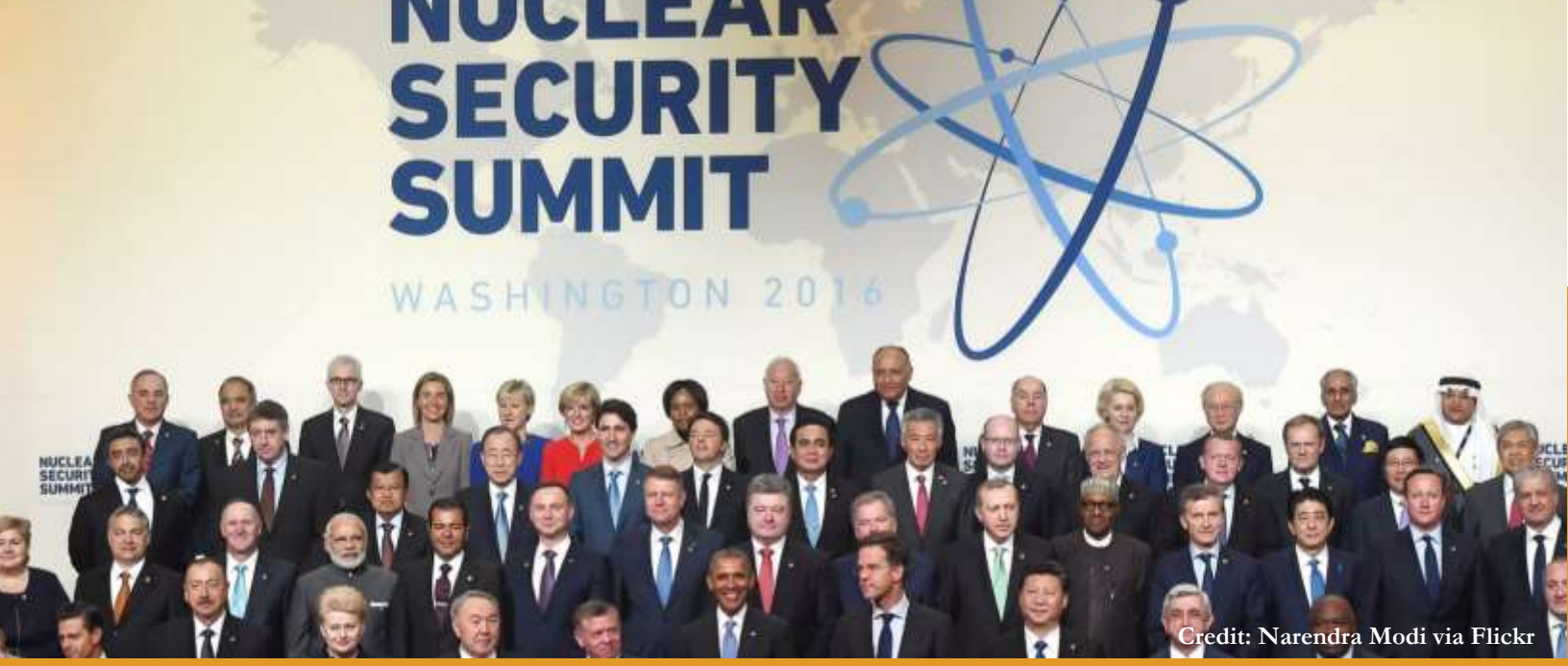
Voluntary Reporting Impacts India's Exceptionalism

As per INFCIRC/549, a state's management of plutonium is to be handled as per its obligations under the Nuclear Nonproliferation Treaty (NPT) and its Safeguards Agreement with the IAEA. Now, the NPT members have forgone their right to nuclear weapons. Since India is a non-NPT member, it would not want its reporting mechanism to be linked with obligations for NPT non-nuclear weapon states. The reason may be symbolic but it does touch upon India's unique nuclear exceptionalism.

Conclusion

INFCIRC/549 does not provide India any attractive benefits apart from maybe boosting its nuclear security profile. Furthermore, it eludes any verification mechanism and is also non-binding, which further diminishes the value of INFCIRC/549 in India's eyes. Finally, it seems that India would not be prepared to share this information yet, considering that no white papers or annual public press statements from the government on even broader nuclear issues are produced. Revealing estimates on civilian plutonium from safeguarded facilities, thus, seems to be a distant dream at this point. Finally, if such reporting is to ever be institutionalized as a norm in South Asia, a strong sense of its requirement has to be justified. That requirement has to come in the form of an IAEA obligation.

[49] "INFCIRC/549."
[50] Albright, Kelleher-Vergantini, and l Schnur, "Civil Plutonium Stocks Worldwide End of 2014."
[51] Michael Crowley, "Can Terrorists Build the Bomb?," Popular Science, February 1, 2005, https://www.popsci.com/scitech/article/2005-02/can-terrorists-build-bomb.



Credit: Narendra Modi via Flickr

Prospects for Civilian Plutonium Management in Pakistan and South Asia

Maimuna Ashraf

Over the past three decades, the progressive accretion of nonproliferation agreements has led to greater transparency on nuclear materials worldwide. This has enabled the introduction of various commitments and treaties to strengthen transparency measures, driven by the need for the protection of materials and enhancing the scope of safeguards. To this end, one of the primary goals of the Nuclear Security Summit (NSS)[52] process has been to secure nuclear materials by helping to create a tangible and enduring international architecture for securing highly enriched uranium (HEU) through ratified treaties and multilateral commitments. However, experts continue to point out the risks related to civilian fissile material and growing stockpiles of separated plutonium, which have typically garnered less attention from the global nonproliferation regime.

What is INFCIRC/549?

With specific reference to South Asia, Sharon Squassoni and Cindy Vestergaard, in their paper, "Charting Nuclear Security Progress in South Asia,"[53] have proposed that both India and Pakistan voluntarily agree to report their civilian fissile material stockpiles under an already-existing mechanism: the International Atomic Energy Agency (IAEA) Guidelines for the Management of Plutonium (INFCIRC/549). While articulating the challenges of arriving at sustainable solutions for securing the production, usage, and stockpiles of separated plutonium from incipient risks, the authors suggest that India and Pakistan should adopt steps to improve their nuclear security, and subsequently, their nonproliferation credentials. INFCIRC/549 is a voluntary transparency initiative to facilitate information sharing on nuclear materials. In considering

[52] Kelsey Davenport, "Nuclear Security Summit at a Glance," Arms Control Association, n.d., https://www.armscontrol.org/factsheets/NuclearSecuritySummit.
[53] Squassoni and Vestergaard, "Charting Nuclear Security Progress in South Asia."

whether there is utility in Pakistan or India participating in INFCIRC/549 reporting, it is pertinent to first raise the question as to what fall under its parameters.

A country adhering to INFCIRC/549 commits to annually reporting figures for civilian unirradiated plutonium stockpiles under IAEA safeguards, including materials being shipped to and from an international location but owned by a particular state (as in the case of Japan).[54] States also review the physical protection of plutonium in use, storage, or transport, by attaching a note on "Levels of Physical Protection" in accordance with the Convention on the Physical Protection of Nuclear Materials.[55] Although reporting guidelines do not directly apply to plutonium in spent fuel, HEU, or materials from unsafeguarded facilities, a few states[56] have voluntarily reported their estimated amounts of HEU, plutonium holdings in excess of defense requirements, or diverted military stock for civilian purposes. And almost all participating states also report on plutonium contained in spent civil reactor fuel.

Pakistan's Civilian Plutonium

Plutonium in spent reactor fuel needs to be separated before it is made available for use as fuel for breeder reactors or fissile material for nuclear weapons. Unirradiated (separated) plutonium and irradiated plutonium in power reactor spent fuel are the two major forms of civilian plutonium. The unirradiated plutonium, free from fission products through reprocessing of spent fuel, contains weapons-grade Pu[57] content, Pu-239, which is classified as direct-use material by the IAEA and is prone to greater proliferation risk as compared to irradiated plutonium. Pakistan produces indigenous natural uranium fuel for the Karachi Nuclear Power Plant (KANUPP).[58] However, this power plant is under IAEA safeguards, which enforce restrictions on the fuel that is irradiated in its power reactor, and is subject to regular monitoring and inspections. Pakistan imports low enriched uranium fuel from China for the four Chinese power reactors at Chashma,[59] which are also under IAEA safeguards, as well as the spent fuel produced therein. Pakistan does not have a civilian reprocessing program (rather it has a military reprocessing program[60]) or a project for spent fuel[61] produced in its safeguarded power reactors. However, it does produce indigenous nuclear fuel for its four heavy water production reactors at Khushab,[62] which is believed to be reprocessed for obtaining weapons-grade plutonium at its military reprocessing plants.

[54] "Japanese Waste and MOX Shipments from Europe," World Nuclear Association, March 2017, http://www.world-nuclear.org/information-library/nuclear-fuel-cycle/transport-of-nuclear-materials/japanese-waste-and-mox-shipments-from-europe.aspx.
[55] "Convention on the Physical Protection of Nuclear Material."
[56] Albright and Walrond, "Civil Separated Plutonium in the INFCIRC/549 States – Taking Stock."
[57] Caroline Jorant, "Discussion Paper: Strengthening the Security of Plutonium" (Nuclear Threat Initiative, September 2014), https://www.nti.org/media/pdfs/Strengthening_the_Security_of_Plutonium.pdf.
[58] "KANUPP," Nuclear Threat Initiative, March 1, 2011, https://www.nti.org/learn/facilities/111/.
[59] Shivani Singh, "The China-Pakistan Nuclear Nexus: Threats and Challenges," *Asia Dialogue* (blog), December 11, 2017, http://theasiadialogue.com/2017/12/11/the-china-pakistan-nuclear-nexus-threats-and-challenges/.
[60] "Pakistan's Chashma Reprocessing Plant May Be Completed," *International Panel on Fissile Materials Blog* (blog), February 23, 2015, http://fissilematerials.org/blog/2015/02/pakistans_chashma_reproce.html.
[61] *Country Nuclear Fuel Cycle Profiles*, 2nd ed., Technical Reports Series 425 (Vienna: International Atomic Energy Agency, 2005), 63–65.
[62] "Khushab Complex," Nuclear Threat Initiative, December 13, 2013, https://www.nti.org/learn/facilities/940/.

Consequently, in accordance with Annex B and C of INFCIRC/549, there is no civil unirradiated separated plutonium in Pakistan that can be reported. Furthermore, Pakistan has no breeder reactors[63] and no MOX fuel fabrication facility (MOX is typically used as fuel for breeder reactors), which eliminates the need for any civilian fuel reprocessing program and fabricated goods. The country's indigenous nuclear fuel cycle facilities are geared towards producing fissile material for nuclear weapons, but they are not under IAEA safeguards. However, all of Pakistan's power and research reactors *do* comply with IAEA safeguards; the latter are completely separate from military nuclear activities,[64] with no linkages with the military nuclear fuel cycle. This explains why there are no civilian plutonium stockpiles in Pakistan—though it is estimated to possess 2.17 metric tons[65] of irradiated plutonium in civil reactor spent fuel, which is under IAEA safeguards.[66]

Credit: IAEA Imagebank

[63] Mansoor Ahmed, "Pakistan's Nuclear Trajectory: Punching Below Its Weight – Part 1 of 2," *South Asian Voices*, November 5, 2013, https://southasianvoices.org/pakistans-nuclear-trajectory-punching-below-its-weight/.
[64] "Nuclear Power in Pakistan," World Nuclear Association, May 2018, http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/pakistan.aspx.
[65] David Albright and Serena Kelleher-Vergantini, "Plutonium & Highly Enriched Uranium, 2015" (Institute for Science and International Security, n.d.), https://isis-online.org/uploads/isis-reports/documents/2015_HEU_and_Plutonium_Presentation_FINAL.pdf.
[66] "Nuclear Power in Pakistan."

Should Pakistan Consider Participation in INFCIRC/549?

Pakistan might consider participating in INFCIRC/549 as an additional public measure to demonstrate its commitment to nonproliferation. However, in practice, participation would not constitute a substantive reporting shift as Islamabad already provides reports on facility operations, information analysis, and nuclear material accountancy under INFCIRC/66. The only civilian plutonium Pakistan could report under INFCIRC/549 would be from spent fuel that is already under the IAEA's safeguards. It is therefore unclear what would motivate Pakistan to adopt another IAEA mechanism related to civilian facilities or spent fuel. Any additional benefit will only have cosmetic value for Pakistan—one more international commitment—and would not significantly improve the country's existing nuclear safety and security mechanisms.

Furthermore, as Pakistan is not a signatory to the Nuclear Nonproliferation Treaty (NPT),[67] if it agrees to adhere to the guidelines, it would then be the first non-NPT nuclear weapon state (NWS) to implement transparency measures for its civilian spent fuel under INFCIRC/549. To date, there is no mechanism for this kind of non-NPT NWS participation. States' notes verbales[68] to the IAEA reflect policies and commitments adopted in accordance with obligations under the NPT. Thus, despite Pakistan's standing commitments under IAEA safeguards, the broader nuclear governance context of INFCIRC/549 could present additional challenges to Pakistani participation.

Finally, in terms of reporting INFCIRC/549 on plutonium "no longer required for defence purposes,"[69] Pakistan is unlikely to participate in any voluntary mechanism to report on such sensitive materials. This kind of reporting would compromise the secrecy, deliberate ambiguity, and deterrence of Pakistan's national security interests.

Improving INFCIRC/549: Bridging Crucial Gaps

Despite the achievements of INFCIRC/549, there are crucial gaps that need to be bridged, keeping in view the objectives, approach, and scope of this mechanism to make it a more effective tool and encourage greater participation.

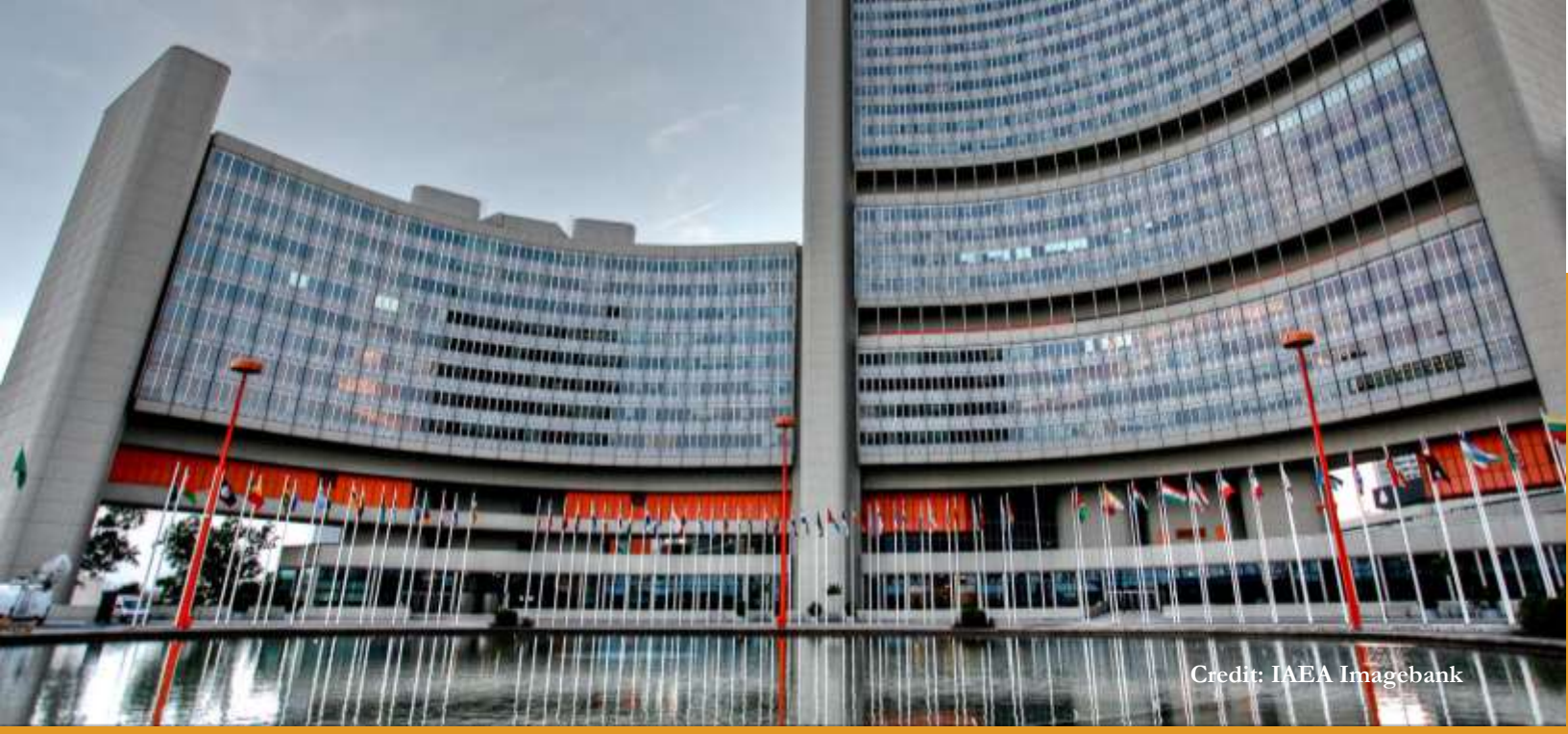
For instance, each participating state voluntarily chooses the nature of exactly how it reports various stocks when providing a note verbale to the IAEA. Variation in reporting weakens the mechanism's ability to serve as a universal standard. Additionally, while the annual reports present a broad picture of the state's civilian stockpiles, they do not show specific or significant details about the separation of civilian plutonium outside safeguards or overlapping streams of nuclear activities involving safeguarded or unsafeguarded fissile material stockpiles. Ideally, spent fuel from power reactors that contain any element of weapons-usable plutonium should be subject to stringent international safeguards. Unless these reactors are under IAEA safeguards, there is no means to verify completeness and accuracy of the reported stockpiles. For example, in the context of South Asia, the exclusion of unsafeguarded nuclear power facilities under INFCIRC/549

[67] "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)," United Nations Office of Disarmament Affairs, 1970, https://www.un.org/disarmament/wmd/nuclear/npt/.
[68] "INFCIRC/549."
[69] Ibid.

is of particular concern to Pakistan because of neighboring India's nuclear program, yet inclusion without verification also presents problems. Pakistan's existing concerns[70] relate to India's unsafeguarded strategic reserve[71] of fissile materials. If India were to report on its unsafeguarded civilian plutonium stockpiles through INFCIRC/549, it would increase its nonproliferation credentials for membership into the Nuclear Suppliers Group. Yet, there is little verification of the reporting of civilian plutonium stockpiles in a non-NPT nuclear-armed state like India, thus declarations are unlikely to be accurate.

Tackling these concerns and developing the guidelines to be more comprehensive could help make reporting under INFCIRC/549 a more meaningful demonstration of a country's commitment to nonproliferation, increasing transparency, and building confidence about reporting and accounting systems. Ultimately, INFCIRC/549 is a superficial international mechanism that does little to bolster nuclear safety and security or build confidence in global nuclear transparency. Pakistan may consider this voluntary mechanism sometime in the future with concerns addressed and interests served, but at least in the near term, the country has little to gain from participation.

[70] John Carlson, "India's Nuclear Safeguards: Not Fit for Purpose," Discussion Paper (Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard Kennedy School, January2018).
[71] Mansoor Ahmed, "India's Nuclear Exceptionalism," Discussion Paper (Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard Kennedy School, May 2017).



Credit: IAEA Imagebank

Voluntary Information Sharing on Civilian Plutonium: A Perspective from Pakistan

Muhammad Faisal

In its broadest sense, transparency refers to disclosing information that was earlier kept classified. In practice, transparency regarding the management of nuclear materials varies for every nuclear state. States engaged in the use of nuclear materials and technologies tend to manage their civil and military nuclear programs under tight veils of secrecy as sensitivities about national security interests prevail. However, voluntary information sharing mechanisms related to the management of nuclear materials hold significant political value for nuclear states, since such mechanisms may inspire the confidence of the international community in the safety of the state's nuclear materials.

Arguably, however, transparency on nuclear issues has another upside: it may help to manage and mitigate the effects of nuclear competition by increasing the predictability of actions taken by either side. During a crisis, states tend to contextualize the actions of the adversary in terms of their national security. Any event or action that can complicate this understanding may then result in the execution of destabilizing actions, undertaken with the belief that doing so safeguards national security interests. With this in mind, the preemptive adoption of transparency measures, such as the sharing of sensitive information on the management of nuclear materials, *are* in the national security interests of a state as it may prevent crises from spiraling out of control. For instance, per a bilateral agreement,[72] India and Pakistan have annually shared information about the locations of their nuclear installations and facilities for thirty years. Under this

[72] "Agreement on the Prohibition of Attack Against Nuclear Installations and Facilities."

agreement, both sides are bound from acting against the information shared, which may have had a stabilizing effect on their oftentimes tense bilateral relations.

At the international level, nuclear transparency unfolds in one of two ways: for the nuclear weapon states (NWS) that are signatories to the Nuclear Nonproliferation Treaty (NPT),[73] mandated transparency measures require they demonstrate progress on their disarmament obligations under Article VI.[74] For non-NPT nuclear weapon states, transparency measures are voluntary, earning them goodwill and a gradual acceptance into the international nuclear order. The International Atomic Energy Agency (IAEA)[75] is "the international center for cooperation in the nuclear field" promoting the "safe, secure and peaceful use of nuclear technologies." One of the IAEA's transparency mechanisms is the Guidelines for the Management of Plutonium (INFCIRC/549)[76] to "increase the transparency of the management of civil plutonium by publishing annual statements of each country's holdings of civil plutonium." The goal here is for a state to manage plutonium "in ways which are consistent with its national decisions on the nuclear fuel cycle and which will ensure the peaceful use or the safe and permanent disposal of plutonium."

Potential Hurdles to the INFCIRC/549

Nuclear states are generally reluctant to voluntarily share information regarding their programs internationally, especially since these programs have been managed out of the public spotlight for decades. Sharing information related to stocks of civil plutonium is a voluntary act of transparency, a sovereign choice made by a state. Yet, since all nuclear-related information is considered crucial to national security, there is general apprehension that any such information shared could potentially compromise that security. For instance, India—a non-NPT signatory state—maintains civilian facilities, separate from military facilities, that are not under IAEA safeguards and are being run in secrecy.[77] This culture of secrecy prioritizes security and sovereignty over the sharing of information and transparency.

Similarly, the lack of a political framework for sharing such information on a voluntary basis also poses an obstacle. Being a technical subject, political decision makers delegate this information sharing to the scientific enclave and the national security bureaucracies, which are traditionally more cautious and slow-moving.

Information sharing practices are also directly linked to the legitimacy enjoyed by nuclear states. Legitimacy is bi-directional: if a nuclear state seeks legitimacy, this reflects a desire to be treated as a responsible member of the global nuclear community. Legitimacy, once attained, gives confidence to nuclear states that their nuclear capability is accepted by the international community. Thus, they can then engage in a variety of initiatives to advance the goals of nonproliferation and safe management of nuclear materials under their control. For instance, the United States makes information public because its nuclear status is legitimate under the international nonproliferation regime. On the other hand, in the absence of legitimacy, states tend

[73] "Treaty on the Non-Proliferation of Nuclear Weapons (NPT)."
[74] Ibid.
[75] "About Us - IAEA," International Atomic Energy Agency, accessed February 20, 2019, https://www.iaea.org/about.
[76] "INFCIRC/549."
[77] Kalman A Robertson and John Carlson, "The Three Overlapping Streams of India's Nuclear Programs" (Project on Managing the Atom, Belfer Center for Science and International Affairs, Harvard Kennedy School, April 2016), https://www.belfercenter.org/sites/default/files/legacy/files/thethreesoverlappingtreamsofindiasnuclearpowerprograms.pdf.

to prioritize sovereignty concerns and refuse to participate in what they perceive to be an unfair global order. In the context of South Asia, India and Pakistan are reluctant to share information because their nuclear status still lacks legitimacy from the international nuclear order. Yet, Pakistan has shared[78] information related to its nuclear security practices in order to allay international concerns. However, whether Pakistan would be willing to share information related to stock holdings without international legitimacy of its nuclear status, say in the form of membership of export-control regimes or inclusion in high-level discussions about the nuclear order, is an open question.


Credit: Pakistan Atomic Energy Commission

Potential Benefits of Participation in INFCIRC/549

Despite potential roadblocks, nuclear states may accrue benefits in choosing to adhere to INFCIRC/549. While transparency grants outsiders insight into a state's operations, it also signals the state's willingness to share information. When a state participates in such mechanisms on a voluntary basis, it earns the trust[79] of fellow states, which is especially beneficial for non-NPT signatory states. For these states, adherence in good faith to practices followed by NPT-signatory nuclear weapon states enhances their credentials as they seek a larger role within the global nuclear order. By voluntarily sharing information[80] related to INFCIRC-549,

[78] "Pakistan's Role in Nuclear Security Summit (NSS) Process - Inaugural Statement by Lt Gen Khalid Ahmed Kidwai - 23 March 2015," Institute for Strategic Studies Islamabad, http://issi.org.pk/wp-content/uploads/2016/03/Inaugural-statement-by-Lt-Gen-Khalid-Ahmed-Kidwai.pdf.
[79] Narayan Lakshman, "Obama Confident of Nuclear Security of Pakistan," *The Hindu*, April 14, 2010, https://www.thehindu.com/news/international/Obama-confident-of-nuclear-security-of-Pakistan/article16366506.ece.
[80] "INFCIRC/913 - Communication of 24 January 2017 from the Permanent Mission of Pakistan Concerning the Review of Control Lists and a Statutory Regulatory Order" (International Atomic Energy Agency, February 17, 2017), https://www.iaea.org/sites/default/files/publications/documents/infcircs/2017/infcirc913.pdf.

non-NPT signatory states also signal their continued commitment to the global nonproliferation regime, and for achieving the highest degree of nuclear security.

Additionally, there is always speculation in the public domain regarding a state's nuclear material holdings. Absent official announcements, experts oftentimes resort to calculating and estimating[81] plausible amounts of nuclear material held by any state based on public sources and scientific analysis. As the absence of officially declared information does little to hinder public debate about stockpiles, why not get ahead of the narrative and lead it? By making limited information on civilian nuclear energy programs available, nuclear states can advance their policy interests by framing public debates. For instance, releasing information about civil stocks of plutonium could function as an opportunity to bolster Pakistan's global messaging on the policy objectives and future trends of its growing nuclear energy program.

Should Pakistan Consider Participating in INFCIRC/549?

When analyzing the proposal for releasing information related to INFCIRC/549, Islamabad will have to consider two critical factors: first, its deterrence relationship vis-à-vis India, which is underpinned by ambiguity and thus demands reciprocity from New Delhi on any information sharing or transparency measures Pakistan undertakes; and second, its policy towards the broader question of declaration of existing stocks under the proposed Fissile Materials Cut-Off Treaty (FMCT). Given its deterrence equation with India and the asymmetry in their stocks, Pakistan will jealously guard any information related to existing fissile material for nuclear weapons i.e. military purposes. As for FMCT, the debate[82] on whether to include existing stocks in the scope of the treaty and declare[83] them has been ongoing and the deliberations at the Conference on Disarmament (CD) have been stalled for years. Pakistan has been vetoing[84] commencement of negotiations towards an FMCT. Agreeing to voluntarily declare some of its civilian fissile material stocks under INFCIRC/549 would set a new precedent. This shift could push Pakistan to reevaluate its stance on the declaration of its broader fissile material stockpile in the future.

However, Pakistan has signaled[85] its commitment towards the best international practices for safe and secure management of its nuclear program and handling of nuclear materials, and could therefore consider adopting INFCIRC/549. Recently, Islamabad announced[86] its voluntary adherence to the Supplementary Guidance on the Import and Export of Radioactive Sources by the IAEA, which indicates that Islamabad is open to participation in mechanisms that strengthen its nonproliferation credentials, while also advancing goals of nuclear safety and security. Furthermore, Pakistan's civil power and research reactors are currently under

[81] "Global Fissile Material Report 2015: Nuclear Weapon and Fissile Material Stockpiles and Production" (International Panel on Fissile Materials, December 21, 2015), http://fissilematerials.org/publications/2015/12/global_fissile_material_report_7.html.
[82] "Proposed Fissile Material (Cut-off) Treaty (FMCT)," Nuclear Threat Initiative, October 26, 2018, https://www.nti.org/learn/treaties-and-regimes/proposed-fissile-material-cut-off-treaty/.
[83] Michael Krepon, "Pakistan and the FMCT," *Dawn*, February 14, 2012, http://www.dawn.com/news/695613.
[84] Baqir Sajjad Syed, "Pakistan Unlikely to Drop Opposition to FMCT Talks," *Dawn*, February 7, 2017, http://www.dawn.com/news/1313135.
[85] Kyle Mizokami, "How Pakistan Is Planning to Fight a Nuclear War," *The National Interest*, March 25, 2017, https://nationalinterest.org/blog/the-buzz/how-pakistan-planning-fight-nuclear-war-19897.
[86] "Pakistan Announces Subscription to the IAEA's Supplementary Guidance on the Import and Export of Radioactive Sources," *Pakistan Press International*, February 21, 2018, https://ppinewsagency.com/pakistan-announces-subscription-to-the-iaeas-supplementary-guidance-on-the-import-and-export-of-radioactive-sources/.

IAEA safeguards.[87] Thus, all of the civilian plutonium in spent fuel produced is already accounted for,[88] while the fuel cycle and stocks for defense purposes remain outside IAEA safeguards. However, participation in INFCIRC/549 would boost Pakistan's international reputation and enhance its nonproliferation credentials at a time when Islamabad has applied[89] for Nuclear Suppliers Group (NSG) membership. Thus, the voluntary agreement could hold some appeal for Pakistan.

Looking Ahead: Modalities of Pakistan's Participation in INFCIRC/549

For Pakistan, such a move would be the first time the country has agreed to voluntarily declare a portion of its fissile material stockpile. For consistency on this in the future, Islamabad would require a positive reaction from major powers in the international nuclear community and reciprocity from New Delhi. Alongside being a technical issue, this sharing of information is politically symbolic and for that reason, Pakistan will be watching the reaction of other governments and the policy community. Therefore, initially, Pakistan can join participating governments to report its holdings of civil plutonium—the irradiated plutonium in spent fuel—under INFCIRC/549. Since this spent fuel is already under IAEA safeguards, sharing detailed information about it with other states will not undermine national security. Based on the reaction from those who gain access to this information, especially the IAEA and New Delhi, Pakistani policymakers and experts alike can determine Islamabad's future level of participation as its civilian nuclear energy program continues to grow.

[87] "Signing of a Safeguards Agreement with Pakistan," International Atomic Energy Agency, May 3, 2017, https://www.iaea.org/newscenter/news/signing-of-a-safeguards-agreement-with-pakistan.
[88] Albright, Kelleher-Vergantini, and Schnur, "Civil Plutonium Stocks Worldwide End of 2014."
[89] Sobia Paracha, "The Case for Pakistan's Nuclear Suppliers Group Membership," *The Diplomat*, November 19, 2016, https://thediplomat.com/2016/11/the-case-for-pakistans-nuclear-suppliers-group-membership/.

Credit: Pallav Bagla via Getty Images

Benefits and Challenges of Nuclear Information-Sharing in South Asia

Sharon Squassoni and Cindy Vestergaard

In our essay[90] entitled "Charting Nuclear Security Progress in South Asia," we explored whether voluntary declarations on civilian plutonium under the existing INFCIRC/549 Guidelines on the Management of Plutonium would be useful for India and Pakistan in the context of reducing risks related to nuclear terrorism. Four scholars – Muhammad Faisal, Maimuna Ashraf, Pooja Bhatt and Hina Pandey – shared their views in the *South Asian Voices* series "Multilateral Nuclear Information Sharing: The View from South Asia."[91] All raised considerable objections and challenges, but also assessed the benefits.

Briefly, Faisal agreed[92] that transparency "may help to manage and mitigate the effects of nuclear competition by increasing the predictability of actions taken by either side" and suggested that measures such as sharing information on the management of nuclear materials "*are* in the national security interests of a state as it may prevent crises from spiraling out of control." He also noted that improving trust outside of the India-Pakistan dyad could be helpful, specifically suggesting that adherence for a non-Nuclear Nonproliferation Treaty (NPT) member could enhance its credentials and signal commitment to the global nonproliferation regime. Faisal suggested that Islamabad's recent announcement that it would voluntarily adhere to the Supplementary Guidance on the Import and Export of Radioactive Sources may indicate that Islamabad is open to participation in other mechanisms. He saw participation as "an opportunity to bolster

[90] Squassoni and Vestergaard, "Charting Nuclear Security Progress in South Asia."
[91] "Multilateral Nuclear Information-Sharing: The View from South Asia," South Asian Voices, n.d., https://southasianvoices.org/multilateral-nuclear-information-sharing-view-south-asia/.
[92] Muhammad Faisal, "Voluntary Information Sharing on Civilian Plutonium: A Perspective from Pakistan," *South Asian Voices*, March 21, 2018, https://southasianvoices.org/voluntary-information-sharing-on-civilian-plutonium-a-perspective-from-pakistan/.

Pakistan's global messaging on the policy objectives and future trends of its growing nuclear energy program."

Ashraf, Pandey, and Bhatt were less optimistic and saw less utility for India and Pakistan to make declarations under INFCIRC/549. Ashraf viewed[93] the benefits of adherence as primarily cosmetic with few improvements to the safety and security of Pakistan's nuclear material. Since all civilian spent fuel in Pakistan is under International Atomic Energy Agency (IAEA) safeguards, there was no need, in her view, for declarations. Faisal, on the other hand, concluded[94] that precisely because of this, there should be no obstacles to adherence. Ashraf noted that Pakistan was unlikely to voluntarily report on plutonium no longer required for defense purposes due to national security concerns. All four authors acknowledged the difficulties both parties would have under a voluntary system of reporting where absolute reciprocity was not required. Ashraf also pointed[95] to the lack of precedent for non-NPT member states offering such information voluntarily and the NPT-specific language in participating states' declarations. In our view, this is not a show-stopper for expanded participation in INFCIRC/549 but rather something that can be finessed with careful language.

Pandey noted[96] that adherence could ensure transparency, strengthen a nuclear security norm, and contribute to nuclear security in a region where the nuclear security architecture was still under construction. If both India and Pakistan participated, "South Asia will have its first nuclear transparency measure for civilian plutonium," she stated. At the same time, Pandey argued there were few incentives for India to adhere given it has already subscribed to significant nuclear security commitments, including INFCIRC/869, to strengthen nuclear security in the post-summit environment, and is a party to all 13 international counterterrorism agreements. Bolstering its nuclear security profile, in Pandey's view, was unlikely to help resolve China's opposition to India's membership in the Nuclear Suppliers Group.

Bhatt likewise viewed[97] India's participation as unlikely, but focused on deficiencies in the INFCIRC/549 mechanism. She suggested that "the voluntary and nonbinding nature of the guidelines may fail to advance mutual trust between India and Pakistan in any significant way" because without verification, it would be easy to provide inaccurate information. In Bhatt's view, this would decrease rather than increase trust. She favored a bilateral approach, perhaps adding information regarding plutonium to existing bilateral confidence-building measures between India and Pakistan.

All four authors pointed to existing IAEA safeguards on their facilities and material as sufficient, equating IAEA safeguards with transparency. This is not the case, since safeguards information is held in confidence by the IAEA and summarized by categories only in the annual Safeguards Implementation Report. The fact that non-nuclear weapon states under the NPT with comprehensive safeguards also participate in reporting

[93] Maimuna Ashraf, "Prospects for Civilian Plutonium Management in Pakistan and South Asia," *South Asian Voices*, March 22, 2018, https://southasianvoices.org/prospects-for-civilian-plutonium-management-in-pakistan-and-south-asia/.
[94] Faisal, "Voluntary Information Sharing on Civilian Plutonium."
[95] Ashraf, "Prospects for Civilian Plutonium Management in Pakistan and South Asia."
[96] Hina Pandey, "India's Reservations About Voluntary Reporting of Civilian Plutonium Stocks," *South Asian Voices*, March 24, 2018, https://southasianvoices.org/indias-reservations-about-voluntary-reporting-of-civilian-plutonium-stocks/.
[97] Pooja Bhatt, "Guidelines for the Management of Plutonium: India's Case," *South Asian Voices*, March 27, 2018, https://southasianvoices.org/guidelines-for-the-management-of-plutonium-indias-case/.

under INFCIRC/549 was not raised by these authors as suggestive of the need for transparency beyond safeguards. Likewise, the authors did not explore why nuclear weapon states and non-nuclear weapon states have undertaken similar obligations under INFCIRC/549 in this manner.

Contrary to some perspectives, the nuclear weapon states do not have a "mandatory" requirement for transparency, even if some non-nuclear weapon state members of the NPT see it that way. INFCIRC/549 is one of several different mechanisms that help build a norm of transparency that has grown since the end of the Cold War and needs to be nurtured further. The fact that there is no uniform treatment of information across nuclear weapon states is precisely because they do not have mandatory disclosure requirements. Efforts to establish uniform reporting have been underway for many years, and progress is discernible but slow.

All four authors brought up the need for secrecy in the service of security and sovereignty. Ashraf, in particular, stated[98] that reporting would "compromise the secrecy, deliberate ambiguity, and deterrence of Pakistan's national security interests." Pandey suggested[99] that a culture of transparency is still developing in India, which does not publish information about its capabilities. However, Faisal noted[100] that secrecy does not stop a public debate about stockpiles and asked why Pakistan should "not get ahead of the narrative and lead it?" Analysts should explore ways in which necessary ambiguities can be preserved while sharing information in other areas. The United States and Russia have decades of experience in this.

There were a few interesting perspectives on legitimacy. Faisal suggested[101] that "the United States makes information public because its nuclear status is legitimate under the international nonproliferation regime," while all four assumed that membership in international export control regimes would confer some kind of status. We do not believe it is helpful to distinguish between "legitimate" and "illegitimate" nuclear weapon states. Nuclear weapons pose significant risks to humanity and all states with nuclear weapons bear special responsibilities for taking steps toward their ultimate elimination, while ensuring they are safe and secure until elimination. Another issue that deserves further analysis is the particular responsibility of democratic states regarding accountability of their nuclear programs whether for weapons or civilian purposes.

98 Ashraf, "Prospects for Civilian Plutonium Management in Pakistan and South Asia."
99 Pandey, "India's Reservations About Voluntary Reporting of Civilian Plutonium Stocks."
100 Faisal, "Voluntary Information Sharing on Civilian Plutonium."
101 Ibid.

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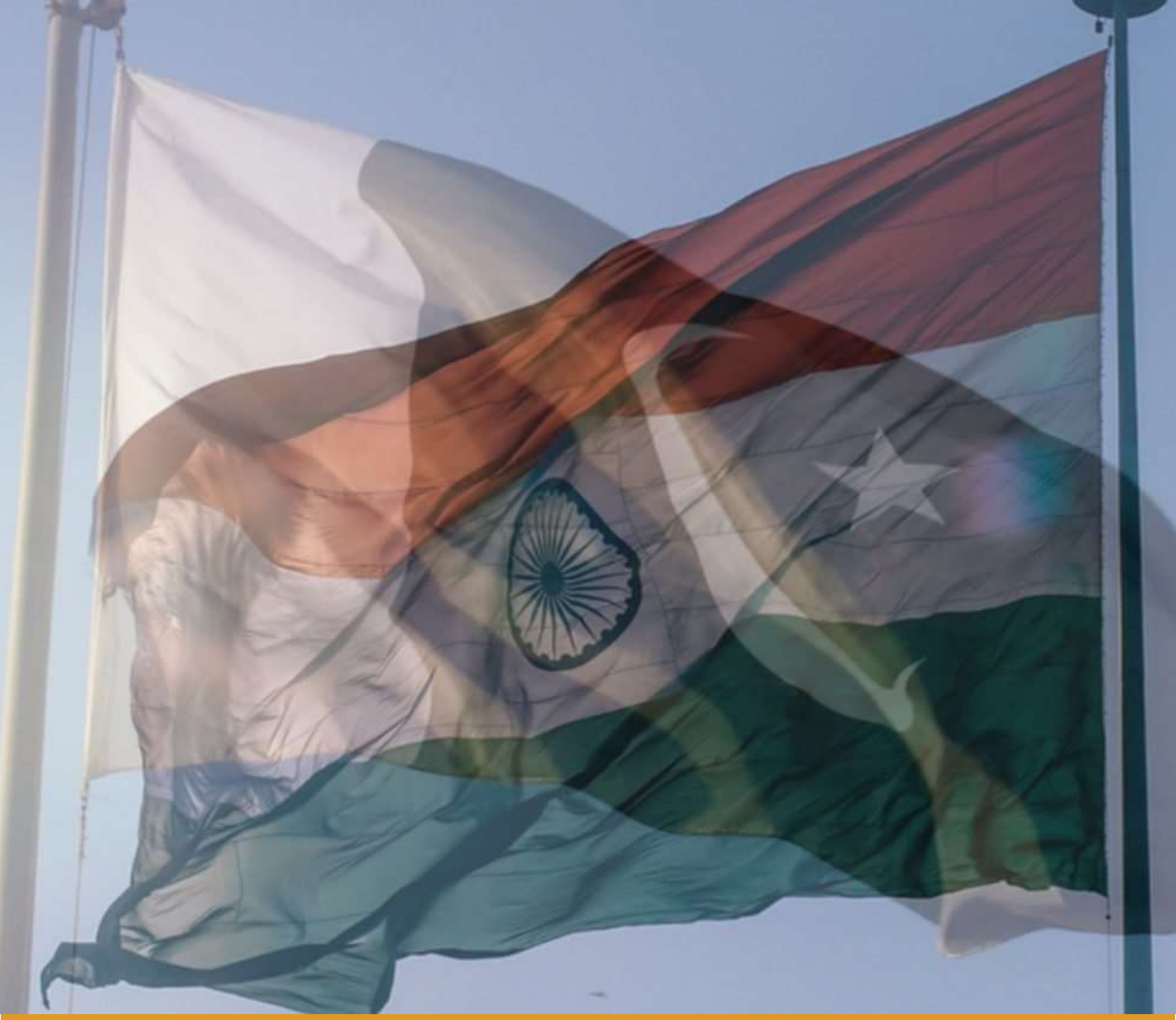

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