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## *Report- Book Launch*

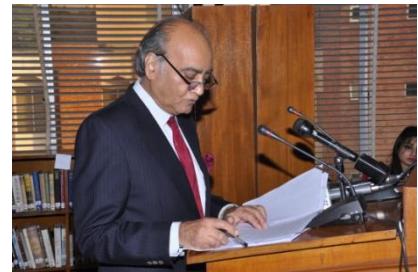
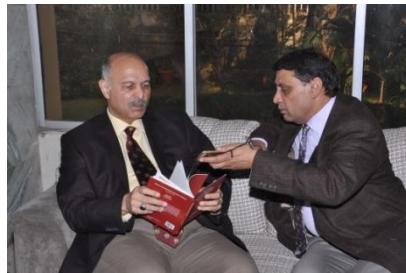
# **Indian Unsafeguarded Nuclear Program: An Assessment**

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The Institute of Strategic Studies, Islamabad (ISSI) launched a book titled "*Indian Unsafeguarded Nuclear Program: An Assessment*," authored by three Visiting Research Fellows at ISSI Adeela Azam, Ahmed Khan, Sameer Ali Khan and Syed Muhammad Ali from CISS on October 24, 2016. Speakers at the occasion included Dr. A.H. Nayyer an internationally known physicist, Dr. Ansar Pervez, former Chairman of Pakistan Atomic Energy Commission (PAEC) and Dr Naeem Ahmad Salik, Senior Fellow at the Centre for International Strategic Studies, Islamabad.

### Welcome Remarks by Chairman ISSI

The Chairman ISSI, Ambassador Khalid Mahmood opened the event with his welcome remarks. He said that nuclear technology is dual use technology which can be used for peaceful purposes, as well as to make nuclear weapons. About nine states mastered that technology and developed nuclear weapons. India is also among the states to develop a nuclear programme and nuclear weapons. A large part of the Indian programme is unsafeguarded, but the international community has not raised any concerns over it. Moreover, he said that India's non-proliferation record is not as clean as it claims. The most glaring example of its proliferation activity is the 1974 nuclear explosion, for which India diverted nuclear fuel from Canadian reactors supplied for peaceful purposes, to conduct its nuclear test. As such, India became the first country to divert peaceful nuclear resources towards weapons use. Interestingly, the Nuclear Suppliers Group was created in the wake of this explosion specifically aimed at preventing the diversion of civil nuclear technology for military purposes in future. India has also proliferated by indulging in illicit procurement of dual-use nuclear items, by leaking centrifuge know-how, and by running a poorly implemented national export control regime.

He said that the book addresses the role of major powers and countries that have helped India acquire its unsafeguarded nuclear programme. Emboldened by its unsafeguarded nuclear programme, India had been pursuing an aggressive nuclear weapons programme to acquire a major power status. He further said that India's threatening posture is destabilising for the region.

On the other hand, Pakistan has been a responsible nuclear state that has all of its civil nuclear facilities under IAEA safeguards, an exemplary nuclear safety and security record and has put in place the most stringent export control regime. He further said that Pakistan had also put forward many proposals to India including strategic restraint regime covering nuclear and missile restraint, conventional balance and conflict resolution and bilateral nuclear test ban treaty. However, India had rejected all these proposals and had gone for nuclear and conventional buildups.

He noted that the exposure of India's unsafeguarded programme had direct relevance with the NSG membership. The aim of the NSG was to curtail the proliferation of nuclear weapons. He further said that the exception granted to India in 2008 so that the US and other countries could do nuclear trade with it was a blatant discrimination. Mentioning that the applications for membership to the NSG by both India and Pakistan were denied in 2016, he stressed the need for a universal non-discriminatory criteria for membership of the Group.

Ambassador Khalid Mahmood said it was a matter of pride for the institute to publish and launch a major research study on an important subject of immense regional, global and strategic significance. He said that the book gave a fresh perspective on India's unsafeguarded nuclear

programme and expressed the hope that it would be read with interest around the world and benefit scholars and diplomats at different levels. Moreover, he said it would encourage scholars to further advance the quest of knowledge on various additional and new aspects.

## Reviews of Book

There were two eminent reviewers including Dr. A.H. Nayyer an internationally known physicist and a member of the International Panel on Fissile Materials (IPFM) and Dr. Ansar Pervez, former Chairman of Pakistan Atomic Energy Commission (PAEC).

Dr. A. H. Nayyar, praised efforts of the authors and said that the book made a significant addition to the existing knowledge about the size, history and capacity of the Indian unsafeguarded nuclear programme. The authors used government documents, speeches, parliamentary debates, research of leading Indian and international nuclear experts and international assessments related to the Indian nuclear programme while compiling the book. He appreciated the great details provided in the different chapters of the book on Indian Nuclear Energy Needs and Uranium Reserves, Indian Uranium Enrichment Capacity and Future Requirement, Indian Unsafe-guarded Nuclear Reactor Programme and Indian Nuclear Reprocessing Programme. He said that these were important pillars of India's nuclear programme. However, he pointed out a few estimates or figures that may be exaggerated. On uranium resources and production, he appreciated the detail provided by the book on where the resources were located. However, he pointed out that one of the claims of the book that India's own mines have sufficient uranium reserves and capacity to run New Delhi's existing reactors for more than a century, implying that India was never faced a uranium shortage, was not entirely true. He said that India did face some uranium shortage when it negotiated the civil nuclear deal with the US. He said that India's estimates of uranium reserves have picked up since.

He noted that another important chapter in the book was on enrichment of uranium. India was not well known for its uranium enrichment capacity. However, India has developed an uranium enrichment programme to fuel its nuclear submarines. He noted that the second enrichment plant that India had developed was still online. He also questioned the uranium enrichment capacity estimate of 43000 separative work units (SWU) that the book quoted. He pointed out that most Western reputable sources estimated Indian uranium enrichment capacity to be between 10000-15000 SWU. The conclusions of the chapter were based on the 43000 SWU and therefore faulty. He also said that more careful conclusion needed to be made in the book regarding the plutonium production capacity which was again overestimated. He suggested that for greater accuracy the International Panel on Fissile Materials (IPFM) reports should be consulted.

In conclusion, he appreciated the pioneering effort by young researchers on such an important subject as India's nuclear programme. He further said that the efforts of the authors of the book needed to be carried forward.

Dr. Ansar Pervez praised the book for being the first of its kind in Pakistan on such an important subject and for providing a critical assessment. He lauded the extensive research and said that it would provide officials, researchers, scholars and students new insights into the Indian nuclear weapon-making capacity. He said that in terms of extensive detail, depth, analysis and use of

primary source of information, the research was far superior to several studies on the subject of Indian nuclear programme.

One point he highlighted was that we live in an era where political and commercial interests take precedence. India was a huge country with 1.3 billion populations and a huge economy, and ambitions to become a major power. Given this fact, most countries want good political and commercial ties with India. This was the context for the Indo-US strategic cooperation as well.

Finally, he once again appreciated the effort by young researcher saying that the work was an important contribution to a subject that would remain important to Pakistan, the region and to the international community for a long time to come.

### **Engagement with Authors**

Dr. Naeem Salik conducted the session. In his remarks, he lauded the efforts of the ISSI for commissioning this study. He appreciated the efforts of four authors of the book who are primarily social scientists, for writing a technical book on nuclear related issues. He also highlighted the need to introduce teaching technical aspects of subjects like nuclear technology in social sciences. The authors of this book have set a precedent for other social scientists to write on technical subjects. He suggested that the authors should not be discouraged by the critique of the experts and reviewers of the book as it is meant to improve their next edition. The authors have taken the hard facts and mainly relied on Indian and international sources. This will help to qualify the study as unbiased. There are 4-5 international data bases: International Panel on Fissile Materials (IPFM), Stockholm International Peace Research Institute (SIPRI), Bulletin of Atomic Scientists, and Nuclear Threat Initiative (NTI) and they all cross reference each other. So basically, it is one data prepared by some and it circulates all around. However, they were bound to make mistakes also. He suggested that the authors give the devil what is due and what is not. It could impact Pakistan's threat assessment and responses. One should be careful not to highlight the course which is not there. Capabilities and futuristic assessment of adversaries should be as realistic as possible. With reference to using of Indian sources, Dr. Salik said that government organisation in India have a history of making tall claims. All these calculations assume lot of things such as reactors are running 365 days a year, but there are breakdowns, stoppages, maintenance issues, hurdles and shutdowns during the operational life of a reactor. Therefore, no nuclear plant runs at 100 percent capacity which should also be taken into account before making any final conclusions.

Dr Salik also raised some questions for the authors of the book that since it has been assumed in the study that India is developing its enrichment capability and access of fuel could be meant especially for thermonuclear weapons purposes, could it be possible that India was importing uranium and turning it into low-enriched uranium fuel which would be much more economical than importing the fuel from outside as it is going to purchase next generation of Light Water Reactors (LWR). There is difficulty in calculating the capacities, especially to increase its enrichment unless one knows the exact technology and number of Indian centrifuges and related infrastructure. Therefore, one should make assumptions as close as reality. He invited all the authors to give their perspective on how they picked up their particular subject, what are their conclusions and findings and what to learn from those conclusions?

Ms. Adeela Khan said that she shares her sincere gratitude to the reviewers of the book. She said that her main argument revolves around two questions i.e. what is the status of uranium reserves in India and for how long India could sustain the operation of its nuclear reactors based on these reserves. An assessment has also been made on Indian future nuclear fuel requirement in relation to its identified fuel reserves. The study finds that the exiting Indian nuclear fuel reserves are sufficient to sustain the operation of Indian nuclear reactors for a longer duration, almost for a century. With reference to India's production capacity of uranium, the findings of the study indicate that its capacity is much larger and higher than its actual requirement. Since uranium reserves are subject to exploration, there is likelihood that it would increase with the passage of time. With the introduction of new mines, milling plants, processing plants and production facilities, India is likely to further enhance its uranium reserves.

Mr. Ahmad Khan pointed out that when he was analysing the available material on Indian nuclear programme, he found a stark difference between different international estimates about Indian centrifuges. Therefore, a careful analysis suggests that India has around 43000 separative units. There is also a finding that if India spare some of its enrichment facilities, it could develop a thermonuclear weapon in future. Indian scientific community is also interested that India should go for further nuclear testing. India has the capability and it is just a matter of intention to conduct further nuclear tests. Indian capacities are growing and it could reach up to 100,000 separative units in near future. On the question of quality of India's Highly Enriched Uranium (HEU) stocks, Mr. Khan replied that India is increasing quality and capacity of its HEU.

Mr. Syed Muhammad Ali said that his analysis gives an assessment of Indian capacity to develop nuclear weapons. It may not be the exact reflection of India's stocks as this work was mostly based on primary sources of Indian origin. There were constraints to use other international sources and we preferred to use Indian sources. The study was done keeping this in mind that Indian sources might give an exaggerated estimates. As far as the issue of weapons grade plutonium and reactor grade plutonium is concerned, the study did not reject the option of using reactor grade plutonium for weapons development purposes. There are examples that reactor grade plutonium could be used, with a little bit of difficulty for producing nuclear weapons. The US has already successfully carried out a nuclear test by utilising reactor grade plutonium in past. India has also claimed that at least one of their nuclear tests was based on reactor grade plutonium. Indian unsafeguarded nuclear reactors have the capacity to build more fuel for nuclear weapons. Over the last seven decades, Indian foreign policy is in close support of Indian nuclear programme. Its non-aligned policy helped India to gain access to nuclear technology material and knowledge through multiple sources. Based on Indian origin sources, a modest estimate suggests that India with its 53 per cent of reactor capacity factor have the capacity to produce 356-493 plutonium-based nuclear weapons. This is an estimation of capacity and not a political decision that how many weapons India has assembled. Indian Fast-Breeder Reactor (FBR) programme is very complex, but it is most suitable for weapons development. In this context, the Indian nuclear doctrine is overtaken by time and it also indicates that prospects of India supporting Comprehensive Test Ban Treaty (CTBT) and Fissile Material Cutt-off Treaty are very remote.

Mr. Sameer Ali Khan gave a technical overview of India's reprocessing activities. Has said that India operates around four reprocessing plants with a cumulative production of 360-480 tonnes of heavy metal per year. All of these plants are outside the IAEA safeguards, with the exception of one which will come under the IAEA safeguards once it would be handling safeguarded

imported material. The study made an attempt to assess the output of these plants at 80 and 50 per cent capacity factor despite Indian official claims that these plants are working at the 120 per cent capacity factor. There is no way and method to verify the quantity that comes to these plants. At the assumption of 80 per cent capacity factor, it could be estimated that India could separate over 1 tonnes of weapons grade plutonium and 9-10 tones of reactor grade plutonium. At 50 per cent capacity factor, it could be estimated that India might have separated 700 kilogram of weapons grade plutonium and 7 tonnes of reactor grade plutonium. At 50 per cent factor, the estimates are closer to the international estimates and at 80 per cent factor estimates are far ahead than the international estimates. As a result, the ultimate output would be available for weapons development.

### **Q/A Session**

The Q/A session was conducted by Ambassador Khalid Mahmood, Chairman ISSI. A large numbers of audience from various walks of the life was present to attend this book launch. The audience included foreign diplomats, retired Pakistani diplomats, people from academia, think tanks, universities, and media. They lauded the role ISSI and appreciated the efforts of young visiting scholars for producing a technical assessment of India's unsafeguarded nuclear programme. The participants of book launch asked several questions and made comments related to the dangers of escalation between two nuclear armed rivals, India and Pakistan; Quality of technology of Indian unsafeguarded nuclear programme; how to engage international community to take a notice of Indian unsafeguarded nuclear programme; Impact of Indo-US nuclear deal and what kind of nuclear technology India is going to acquire in future. In response to these questions, the authors of the book replied that after the Indo-US nuclear deal, India is going to acquire next generation and modern light water reactors which will totally change the future outlook of India's nuclear programme. Indian nuclear reactors can be sustained for 100 years on its domestic reserves. India's nuclear weapons capability is growing so is the Indian missile programme and other means of delivery. The international community should take a notice of existing and future growth trends of India's unsafeguarded nuclear programme.

### **Concluding Remarks by Chairman ISSI**

Ambassador Khalid Mahmood concluded by saying that all the data and scientific jargon used in the book points to the fact that India had enough stock of uranium. Like Pakistan, India was also exploring and increasing its capacity for uranium enrichment. He further expressed concern over huge stocks of nuclear fuel that could be used for weapons production. Such a vast weapons making capacity, combined with India's aggressive stance was a source of grave concern for Pakistan. This was a genuine reason for concern that the international community did not realise. World powers who were helping India in its bid for NSG should be mindful of the repercussions that would aid India expand its nuclear weapons programme further.