REGIONAL HUBS FOR RESEARCH AND CAPACITY-BUILDING ON **NUCLEAR DISARMAMENT VERIFICATION**

Historically, debates on nuclear disarmament verification and how to conduct it have not seen equal participation globally, as not all states have sufficient capacity or technical knowledge to take part in the process. Nonetheless, for all involved states to have sufficient confidence in a nuclear disarmament process, this will need to be accompanied by an adequate technical and political process to confirm it – namely, a process of verification.

While nuclear possessor states can provide technical leadership in disarmament processes – there are also other states with advanced nuclear fuel cycles and unique histories that can provide significant contributions.

SUPPORTING NUCLEAR DISARMAMENT VERIFICATION EXPERTISE IN NON-NUCLEAR WEAPONS STATES

From 2018-2021, VERTIC, funded by the Norwegian Ministry of Foreign Affairs, conducted a multilateral project supporting capacity building in nuclear disarmament verification (NDV). The project sought to explore the expertise and unique experiences in non-nuclear-armed states with highly relevant histories—Argentina, Brazil, Kazakhstan and South Africa. The project aimed to support and grow disarmament verification relevant capabilities in these states and their regions.

To help achieve these goals, the project explored the feasibility of establishing three regional networks of disarmament expertise in Latin America, Central Asia and Africa. Here, research, education and expertise on nuclear disarmament verification could come together in a knowledge-centre or 'hub'. These hubs would allow for the development of regional perspectives and outputs on conceptual, policy and technical issues pertinent to nuclear disarmament verification. These hubs would also undertake outreach activities to enhance awareness among students and young professionals of the nuclear disarmament and non-proliferation as a field of study, and thus contribute to building expertise amongst the next generation of professionals. Argentina, Brazil, Kazakhstan and South Africa were the focal points with the goal of a NDV Hub located in a suitable institution in each region.

Box 1
Unique nuclear legacies and expertise

Each of the countries identified to host one of the NDV hubs has significant expertise in nuclear technologies, and significant history, that makes it uniquely placed to contribute to NDV debates:

- South Africa is the only state to completely dismantle a nuclear weapons programme in a verifiable and irreversible manner;
- Kazakhstan, as a non-nuclear weapon state, oversaw the dismantling of the nuclear weapons infrastructure left on its territory by the Soviet Union, including the Semipalatinsk nuclear test site; and,
- Argentina and Brazil have the only bi-national safeguards organisation in the world – the Brazilian–Argentine Agency for Accounting and Control of Nuclear Materials (ABACC).

Photo: A CTBTO On-Site Inspection specialist carrying a magnetometer, used for detection of underground cavities that may be caused by nuclear tests, during the 2008 Integrated Field Exercise held at the Semipalatinsk test site.
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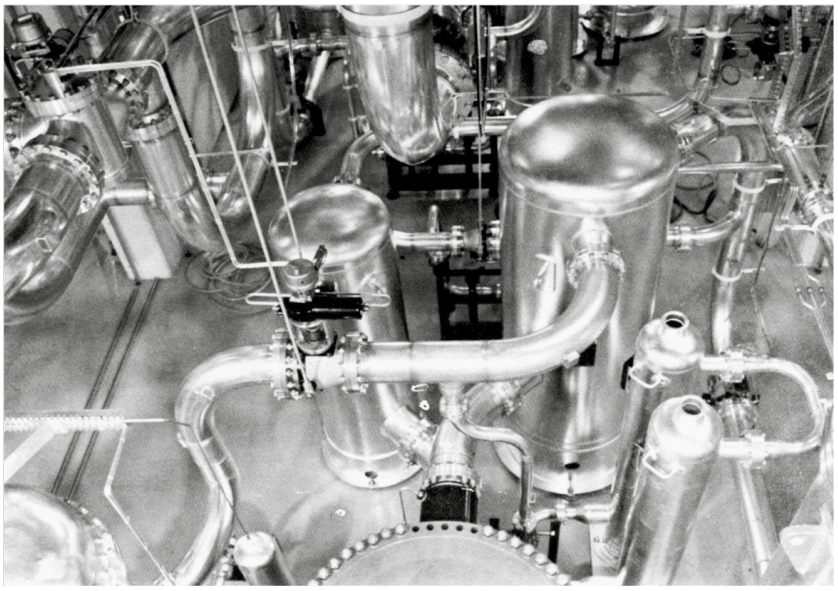
"THE PROJECT SOUGHT TO EXPLORE THE EXPERTISE AND UNIQUE EXPERIENCES IN NON-NUCLEAR-ARMED STATES WITH HIGHLY RELEVANT HISTORIES—ARGENTINA, BRAZIL, KAZAKHSTAN AND SOUTH AFRICA."



Photos: Above: Soil radionuclides detection at the Semipalatinsk former nuclear test site. Photo provided to VERTIC by project partners; Equipment inside an enrichment stage of South Africa's "Y-Plant" facility at Valindaba. Used with permission of Nic Von Wielligh and L. von Wielligh-Steyn, authors of 'The Bomb: South Africa's Nuclear Weapons Programme' . Below: Then UN Secretary-General Ban Ki Moon visit to ground zero of the Semipalatinsk Test Site. © UN Photo/Eskinder Debebe, CC BY-NC-ND 2.0.

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Box 2
Regional Partner Organisations

To ensure regional ownership and enhance participation, VERTIC worked with partner organisations in each region:

- The Radiation and Health Physics Unit at the University of Witwatersrand in South Africa.
- The NPSGlobal Foundation in Argentina.
- The International Science and Technology Center (ISTC) in Kazakhstan.

BUILDING NDV EXPERT NETWORKS

The project sought to identify and further raise awareness of nuclear disarmament verification, and to build support for enhancing regional activity and engagement on the topic. VERTIC and its partners in each region worked to engage key stakeholders across government, academia, and the third sector from the fields of policy, science and engineering. Over 100 participants, more than 30 per region, were involved at various stages of the project through workshops and other events. Beyond the aforementioned countries, stakeholders participated from Chile, Costa Rica, Mexico, Paraguay, and Uruguay in Latin America; Algeria, Botswana, Cameroon; Malawi, Egypt, Ethiopia; Ghana; Namibia; Nigeria, Zambia and Zimbabwe on the African continent; and Tajikistan and Uzbekistan in Central Asia.

Throughout the course of the project, regional experts, emerging researchers and students wrote over 40 papers and research briefings on the issue. Initial papers focused on producing assessments of existing capabilities within the regions. These assessments covered the legislative and policy contexts for work on nuclear disarmament and its verification in each of the regions; the available regional expertise within the public sector, nuclear industry and nuclear fuel cycle activities, and the involvement of academia and civil society on nuclear issues, with a focus on education and training. Moreover, these assessments also considered the unique expertise available in each region, zooming in on issues such as warhead dismantlement, decommissioning of nuclear infrastructure and the verification thereof, as well as the post-disarmament application of safeguards.

Further papers produced by the regional hubs covered a broad range of technical and conceptual topics. Some also examined historical processes from which possible lessons could be drawn.

These included:

- the experience of South Africa in having a baseline declaration verified by the IAEA;
- regional perspectives on what might constitute sufficient assurance and irreversibility;
- practical steps to achieve gender parity in disarmament diplomacy and nuclear disarmament verification activities;
- the application of safeguards as a means to prevent the re-emergence of nuclear weapons;
- verification procedures and techniques applicable to the disposition of weapons-usable fissile material;
- the development of methods for the detection, identification and characterisation of nuclear materials and nuclear waste in the framework of former nuclear test sites; and,
- the experience of Kazakhstan in monitoring nuclear tests in support of the Comprehensive Nuclear-Test-Ban Treaty (CTBT).

LONG-TERM GOALS AND SUSTAINABILITY

The project concluded with a high level of support from across the three regions for ongoing activities and engagement on disarmament verification-related activities. The establishment of regional research and innovation as seen as a means to empower regional actors to be more active in nuclear disarmament verification activities; to embed, use and grow their expertise and experience; to enhance their knowledge of the chal-lenges of verification; and to develop possible solutions.

To help secure long-term viability of the initiative, project stakeholders worked to develop an action plan for a sustainable process to identify, assemble and make the hubs functional in each region. The regional stakeholders considered existing nuclear and disarmament related capacities, the benefit for the region of involvement in NDV and the hub's needs for the future. The regional partners also conducted outreach and awareness-raising in their respective communities, and produced new research and insights. The hubs, once established, will support mutually complementary research, creating suitable vessels for peer-to-peer collaboration and de-confliction between projects. In addition, the action plans also considered how these hubs could support follow-on actions as recommended by the UN-established Group of Governmental Experts (GGE) to further consider nuclear disarmament verification issues.

At the end of the project in November 2021, the first trilateral conference was held between the networks in Africa, Central Asia and Latin America.

Participants agreed on challenges that would need to be tackled for sustainable action on NDV: long-term financial support and other resource needs; the need for collaborative disarmament verification research between the hubs, civil society, academic initiatives and State partnerships elsewhere in the world including in countries with existing disarmament verification activities. The partner organisations are currently the regional focal point for the evolving hubs. When fully established, the hubs will support expertise and capacity building for disarmament verification activities in their regions. It is anticipated that new activities can begin soon in these regions and beyond.

Photo: Pilot enrichment plant or Y-plant at the Valindaba site. Used with permission of Nic Von Wielligh and L. von Wielligh-Steyn, authors of 'The Bomb: South Africa's Nuclear Weapons Programme' .

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Box 3
Follow the NDV Hubs

This initiative is continuing and more public news about the NDV Hubs and their activities will appear in the future.

To engage or join with the hubs please email vertic@vertic.org. To follow project activity please look for updates on vertic.org, our Twitter account @vertic_org or subscribe to the VERTIC newsletter.

Photo: Signing of safeguards agreement between Argentina and Brazil. IAEA, Vienna, Austria, 13 December 1991. From left to right: Dr. Hans Blix, IAEA Director General, Dr. Fernando Collor de Mello, President of Brazil and Dr. Carlos Saul Menem, President of Argentina. © IAEA Imagebank, CC BY-SA 2.0.

VERTIC is an independent, not-for-profit, nongovernmental organisation. Our mission is to support the development, implementation and effectiveness of international agreements and related regional and national initiatives, with particular attention to issues of monitoring, review, legislation and verification. We conduct research, analysis and provide expert advice and information to governments and other stakeholders. We also provide support for capacity building, training, legislative assistance and cooperation.

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