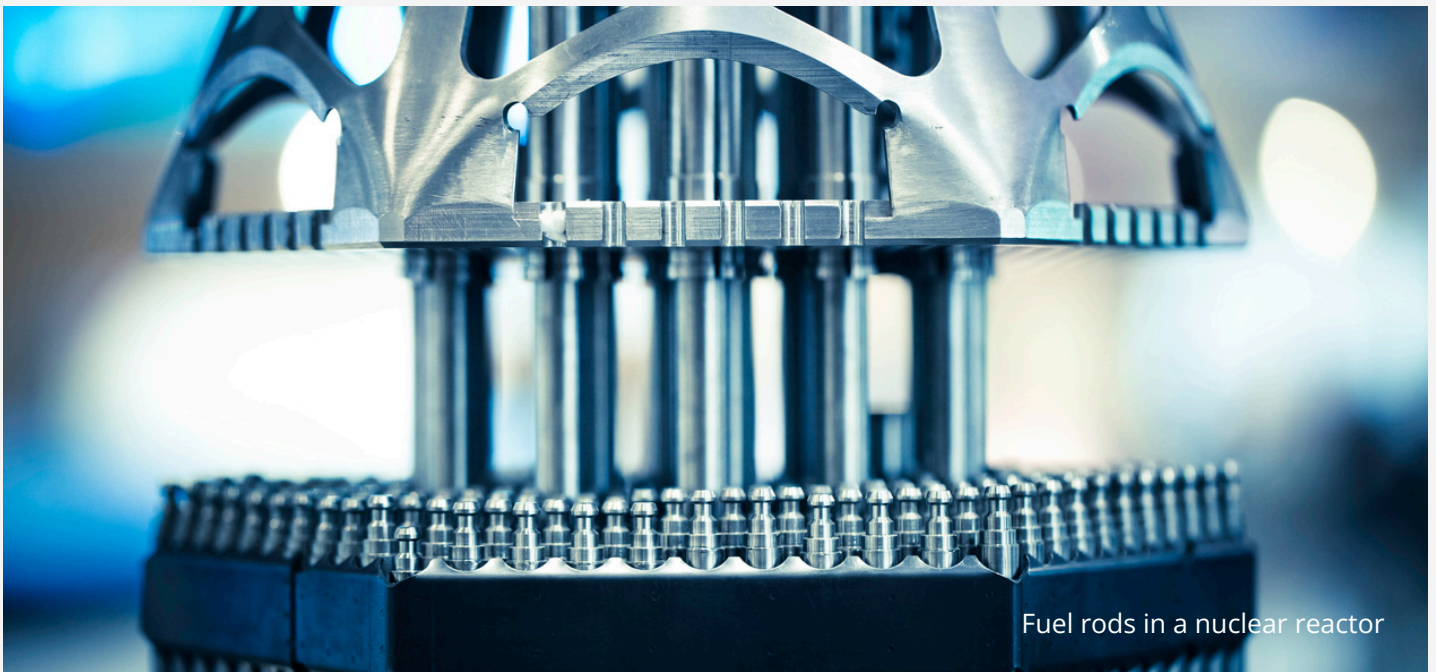


Governing the Atom Brief No. 10

The Nuclear Suppliers Group: What You Need to Know

Louis Reitmann



The Nuclear Suppliers Group (NSG) is the multilateral export control regime with the largest membership and plays an important role in maintaining the peaceful nature of global nuclear trade. Marking the 50th anniversary of the NSG's first meeting in 1975, this brief summarises the Group's history and explains its purpose, functioning, and some of the challenges facing it.

What is the NSG?

The NSG is an association of 48 Participating Governments (PGs) that develops rules on

transfers of nuclear material, equipment, and technology as well as dual-use items to ensure that peaceful trade does not contribute to the spread of nuclear weapons. These rules, known as the NSG Guidelines, establish a common non-proliferation standard among nuclear supplier countries competing for global market share. In this way, the NSG Guidelines contribute to global confidence in nuclear trade and the peaceful use of nuclear energy.

Like all export control regimes, the NSG is a voluntary association, operating on consensus.

While not legally binding, PGs adhere to the NSG Guidelines based on a shared political commitment to non-proliferation. Over the years, the NSG Guidelines have become the globally recognised standard for nuclear export controls. The importance of effective controls on proliferation-sensitive materials and items for the implementation of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) has been acknowledged in NPT Review Conference final documents, including the 2010 Action Plan.¹

What are the NSG Guidelines?

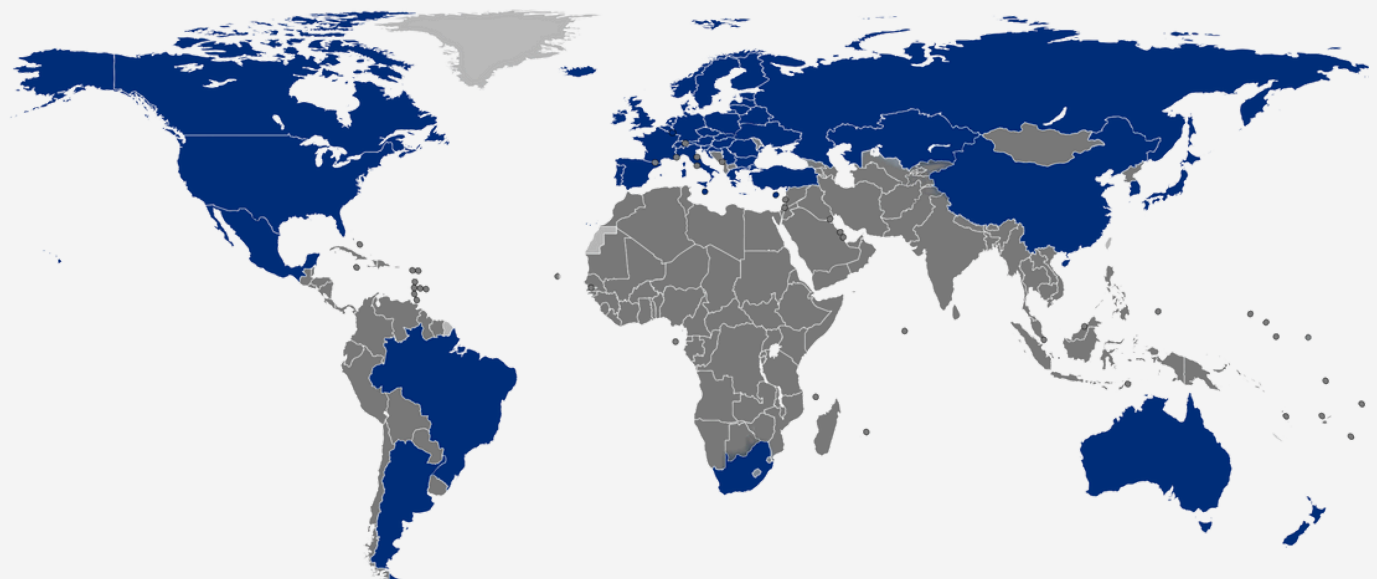
The NSG Guidelines consist of two sets of documents: The Part 1 Guidelines address transfers of nuclear material as well as equipment and technology, including software, that are especially designed or prepared for the nuclear fuel cycle, such as reactor parts or gas centrifuges.

The Part 2 Guidelines cover dual-use items that have peaceful applications across

different industries, but can also be used in the nuclear fuel cycle or for weapons development, for example, certain valves, pumps, and lasers. Both Guidelines contain annexes, known as control lists, which specify to which materials, items, and technologies the Guidelines apply.

The Part 1 Guidelines establish conditions of supply that PGs use to decide whether to authorise a transfer. For transfers of nuclear material, equipment, and technology:

- The receiving government must provide explicit assurance that they will not be used towards nuclear explosive activities;
- Nuclear material and facilities must be physically protected as per current International Atomic Energy Agency (IAEA) standards and as agreed with the exporting government;
- Non-nuclear-weapon States can only receive such items if they have a full-scope safeguards agreement with the IAEA;



The 48 Participating Governments of the Nuclear Suppliers Group

¹ United Nations, “2010 Review Conference of the Parties to the Treaty on the Non-Proliferation of Nuclear Weapons: Final Document, Volume I”, 5, 26, 27.

- Re-exports to third countries must adhere to the same conditions and may require approval by the original supplier; and
- Equipment and technology for enrichment and reprocessing must meet further conditions, such as the recipient country having an Additional Protocol in place.

Annex B of the Part 1 Guidelines, listing nuclear equipment and technology, was also the basis for Annex II to the IAEA Model Additional Protocol, under which States report international transfers of proliferation-sensitive items to the IAEA.²

Rather than creating conditions of supply, the Part 2 Guidelines on dual-use items and technology establish criteria that PGs use to assess the risk that transferred items may be misused or diverted to bad actors. For example, PGs assess whether items are appropriate for the declared end use, whether the recipient has been involved in clandestine procurement activities, and whether the recipient country has an effective export control system to prevent diversion.

As with other export control regimes, the NSG Guidelines also have a 'catch-all' mechanism that can be used to deny transfers of unlisted items if PGs have reason to believe that they may be intended for use in a nuclear weapons programme.

Similarly, the Guidelines are supplemented by the Non-Proliferation Principle. Under this, PGs commit to authorise a transfer only when satisfied that it would not contribute to proliferation. Adopted in 1994, following the discovery of Iraq's clandestine nuclear weapons programme, the Non-Proliferation Principle creates a positive obligation to thoroughly examine transfers to gain confidence in their peaceful nature, based on the realisation that a recipient State's status as an NPT State Party may not always guarantee its commitment to non-proliferation.

How does the NSG work?

The NSG consists of several bodies.

The **Consultative Group** leads the NSG's work in between the annual Plenary meetings.

- 1.A.1. High-density (lead glass or other) radiation shielding windows, having all of the following characteristics, and specially designed frames therefor:
- a. A 'cold area' greater than 0.09 m²;
 - b. A density greater than 3 g/cm³; and
 - c. A thickness of 100 mm or greater.

This is an entry in the annex of the Part 2 Guidelines. Like most entries, it includes additional criteria to ensure that only advanced items that pose a proliferation concern are controlled without unnecessarily disrupting peaceful trade. The listed radiation shielding windows are controlled because, next to their application in handling radioactive material in peaceful uses, they could be used in a nuclear weapons laboratory.

² For more information on the Annexes to the Model Additional Protocol, see Noah Mayhew, "Reflecting on the Annexes to the Model Additional Protocol in Support of Nuclear Governance", VCDNP, 2022, <https://vcdnp.org/reflecting-on-the-annexes-to-the-map/>.

In it, Vienna-based diplomats and officials from capitals meet at least twice a year, in April and November, to discuss the interpretation of and possible amendments to the conditions of supply and the control lists. They also discuss other topics, such as outreach to third countries or streamlining the process for recipients to provide assurance against misuse of exported items.

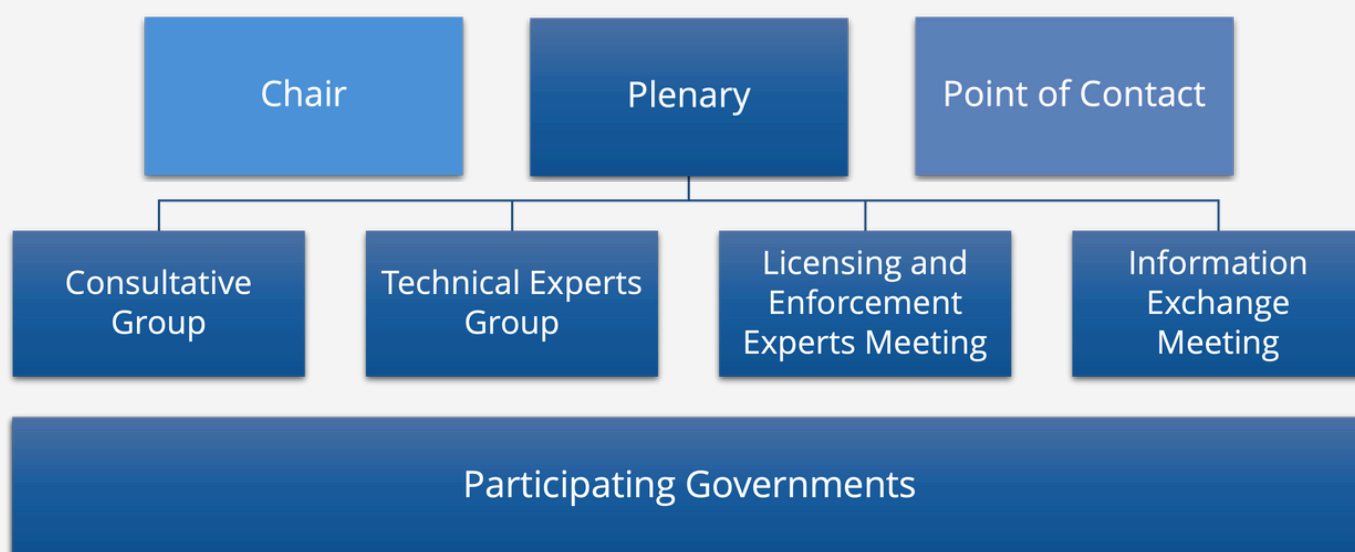
The **Technical Experts Group**, consisting of nuclear scientists and practitioners from PGs, monitors developments in nuclear technology, discusses changes to the control lists, and advises the Consultative Group on technical questions.³

It primarily drafts control list entries on newly developed materials, equipment, and technologies that pose a proliferation risk. It also discusses removing existing controls because certain items or technologies may have become so widely available that their control is no longer feasible. The Technical Experts Group meets back-to-back with the Consultative Group.

During the **Plenary** week in July, States agree on changes to the Guidelines by consensus. Changes are published on the NSG website and in IAEA INFCIRC/254. PGs then adopt these changes into national law. The Plenary also reviews the effectiveness of the NSG, discusses countries of proliferation concern, and can establish special working groups, for example, on reviewing procedures on information sharing among PGs.

Held in conjunction with the Plenary, the **Information Exchange Meeting** offers PGs another opportunity to discuss attempts by States and non-state actors to evade the controls as well as trends affecting the regime, such as the impact of emerging technologies on non-proliferation. Similarly, the **Licensing and Enforcement Experts Meeting** brings together customs officials to discuss national differences in the application of the Guidelines, best practices, and trends in export control evasion.

The Plenary is headed by a **Chair**, rotating among PGs, usually every year.



³ Not all PGs are represented by technical experts. Some delegate their Vienna-based diplomats to attend and some do not regularly participate in Technical Experts Group meetings.

The Chair is responsible for the coordination of the Group's work and conducts outreach to third countries, regional forums, and industry to promote understanding of and adherence to the Guidelines. Part of this outreach is capacity-building for States seeking guidance on enhancing their export control systems. The Chair also liaises with other export control regimes on harmonising controls and minimising duplication of work. The Permanent Mission of Japan in Vienna is the **NSG Point of Contact**, handling administrative matters and hosting meetings.

How does the NSG enforce its Guidelines?

With export controls being a national competency, the NSG does not verify whether PGs accurately apply the Guidelines, unlike the IAEA, which verifies States' compliance with safeguards through monitoring and inspections.

Likewise, the NSG does not make collective decisions about approving or denying exports. Each PG operates its own export control system, under which exporters can apply for export licences. National licensing officers review these applications with cross-governmental input to determine whether the export is in line with the NSG Guidelines and other multilateral and national export control requirements.

However, PGs do exchange information on denied exports, especially of items listed in the Part 2 Guidelines, to identify proliferation attempts, including via a secure online portal. If one PG has denied the transfer of a specific item to a specific recipient, another PG assessing the same transfer will consult with the PG that previously denied it. This is because, without consistent application of the

Guidelines across PGs, proliferators could 'shop around' different exporters until they are successful in acquiring a sensitive item.

Why was the NSG formed?

The NSG began as a series of meetings between seven major nuclear suppliers from 1975 in London, responding to India's first nuclear test in 1974. India had used reprocessing technology to extract plutonium for its device from a Canadian-supplied reactor and US-supplied heavy water, demonstrating that controls on exports of nuclear material and equipment were not sufficient to prevent proliferation. By 1978, the countries later known as the NSG adopted a list of nuclear material, equipment, and technology, for which they would require IAEA safeguards and other conditions of supply. The Group also adopted special conditions for transfers related to enrichment and reprocessing as the most proliferation-sensitive technologies.

The NSG list was, in parts, based on the Trigger List developed by the Zangger Committee between 1971 and 1974. While the Zangger Committee only included NPT States Parties, the NSG also aimed to commit key suppliers that had not yet acceded to the Treaty to nuclear export controls, including France.

Despite their overlap, participants in both regimes have decided not to merge the NSG and the Zangger Committee to maintain their respective strengths and areas of focus. Over the years, the Part 1 Guidelines and the Trigger List have been harmonised, and the regimes coordinate regularly to prevent the duplication of efforts.

The discovery that Iraq had diverted imports of dual-use items to its clandestine nuclear weapons programme highlighted the need for

controls on dual-use items – and not only nuclear material and items with direct application in the nuclear fuel cycle – to effectively prevent proliferation, including to non-state actors. This led to the adoption of the Part 2 Guidelines in 1992.

What is adherence?

Many States apply the Guidelines in their national export control systems without participating in the NSG. Especially smaller economies with lower volumes of trade in relevant items may do so to fulfil their obligation to establish effective WMD export controls under UN Security Council Resolution 1540 (2004).

Even countries with no nuclear industry play an important role for non-proliferation in a globalised economy with complex supply chains and shipping networks. They may produce and export dual-use items that can aid proliferation attempts. They may also serve as waypoints for shipments of proliferation-sensitive items. Today, some of the world's largest shipping hubs are in countries that do not participate in the NSG or other control regimes, but have become role models in export control implementation.

Adherent States often adopt the NSG Guidelines as part of a package of 'tried and tested' export control legislation that combines the guidelines and control lists of all major export control regimes, saving them the time and resource-intensive effort of developing effective controls from scratch. EU Regulation 2021/821 is used by many States in this way. While the NSG does not verify States'

adherence, States can declare their commitment to the Guidelines by sending a letter to the IAEA Director General for publication in the INFCIRC series.

What challenges is the NSG facing?

Next to the need for continuously adapting the control lists to technological developments and responding to new trends in evasion attempts, the NSG faces several long-term challenges:

Enlargement

In 2008, upon the United States' initiative, the NSG exempted India from the requirement for full-scope IAEA safeguards for transfers of nuclear material and equipment and from the conditions applying to dual-use items and technology. In exchange, India agreed to adhere to the NSG Guidelines, maintain its moratorium on nuclear explosions, conclude an Additional Protocol with the IAEA, and separate its nuclear programme into military and civilian facilities, allowing IAEA verification activities at the latter.⁴

Since then, PGs have been unable to agree on permitting India to join the NSG. While some argue that it would strengthen the non-proliferation regime, others point out that India is already adhering to the NSG Guidelines under the current arrangement, that a bigger number of PGs may further complicate decision-making by consensus, and that it would be contrary to the NSG's principles to admit a nuclear-armed State that has not acceded to the NPT.

⁴ NSG via IAEA INFCIRC/734, "Statement on Civil Nuclear Cooperation with India", 2008, <https://www.nuclearsuppliersgroup.org/images/Files%20and%20Documents/Documents/Publications/infirc734c.pdf>.

It has also been criticised that India's military and civilian nuclear facilities remain somewhat entangled, with nuclear material passing between them.⁵ Pakistan too has been interested in joining the NSG. However, similar concerns and criticism of Pakistan's proliferation record have prevented PGs from reaching consensus on this matter.

Implementation

Next to other implementation challenges, PGs have struggled to agree on the application of two exceptions in the Part 1 Guidelines. They allow exporters to override the conditions of supply when the export is essential for maintaining the safety of a reactor, or when a supply agreement had already existed before the NSG began to require full-scope IAEA safeguards in 1992.

Russia has claimed both exceptions for exports of nuclear fuel and equipment to India between the late 1990s and 2007. Other PGs criticised that the pre-existing agreement cited by Russia was merely a legal framework for bilateral cooperation containing no concrete supply commitments and that Russia provided insufficient evidence that reactor safety was at risk. In 2004, China also claimed the 'grandfather' clause to supply nuclear reactors to Pakistan.

Again, other PGs criticised that the referenced document was not a supply agreement.⁶

Criticism

The NSG has long faced criticism that its Guidelines hampered access to nuclear energy and technologies for developing countries. This has been reinforced by a generally sceptical sentiment towards export controls and their supposed discriminatory impact on peaceful trade and development.

However, neither the 2022 report by the UN Secretary-General on "identifying undue restrictions on exports to developing countries"⁷ nor the 2022 Comprehensive Review of UNSCR 1540 contained evidence that export controls unnecessarily hinder peaceful trade and development.⁸ Illustrating the small share of global trade affected by export controls, of all exports from the European Union – the world's second largest exporter – 2% are covered by export controls and 0.04% are denied on the basis of export controls.⁹

The NSG itself stresses that nearly all exports denied by PGs on the basis of the NSG Guidelines were to countries with unsafeguarded nuclear programmes, in support of the implementation of the NPT.¹⁰

⁵ Kalman A. Roberts and John Carlson, "The Three Overlapping Streams of India's Nuclear Power Programs", 15 April 2016, <https://www.belfercenter.org/publication/three-overlapping-streams-indias-nuclear-power-programs>.

⁶ Fred McGoldrick, "The Road Ahead for Export Controls: Challenges for the Nuclear Suppliers Group", January 2011, <https://www.armscontrol.org/act/2011-01/road-ahead-export-controls-challenges-nuclear-suppliers-group>.

⁷ United Nations, "Promoting international cooperation on peaceful uses in the context of international security: Report of the Secretary General", June 2022, <https://digitallibrary.un.org/record/3982965?v=pdf>.

⁸ United Nations, "Final document on the 2022 Comprehensive Review of the status of implementation of resolution 1540 (2004) (S/2022/899)", December 2022, <https://docs.un.org/en/S/2022/899>.

⁹ Figures for 2022. See: European Commission, "Report from the Commission to the European Parliament and the Council on the implementation of Regulation (EU) 2021/821", January 2025, [https://ec.europa.eu/transparency/documents-register/detail?ref=COM\(2025\)19&lang=en](https://ec.europa.eu/transparency/documents-register/detail?ref=COM(2025)19&lang=en).

¹⁰ NSG via IAEA INFCIRC/539/Rev. 8, "The Nuclear Suppliers Group: Its Guidelines, Origins, Structure, and Role", 2022, <https://www.nuclearsuppliersgroup.org/images/Files%20and%20Documents/Documents/Publications/infcirc539r8.pdf>.

The NSG Guidelines, control lists, and any changes to them, are published on the NSG website, providing insight over the criteria against which PGs evaluate exports. These conditions also apply to transfers between Participating Governments.

A particular point of criticism has been that NSG meetings are confidential. The Group's opaqueness in contrast to other forums, such as the IAEA General Conference, whose plenary sessions are livestreamed, has contributed to a lack of understanding of the NSG's purpose and activities.

While the NSG has increased its outreach efforts, e.g., distributing an information brief in INFCRIC/539 and delivering presentations at NPT and other meetings, further enhancing the Group's transparency remains controversial with some Participating Governments.

Recent Challenges in Information Sharing

As geopolitical tensions have increased, information sharing between PGs has diminished. With relations between several PGs significantly reduced, there is little perspective for sharing sensitive information with what are considered geopolitical competitors.

This is problematic for the integrity and effectiveness of the Guidelines. Without constructive information exchange on denied exports and proliferation trends, national authorities may not apply the Guidelines consistently, presenting an opportunity for bad actors to exploit.

Additionally, the IAEA has long been interested in having access to the information that PGs

exchange on denied exports to support its understanding of potential proliferation activities. However, some PGs remain concerned about the security of commercially sensitive information contained in this data. Consequently, Participating Governments have not been able to reach consensus on sharing this information with the IAEA.



**Vienna Center for Disarmament
and Non-Proliferation**

The VCDNP is an international non-governmental organisation that conducts research, facilitates dialogue, and builds capacity on nuclear non-proliferation and disarmament.



vcdnp.org



info@vcdnp.org



[@VCDNP](https://twitter.com/VCDNP)