

# International Leasing of Nuclear Fuel Cycle Reservations

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Current International Atomic Energy Agency (IAEA) safeguards do not provide adequate protection against diversion to military use of materials or technology from certain types of sensitive nuclear fuel cycle facilities. In view of highly-enriched uranium's relatively greater ease of use as a nuclear explosive material, and the significant diseconomies of commercial spent fuel reprocessing, we focus on the need for improved international controls over uranium enrichment facilities as the proximate justification for creation of an International Nuclear Fuel Cycle Association (INFCA). In principle, the proposal is equally applicable to alleviating the proliferation concerns aroused by nuclear fuel reprocessing plants and other sensitive nuclear fuel cycle facilities. The INFCA would provide significantly increased nonproliferation assurance to its member-states and the wider international community by holding long-term leasehold contracts to operate secure restricted zones containing such sensitive nuclear facilities.

The overall weakness of the current international safeguards regime stems not only from its inability to ensure timely warning of a diversion of a Significant Quantity (SQ) of fissile material, as defined by the IAEA, from several existing types of bulk-handling facilities, but also from other concerns, including:

- **The “legal withdrawal” scenario**—under Article X of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), with three months notice a state can legally withdraw from the NPT and its IAEA safeguards agreement if it decides that extraordinary events have jeopardized the supreme interests of its country. It can then proceed to divert to military purposes enrichment technology and enriched materials previously declared for peaceful use.
- **The “breakout” scenario**—a state can abruptly (and thus “illegally”) abandon the NPT—having made secret preparations in advance—and within days or weeks become a nuclear weapon power.
- **The NPT-compliant “virtual weapon state”**—without leaving the NPT, a state can exploit to the fullest its “inalienable right” under Article IV to “develop research, production and use of nuclear energy for peaceful purposes without discrimination” and its right “to participate in the fullest possible exchange of equipment, materials, and scientific and technological information for the peaceful uses of nuclear energy,” and thereby acquire the principal elements of a nuclear weapons capability.
- **Small undeclared facilities**—some types of uranium enrichment facilities, such as small gas-centrifuge and laser enrichment plants, have the potential to be hidden from inspectors and national technical means of surveillance for a considerable period, potentially long enough to produce a quantity of highly enriched uranium (HEU) sufficient to fuel a nuclear explosive device.

- **Covert technology acquisition and production**—national civil enrichment programs can provide cover for the importation and domestic manufacture of enrichment technology for military purposes.
- **Low-confidence or untimely capability for detecting diversion**—the amounts of HEU and plutonium needed to make a nuclear weapon with a militarily useful yield are actually several times smaller than the IAEA’s currently designated SQ values for these materials, thus making even more difficult the Agency’s ability to detect diversion of “weapon quantities” of these materials from large bulk-handling facilities, such as commercial-scale enrichment or reprocessing plants.
- **An under-appreciated barrier to global elimination of nuclear weapon stockpiles**—left unattended, the persistence and spread of isotopic enrichment and spent fuel reprocessing facilities, under purely national forms of control and revocable peaceful use safeguards, will place a floor under nuclear arms reductions by the known nuclear powers, and foster a proliferation of uneconomic nuclear fuel cycle facilities in non-weapons states to “hedge against my neighbor’s hedge.”

Measured against these proliferation concerns—and what is required to allay them while also enabling progress toward a “world without nuclear weapons”—current reform efforts seem poised to deliver only modest improvements in the perceived durability of nuclear peaceful-use commitments. These improvements are mainly limited to: (1) improving material accounting, control, containment, and surveillance measures; (2) increasing the frequency of IAEA inspections; (3) encouraging states to adopt the Additional Protocol which permits IAEA inspections of sites not previously declared as civil nuclear facilities; and (4) providing political assurances and backup multilateral supply mechanisms to ensure an uninterrupted flow of enriched fuel for peaceful uses to non-weapons states that refrain from constructing indigenous sensitive nuclear fuel cycle facilities.

To address directly the international security concerns that accompany continued national acquisition of sensitive nuclear fuel cycle facilities, we propose the establishment of an INFCA as a major supplement to current IAEA safeguards to close the gaps noted above in the global non-proliferation and nuclear disarmament regime. We have employed the following criteria to guide the design of an INFCA:

- The INFCA must be able to fill the international security gap arising from the NPT’s legal right of withdrawal.
- INFCA’s mission would be achieved by endowing the Association with the minimum powers needed to guarantee exclusively peaceful use of civil nuclear fuel cycle facilities for the entire period of their construction, operation, and decommissioning.
- The INFCA control regime should be universally applied to all civil enrichment activities (and could be expanded to include other sensitive fuel cycle activities, e.g., reprocessing)—in weapon- and non-weapon states alike. INFCA would meet this objective principally by ensuring that all such activities occur with “Internationally Secured Leased Areas” (ISLAs) within which INFCA would exercise certain specified privileges and immunities, pursuant to an irrevocable lease that would terminate only upon final decommissioning of the facility.

- Any country joining the INFCA as a supplier and/or consumer of civil nuclear fuel services to or from the global market should be required to undertake binding long-term contractual and protocol obligations not to establish, operate, supply, or purchase services from enrichment or reprocessing facilities unless these are located within an INFCA-ISLA. In other words, these arrangements would require rigid adherence to an “either-you’re-in-or-you’re-out” principle for accessing the legitimate commercial fuel services marketplace.
- The ISLA contract with a member nation should stipulate that the consequence of violating these contractual terms would be the immediate shutdown of the fuel-cycle facilities located within the ISLA and suspension of the nation’s membership in INFCA.
- In accord with Article IV of the NPT, the regime should be completely non-discriminatory in its application of safeguards and security requirements. In weapons and non-weapons states alike, there would be one universal set of technically adequate standards for nuclear material accountancy, frequency of inspections, portal-perimeter monitoring, physical security, and the like, with INFCA afforded unfettered discretion to upgrade particular controls—such as anti-intrusion defenses—at particular sites as the evolving needs of its non-proliferation assurance mission dictate.
- In accord with Article III of the NPT, the proposed improvements should complement and reinforce the role and effectiveness of the IAEA’s international safeguards system.
- The proposed improvements should not impede the normal functioning of the international commercial marketplace for nuclear fuel services.
- Existing ownership and management arrangements for currently operating bona-fide commercial facilities should be disturbed as little as possible.
- Primary responsibility for safe operations and environmental compliance should rest with the operating company and a member nation’s relevant regulatory authorities.
- The cost of INFCA operations should be considered an inherent cost of continuing to exploit nuclear energy for peaceful purposes, and entirely recovered in the cost of nuclear fuel through a modest tariff on enrichment services (SWU’s).

With these criteria in mind, we believe the best way forward is to ensure the irreversible peaceful use of isotopic enrichment facilities—followed by other sensitive fuel cycle facilities—by establishing an administratively independent international association that would acquire, on behalf of all its member states, long-term contractual lease-rights over the geographic sites where uranium enrichment activities are conducted, and these lease rights would endure for the entire life cycle of the facilities at the site, including the period of their decommissioning. This arrangement erects a significant barrier against using a plant originally constructed for peaceful civil purposes to support production of nuclear weapons.