

## THE IAEA LOW ENRICHED URANIUM BANK IN KAZAKHSTAN

by Tariq Rauf

**ASTANA: 29 August 2017:** On Tuesday afternoon, 29<sup>th</sup> August 2017, the International Atomic Energy Agency (IAEA) and [Kazakhstan](#) will formally [inaugurate](#) a [Low Enriched Uranium \(LEU\) Bank](#) located at the Ulba Metallurgical Plant at Öskemen (formerly Ust Kamenogorsk).

This event will mark an important milestone in the long march for the IAEA set up an IAEA owned and operated nuclear fuel bank as envisaged in the 1957 IAEA Statute. This initiative was proposed in September 2006 by the Washington, DC-based [Nuclear Threat Initiative](#) (NTI) which offered US\$50 million to the IAEA, provided by global investor Warren Buffet, to set up an [IAEA LEU Bank](#) by raising an additional \$100 million. By early 2009, the IAEA had accomplished the goal of getting [funding support](#) from the European Union (€50 million), Kuwait (\$10 million), Norway (\$5 million), United Arab Emirates (\$10 million) and the United States of America (\$50 million). Kazakhstan was the only country to offer to host the IAEA LEU Bank on its territory and pledged nearly \$500,000 for the project.

**Background:** The [Baruch Plan](#) of 1946 eerily warned that “*Behind the black portent of the new atomic age lies a hope, which seized upon with faith can work our salvation... Science has torn from nature a secret so vast in its potentialities that our minds cower from the terror it creates. Yet terror is not enough to inhibit the use of the atomic bomb. The terror created by weapons has never stopped man from employing them.*” Baruch envisioned an internationalization of the nuclear fuel cycle that was ahead of its time.

The original concept of “[Atoms for Peace](#)” in 1953 that called for the establishment of the IAEA also included the receipt, custody and supply of nuclear fuel as well as the acquisition and establishment of facilities, plants and equipment for the enrichment or fabrication of nuclear fuel as some of the principal functions of such an organization. These principles were included in the Statute of the Agency, but it was not until the 47th regular session of the [IAEA General Conference in 2003](#) that serious thinking in the contemporary context was devoted to this matter. At the General Conference, [IAEA Director General](#) Mohamed ElBaradei elaborated a [new approach](#) to the sensitive elements of the nuclear fuel cycle – uranium enrichment and plutonium separation. [ElBaradei](#) called for a creation of a [new framework](#) for nuclear energy to [assure supply](#) of nuclear fuel for civilian uses while maintaining flexibility in nuclear fuel cycle choices and options for the Agency’s Member States. Between 2004 and 2008, some [twelve different proposals](#) were advanced including assurances of supply, multilateral enrichment [centres](#) and in international nuclear fuel cycle [centres](#).

### **Nuclear Threat Initiative Offer**

On the eve of the IAEA [General Conference in September 2006](#), the Co-Chairs of the Washington-based Nuclear Threat Initiative (NTI), former US Senator Sam Nunn and Ted Turner, offered the IAEA \$50 million to be provided to the IAEA by Warren

Buffet to help create an IAEA owned and operated [LEU](#) Bank on the proviso that the IAEA raised \$100 million for that purpose.

Another major breakthrough came on [6 April 2009](#) when the [President of Kazakhstan, Nursultan Nazarbayev](#), announced that Kazakhstan would provide a location to host the IAEA LEU Bank. This commitment was reconfirmed on 28 December 2009 through a letter from the Secretary of State and Minister of Foreign Affairs, [Kanat Saudabayev](#).

By the summer of 2009, the IAEA had received both funds and pledges in excess of \$100 million, thus meeting the requirements of the NTI offer. Subsequently, on [3 December 2010](#), the IAEA Board of Governors [approved](#) the establishment by the IAEA of an LEU Bank. The [IAEA Board](#) also [delegated the authority](#) to the IAEA Director General to supply LEU from the Bank to any IAEA Member State, as a [mechanism of last resort](#), which suffers a disruption of supply of LEU from the commercial market in nuclear fuel. To be able to receive LEU from the Bank, an IAEA Member State experiencing a supply disruption, would have to meet the following [criteria](#) that were [approved by the Board](#) in December 2010: (a) the supply of LEU to a nuclear power plant is disrupted; (b) the State is unable to procure LEU from the commercial market, State-to-State arrangements, or by other such arrangements; (c) the State has in force a comprehensive safeguards agreement with the IAEA and remains in compliance with this agreement; and (d) the State has concluded a supply agreement with the IAEA for the LEU and has paid in advance the full cost of the LEU to the IAEA.

**[IAEA LEU Bank](#):** The [IAEA LEU Bank](#) will hold some [90 tonnes of LEU](#) that would be sufficient for one full core reload of a 1000 MW(e) nuclear power reactor, or three annual reloads for such a reactor. In order to meet this requirement, the LEU will be at [three levels of enrichment](#), roughly 4.95%, 3.20% and 1.60%. This will enable the IAEA to supply LEU at an [enrichment level](#) suitable for use in light-water power reactors, which usually need LEU at an enrichment level between 2.5% and 3.5%. In accordance with standard nuclear industry practice, the LEU will be stored in [30B steel cylinders](#), which are 30 inches in diameter, have a capacity of about 62kg of uranium enriched to 4% (the 30B cylinder is certified to contain a maximum net weight of 2,277 kg UF<sub>6</sub> (1,540 kg U). As LEU does not deteriorate it can be safely stored over the medium- to long-term. LEU is a white-grey waxy solid during storage and transport. LEU is not nuclear waste, and no waste generated by storing it. It does not have any adverse environmental impact when properly stored in certified 30B cylinders.



A typical 30B cylinder

**IAEA LEU free of supplier State “flag”:** It has always been recognized by the IAEA Secretariat that in order for the IAEA LEU Bank to provide a credible assurance of supply, the nuclear material acquired by the Agency should *not* require the consent of the supplier State for the Agency to provide nuclear material to a Member State in accordance with the criteria approved by the Board relating to assurance of supply. Accordingly, in 2009, the Director General stated, inter alia, that the Agency would purchase the LEU using its standard procedures for open tender from vendors willing and able to provide LEU to the Agency free of conditions that conflict with the purpose of the establishment of the IAEA LEU bank.

The conditions (“[flag](#)”) required by the IAEA to be accepted by a Member State requesting LEU from the IAEA LEU Bank are much more stringent and comprehensive than any [national export controls](#) and the guidelines of the [Nuclear Suppliers Group](#). And, the Agency must only buy LEU from sources that will accept the Agency’s “[flag](#)” and will not insist on their own national flag. Furthermore, the LEU acquired for the IAEA LEU Bank would need to be free of any previous unresolved commercial disputes or other burdens that could in any way impair or affect the purposes of the IAEA LEU Bank

As the LEU purchased by the IAEA for the LEU Bank [cannot be subject to any export control or end use restrictions](#) by the producer or seller of the LEU, but shall be subject exclusively to the [criteria](#) approved by the IAEA Board of Governors in [December 2010](#) as noted above; the IAEA LEU Bank shall be in a position to supply LEU to eligible IAEA Member States against payment free of any Member State supplier conditions and thus shall provide the [highest independent level of assurance](#) of supply under the aegis of the IAEA.

In May 2011, the IAEA issued a call to Member States for [Expressions of Interest to Host the IAEA LEU Bank](#). Among the some 160 Member States of the IAEA in 2011, it was only Kazakhstan that responded with a bid. The IAEA carried out a technical mission in fall 2011 to assess the suitability of the [Ulba Metallurgical Plant \(UMP\)](#) at Öskemen in northern Kazakhstan, to be a host location for the IAEA LEU Bank. In December 2011, the IAEA communicated to the Government of Kazakhstan that the Agency had selected UMP as the location of the IAEA LEU Bank as it met the required criteria set out by the IAEA subject to further improvements in nuclear safety and nuclear security at the selected building at [UMP](#).



Source: <http://www.worldclimateguide.co.uk/climateguides/kazakhstan/shymkent.php>

The IAEA accepted UMP as the host location because it is a facility duly licensed by the Government of Kazakhstan through the Committee on Atomic Energy (formerly the Kazakhstan Atomic Energy Agency) to handle enriched uranium. Even though the LEU in the IAEA LEU will be the property of the IAEA, nonetheless the LEU shall be subject to verification by the IAEA as a separate nuclear material balance area under the framework of [Kazakhstan's comprehensive safeguards agreement](#) and its [additional protocol](#).



Source: <http://www.ulba.kz/en/>

Negotiations between the IAEA and Kazakhstan on a “[Host State Agreement](#)” (HSA) governing the establishment and operation of the IAEA LEU Bank started in December 2011 and were finalized only in January 2015. The draft HSA was formally approved by [Kazakhstan](#) in May. The IAEA Board of Governors approved the agreement at its regular meeting in June. The [HSA](#) was signed by the designated representatives of Kazakhstan and the IAEA in Astana on 27 August 2015.

The [Host State Agreement](#) consists of nineteen articles. It defines the IAEA LEU Bank as “the physical stock of IAEA LEU located at the IAEA LEU Storage Facility of up to a maximum of 60 (sixty) full 30B cylinders”. Kazakhstan will lease the storage facility at UMP to the IAEA for a token charge of €1 (one) annually. Kazakhstan will cover costs for the implementation of safeguards in connection with the IAEA LEU Bank. The IAEA LEU Bank shall be the property and under the jurisdiction and control of the IAEA. The Bank shall be held inviolable and technical staff of UMP will have authority to enter IAEA LEU Bank without advance IAEA permission only in the event of an emergency, hazard or threat, requiring urgent remedial action. Emergency preparedness and response, as well as nuclear safety, nuclear security and safeguards, shall remain the responsibility of Kazakhstan. The IAEA LEU Storage Facility shall, for the purpose of application of IAEA safeguards, be established by Kazakhstan as a facility (MBA) separate from the nuclear material facilities located at UMP. The IAEA LEU Bank shall be at all times protected against natural and other hazards, unauthorized removal or diversion, damage or destruction, sabotage and forcible seizure, by Kazakhstan authorities. Civil liability for nuclear damage shall be governed by the [Protocol to Amend the Vienna Convention on Civil Liability for Nuclear Damage](#). For the purpose of the Protocol, Kazakhstan shall be the Installation State in relation to the IAEA LEU Storage Facility, and the Facility Operator shall be the Operator of the IAEA LEU Storage Facility (i.e., UMP). The HSA shall remain in force for ten years and shall be renewed automatically for subsequent ten-year periods, unless decided otherwise by either party.

**Kazakhstan's** contribution to the establishment of the IAEA LEU Bank is crucial as it is the only country in the world that has agreed to provide a host location and

facility. Kazakhstan will cover the costs for nuclear safety, nuclear security and safeguards in connection with the IAEA LEU Bank. In addition to these in-kind contributions, Kazakhstan also has made a financial contribution of \$400,000. With the IAEA LEU Bank being inaugurated on [29 August 2017](#) in Kazakhstan, the long march to establish an IAEA owned and administered stock of nuclear material will reach its destination after more than six decades overcoming many political and technical obstacles along the way.

**Assurance of Supply:** Assurance of supply mechanisms have two co-equal objectives. They are designed to facilitate the continuing and future use of nuclear energy in IAEA Member States as well as to strengthen the nuclear non-proliferation regime by offering alternatives to the establishment of new enrichment facilities. However, assurance of supply mechanisms do *not* seek to limit in any way the nuclear fuel cycle options of IAEA Member States. The rights of States under the [IAEA Statute](#) and the [Treaty on the Non-Proliferation of Nuclear Weapons](#) (NPT), including establishing or expanding their own production capacity in the civilian nuclear fuel cycle under IAEA safeguards, would remain fully intact and would not in any way be compromised or diminished by the establishment of assurance of supply mechanisms. In other words, having the right to receive LEU from the Bank or the IAEA LEU Reserve (in the Russian Federation) would not require giving up the right to establish or further develop a civilian national fuel cycle for peaceful uses under IAEA safeguards nor have any adverse impact on it. These mechanisms for assurance of supply support the inalienable rights for peaceful uses of nuclear energy that exist at present under the IAEA Statute and the NPT.

The IAEA LEU Bank, along with the [IAEA LEU Reserve](#), consisting of 120 tonnes of LEU, set up in March 2010 (at the Siberian Electrochemical Combine at [Angarsk](#) in the Russian Federation), the United Kingdom's (Government-to-Government) [Nuclear Fuel Assurance](#) (March 2011), and the United States' owned [American Assured Fuel Supply \(AFS\)](#) consisting of some 230 tonnes of LEU, will consolidate a new framework for the utilization of nuclear energy for peaceful purposes under IAEA safeguards. These assurance of supply mechanisms will contribute to addressing any potential vulnerabilities in the security of supply of nuclear fuel for nuclear power programmes, while reducing possible nuclear proliferation risks of new national enrichment capabilities. In the end, confidence regarding minimization of the possible proliferation risks of the sensitive parts of the nuclear fuel cycle can come only through the multilateralization of *all* uranium enrichment and plutonium separation facilities, supplemented by a multilateral, verifiable, global treaty in force prohibiting the production and stockpiling of weapon-usable nuclear material.

Finally, it is increasingly clear that the future of nuclear energy lies in enhanced non-proliferation, security and safety. Nuclear fuel banks, multilateral enrichment centres, and assurances of supply will remain key to the continued reliance and future expansion of nuclear energy. In this regard, results-oriented open and transparent discussions are vital and the IAEA remains the logical forum for Atoms for Peace in the 21st century.



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*Tariq Rauf presently is working in Vienna on bringing the CTBT into force; he was the Director of SIPRI's Disarmament, Arms Control and Non-Proliferation Programme (2014-2017); previously, he was Head of Verification and Security Policy Coordination at the Office reporting to the Director General of the International Atomic Energy Agency (2002-2011), he also was the Coordinator of Multilateral Approaches to the Nuclear Fuel Cycle and the IAEA LEU Bank (2003-2012) – in this capacity he led the IAEA team that secured the funding and Board of Governors approval for the establishment of an IAEA LEU Bank and he also led the IAEA Mission to Kazakhstan that selected the Ulba Metallurgical Plant as the location for the Bank, and was responsible at the IAEA for the establishment of the IAEA LEU Reserve at Angarsk (Russian Federation) and the UK Nuclear Fuel Assurance.*