

NucWeapons and Nuclndastry, Historical Waste- Kazakhstany case, review

Kanat Baigarin

Nazarbayev University,
Nur – Sultan, Kazakhstan



The Origin and Development of Nonproliferation and Arms Control



- After the world witnessed the unimaginable destruction caused by the first nuclear attack, it became clear that nuclear weapons would drastically alter global power and security.
- Nuclear capability became synonymous with state identity, global respect, and pride. The United States and Russia raced to create the largest and most modern nuclear arsenals.
- As the arsenals of these two countries rapidly increased, reaching astronomical levels at the height of the Cold War, it was apparent that legal and political controls were needed to prevent the potentially destructive consequences of global proliferation and to establish limits on arsenal levels.
- A complex international nonproliferation regime, consisting of bilateral and multilateral legal and political agreements and international bodies, was created.
- Today, with the threats of terrorism and nuclear acquisition by rogue states, nonproliferation and arms control efforts remain crucial to international security.

The spread of nuclear weapons: Dates of first nuclear test



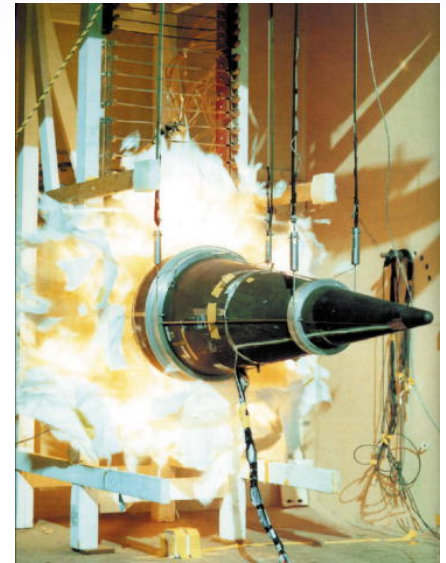
1954 Bravo test

- United States – 1945
- Soviet Union – 1949
- United Kingdom – 1952
- France – 1960
- China – 1964
- Israel – 1st assembled 1967?; suspected test 1979
- India – 1974 (“peaceful nuclear explosion”)/1998
- Pakistan – 1998
- North Korea – 2006/2009/2016

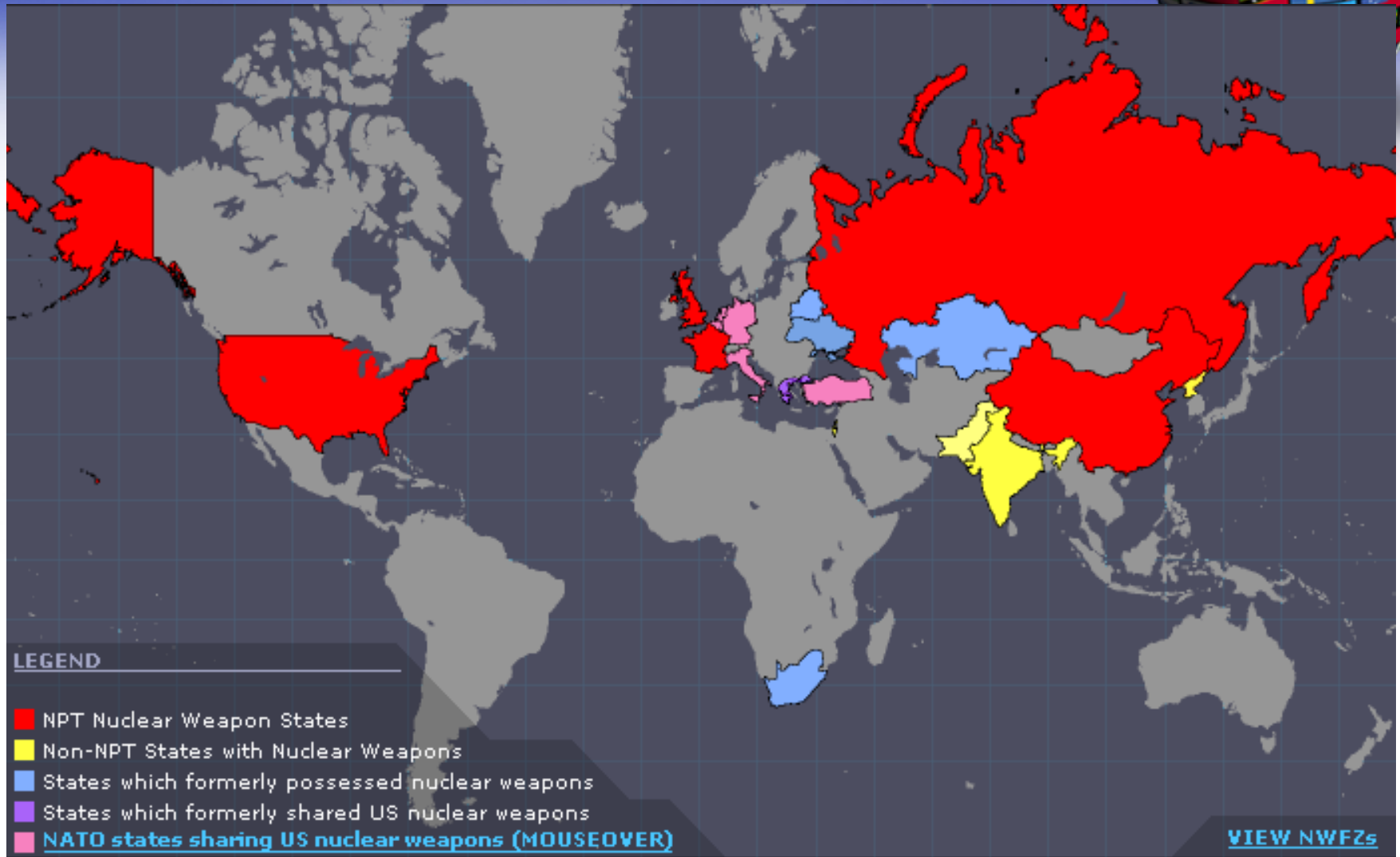
How many weapons are there?



- We count warheads, not delivery vehicles
 - Complication: secrecy (though US, UK, RF becoming more transparent)
 - Complication: only deployed? All operational? Or also those in storage? Including those awaiting dismantlement?
- The most the world ever had:
1986: about 70,300
- How many there are today (2016):
about 15,350
- Another hopeful sign?
numbers going down ...
but will cuts go fast enough & far enough?



Where are the nuclear weapons?



Other states with nuclear weapons



- **Israel:** “Opaque nuclear proliferation.” By late 1966, had completed R&D on first nuclear device BUT did not openly test nuclear weapons or declare itself a nuclear weapon state; alleged test series off South Africa coast in 1979; never joined NPT; estimated 75-200 warheads
- **India:** “peaceful nuclear test” in 1974, series of weapons tests in 1998; never joined NPT; estimated 80-100 warheads
- **Pakistan:** nuclear tests 2 weeks after India in 1998; never joined NPT; estimated 90-110 warheads;
- **North Korea:** withdrew from NPT in 2003 (according to Pyongyang); 1st tested nuclear device 2006 (likely a “fizzle”), second test in 2009; and latest 2016, estimated 4-18 warheads (most estimate less than 10)

Without nuclear weapons:

Kazakhstan (when member of USSR) before:

#4 nuclear warheads worldwide, and almost 500 tests.

Four states gave up nuclear weapons



- **South Africa**
 - Built 6 nuclear weapons in 1980s
 - Dismantled them and joined NPT in 1991
- Three former USSR (“**Soviet**”) republics
 - **Kazakhstan, Ukraine and Belarus** “inherited” former Soviet nuclear weapons
 - Never had operational control
 - All 3 agreed to have weapons removed and joined NPT as non-nuclear-weapon states (NNWS) in 1993 (Belarus) and 1994 (Kazakhstan and Ukraine)

The NPT in context...



Global: Nuclear-Weapon-Free Zones (NWFZ)



Five Regional Nuclear Weapon Free Zones (NWFZs)

1) Treaty of Tlatelolco (*Latin America and the Caribbean*): 1967

- Pre-dates NPT!

2) Treaty of Rarotonga (*South Pacific*): 1985

3) Treaty of Bangkok (*Southeast Asia*): 1995

4) Treaty of Pelindaba (*Africa*): 1996

5) Treaty of Semipalatinsk (*Central Asia*): 2006

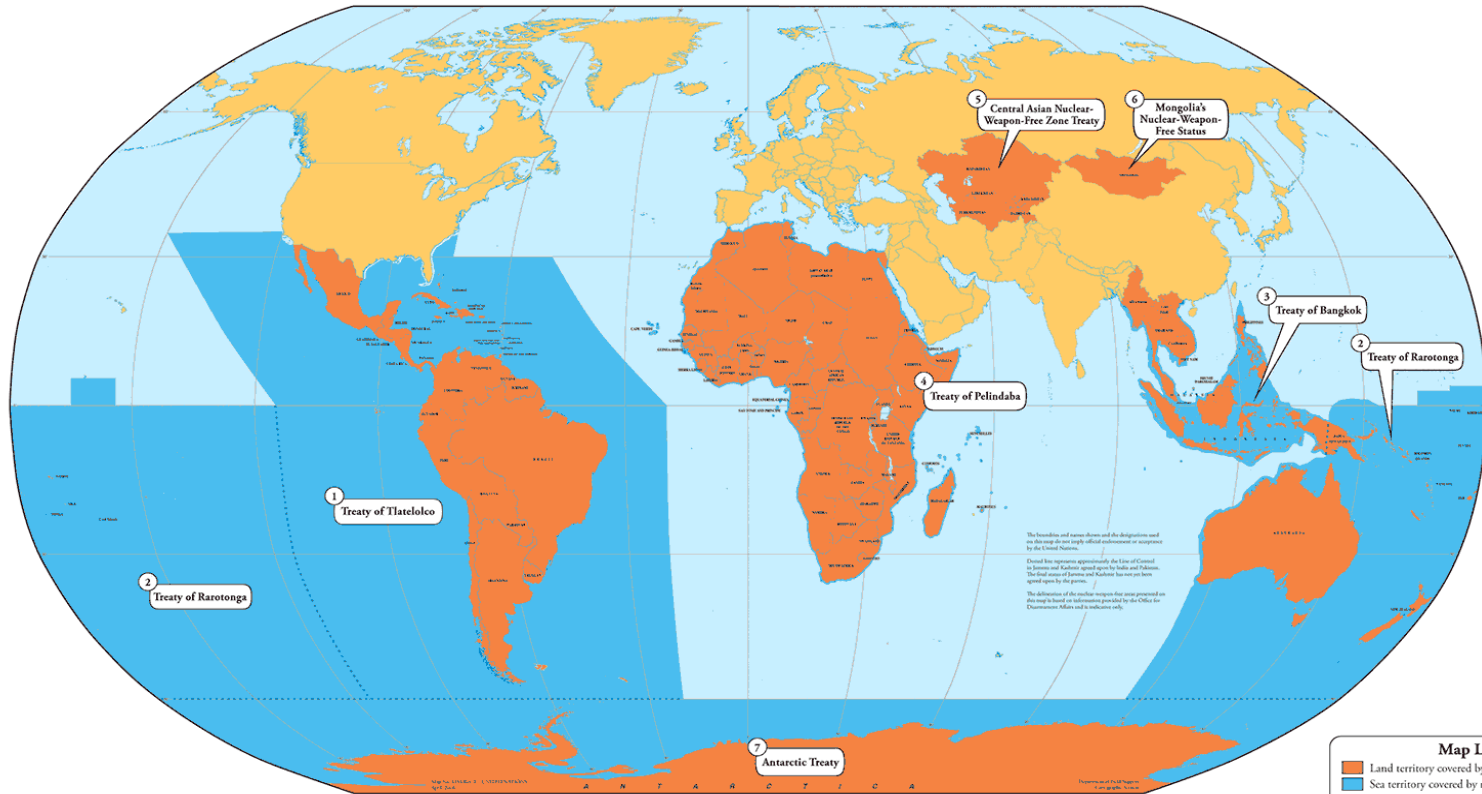
- Total of 89 states party
- Most contain Protocol requiring negative security assurances from NWS
- Only Tlatelolco ratified by all 5; is only one U.S. has currently ratified
- Other NWFZs: Mongolia self-declared nuclear-weapon-free status plus Antarctic Treaty, Outer Space Treaty, Moon Agreement, Seabed Treaty

Map of Nuclear-Weapons-Free Zones



NUCLEAR-WEAPON-FREE AREAS

Demarcation of nuclear-weapon-free zones, nuclear-weapon-free status and nuclear-weapon-free geographical regions



TREATIES ESTABLISHING NUCLEAR-WEAPON-FREE AREAS

Nuclear-weapon-free zones

- ① The 1967 Treaty for the Prohibition of Nuclear Weapons in Latin America and the Caribbean
- ② The 1985 South Pacific Nuclear-Free Zone Treaty
- ③ The 1995 Treaty on the South-East Asia Nuclear-Weapon-Free Zone
- ④ The 1996 African Nuclear-Weapon-Free Zone Treaty
- ⑤ The 2006 Treaty on a Nuclear-Weapon-Free Zone in Central Asia

Nuclear-weapon-free status

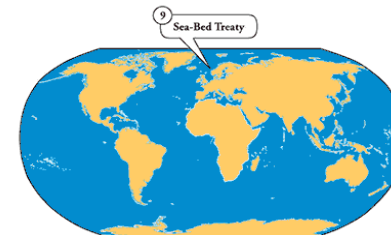
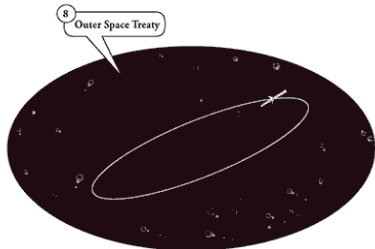
- ⑥ In 1992, Mongolia declared its nuclear-weapon-free status, which is internationally recognized and prohibits, inter alia, the acquisition, possession, placement, testing and use of nuclear weapons on its territory.

Nuclear-weapon-free geographical regions

- ⑦ The 1959 Antarctic Treaty, inter alia, prohibits any measures of military nature on the continent of Antarctica, including any testing of nuclear weapons.
- ⑧ The 1967 Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, inter alia, prohibits placing nuclear weapons in orbit around Earth, installing or testing these weapons on the Moon and other celestial bodies as well as stationing these weapons in outer space in any other manner.
- ⑨ The 1971 Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea-Bed and the Ocean Floor and in the Subsoil Thereof, inter alia, prohibits the emplacement of nuclear weapons on the bottom of the ocean and in the subsoil thereof.
As of 2007, the above nine treaties are at different stages with regard to their signature, ratification and entry into force, as well as with regard to the signature and ratification of their attached protocols requesting assurances from the nuclear-weapon States.

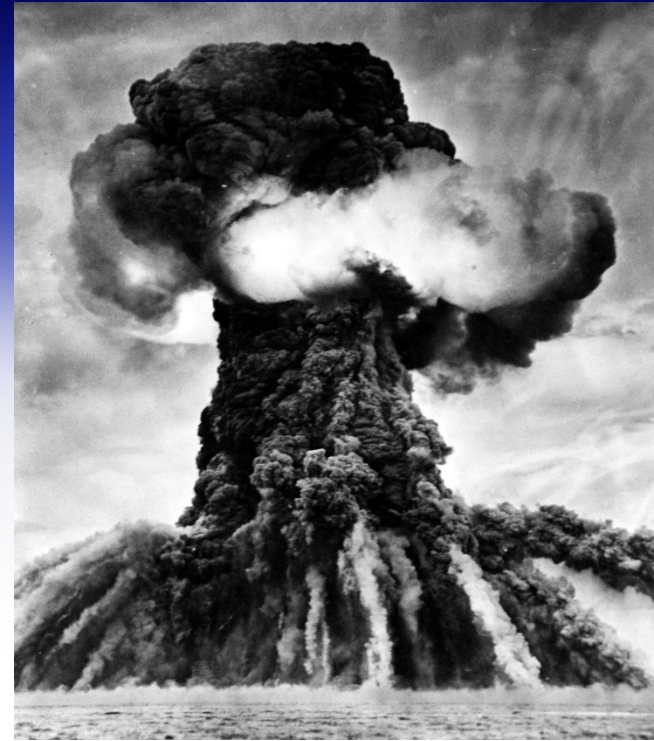
Map Legend

- Land territory covered by nuclear-weapon-free treaties
- Sea territory covered by nuclear-weapon-free treaties

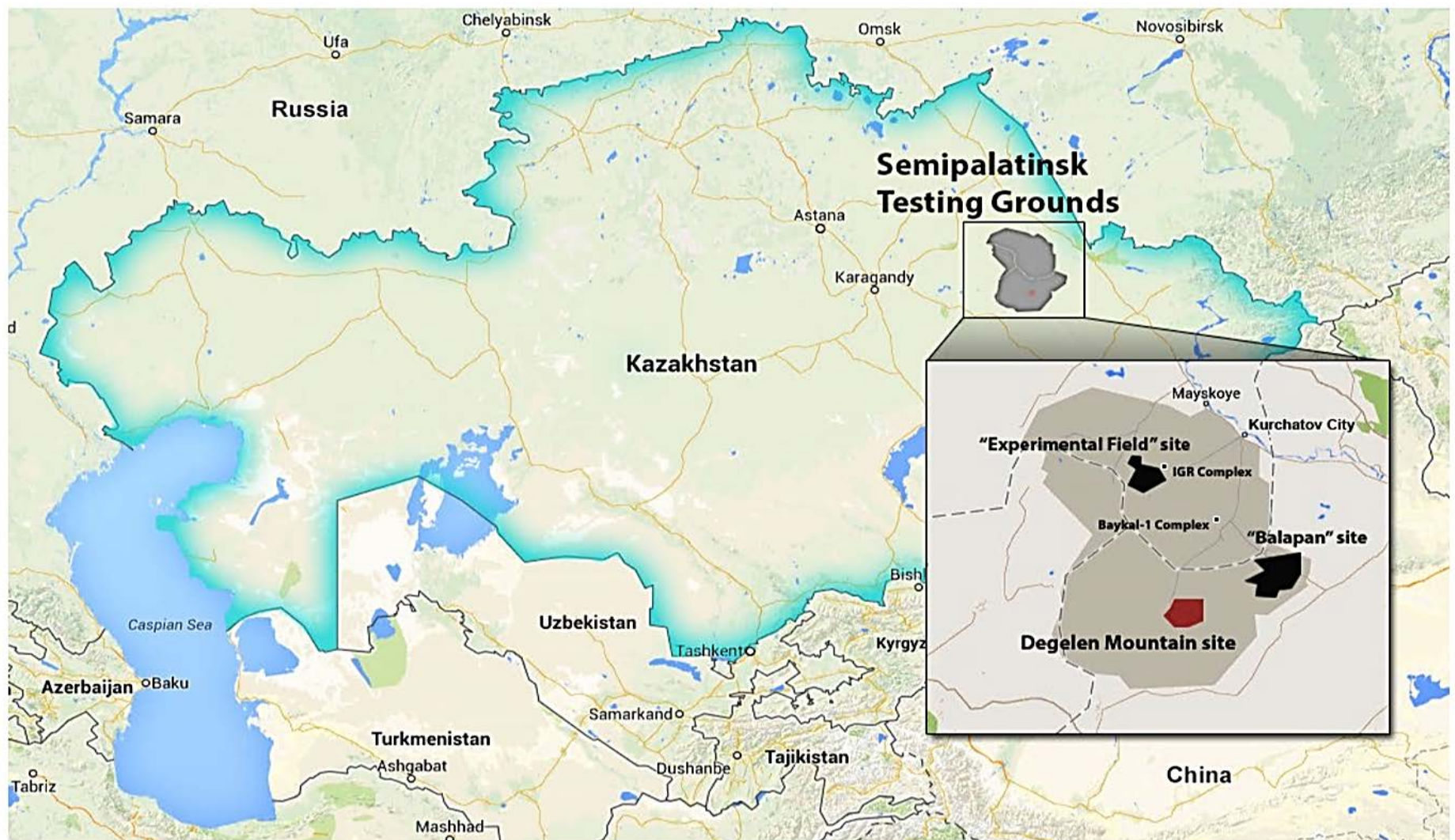


Dark legacy of testing side

- The Soviet Union conducted **456 nuclear tests** at Semipalatinsk from 1949 until 1989 with little regard for their effect on the local people or environment.
- The full impact of radiation exposure was hidden for many years by Soviet authorities and has only come to light since the test site closed in 1991.



Map of Soviet test site at Semipalatinsk region in Kazakhstan



Source: *Plutonium Mountain Inside the 17-year mission to secure a dangerous legacy of Soviet nuclear testing*, by Eben Harrell & David E. Hoffman, August 2013.

Current Status of Nuclear Power Engineering

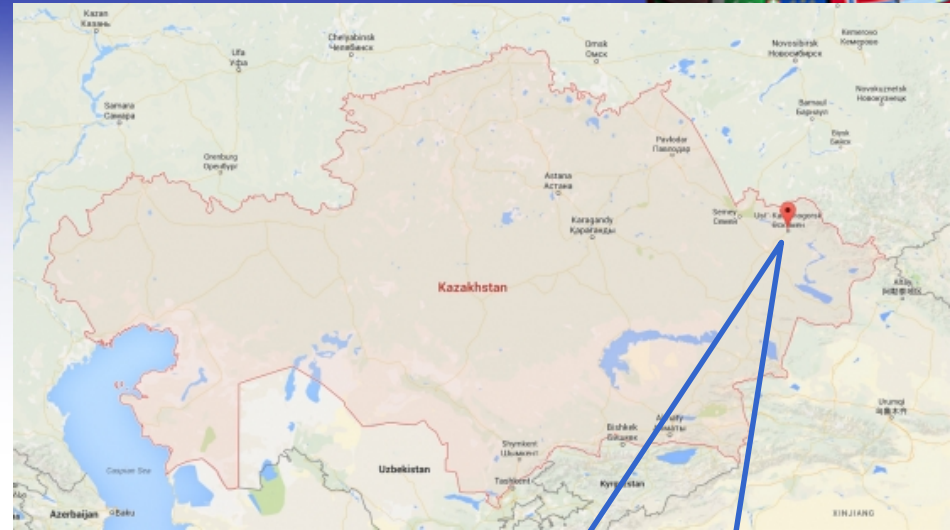


- Significant quantity of explored uranium reserves, which is basic power resource in total balance of country (19 % of world sources and takes 4th place in the world).
- Advanced uranium-mining and processing industries on production of uranium concentrates, uranium dioxide and fuel pellets for power reactors. High-qualified personnel with experience of BN-350 reactor operation and decommissioning (National Nuclear Company "Kazatomprom").
- Infrastructure for carrying-out of fundamental and applied researches in the area of nuclear power engineering and nuclear physics, including the substantiation of nuclear power safety and tests of fuel and core elements for power reactors. High-qualified specialists with experience of research reactors operation (National Nuclear Center of RK).
- Legal and regulatory framework that controls main aspects of activities on peaceful uses of atomic energy and conforms to IAEA requirements.

The IAEA Low Enriched Uranium (LEU) Bank at the Ulba Metallurgical Plant in Ust-Kamenogorsk, Kazakhstan



- Kazakhstan (KZ) has concluded both a Comprehensive Safeguards Agreement and with the IAEA.
- In 2011, KZ offered to host the IAEA LEU Bank in Oskemen in response to the IAEA's request for Expressions of Interest.
- The Host State Agreement between the IAEA and the Government of the Republic of Kazakhstan establishing the IAEA LEU Bank in KZ was approved by the Board of Governors on 11 June 2015 and signed on 27 August 2015.
-
- The storage facility that houses the LEU Bank, designed and constructed for this purpose, was inaugurated in August 2017.



Source: <https://www.iaea.org/topics/leubank/oskemen-kazakhstan>

Source: <https://www.iaea.org/newscenter/pressreleases/iaea-purchases-low-enriched-uranium-in-milestone-towards-establishment-of-iaea-leu-bank-in-kazakhstan>.