FNCA

Forum for Nuclear Cooperation in Asia

COUNTRY REPORT
of the Republic of Kazakhstan

2017

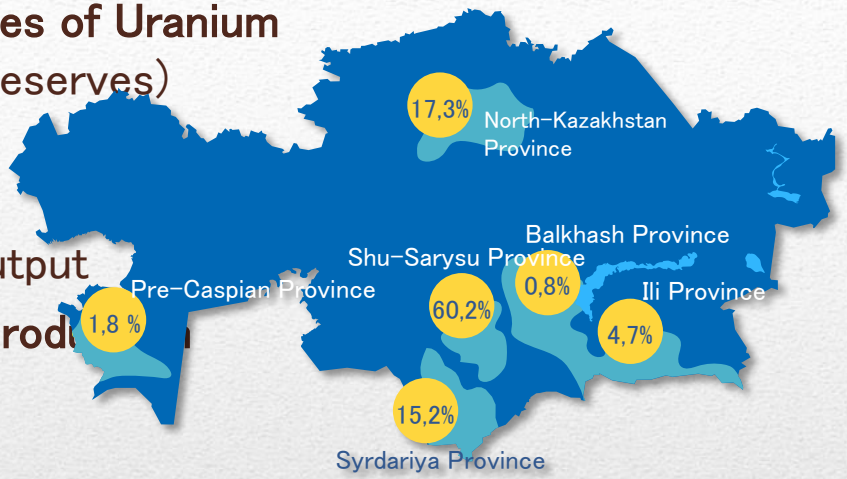
Non-Proliferation and Disarmament

Kazakhstan Priorities

- NUCLEAR NON-PROLIFERATION REGIME ENHANCEMENT
- INHIBITION OF NEW NUCLEAR WEAPO TYPES DEVELOPMENT AND MODERNIZATION
- NUCLEAR RISKS REDUCTION

Uranium Industry and Nuclear Fuel Cycle

- **Kazakhstan possesses considerable resources of Uranium**
  (the 2–nd place in the world, 13 % of world reserves)
- **Uranium Output in Kazakhstan**
  in 2016 composed 24 689 thous. tons
  (the 1–st place in the world, 39 % of world output
- **Kazatomprom NAK JSC operates Uranium prod**
  (subsidiary and joint enterprises)



Kazatomprom NAC JSC performs the operation on creation of vertically integrated complex
of nuclear fuel cycle (Uranium conversion and enrichment, fuel production)

URANIUM CONVERSION *Project with Canada*		Establishment of Joint Uranium Conversion Production together with Cameco company. Feasibility study development: December 2016 – May 2017 CMP – beginning of 2019, commissioning of refinery – in the mid of 2020
URANIUM ENRICHMENT *Project with Russia*	 	Since 2013, CJSO "Uranium Enrichment Center" has access to enrichment services at OJSC "Urals Electrochemical Combine" (Russia) in the volume up to 5 mln. SWU per a year
FA's PRODUCTION *Project with China*		At the UMP, "Ulba–FA" enterprise is established on FA production for NPP in Asian region with production capacity of 200 t. FA per a year

Nuclear Power Development, NPP Construction Plans

Kazakhstan President Orders to choose NPP location and configuration

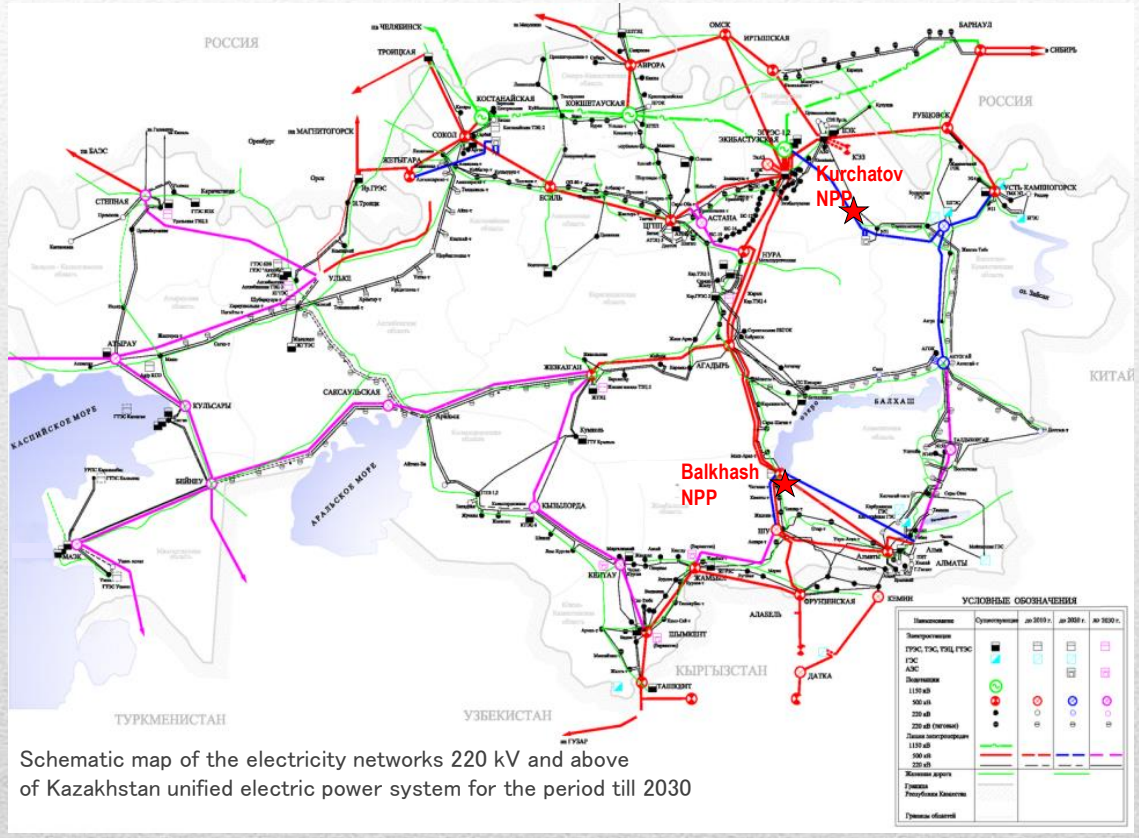
DECREE on MINT RK #132 dated of April 23, 2013

- Establish Working Group and prepare proposal on site determination for Nuclear Power Plant location, its capacity and reactor type, as well as "Road-Map" Project on NPP construction

Governmental regulation about "Commission establishment for proposal making on NPP location and configuration at the territory of Kazakhstan"

- Commission … to introduce agreed proposals concerning NPP location and configuration
  at the RK territory

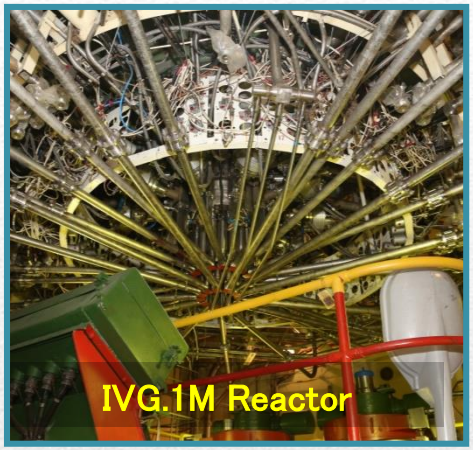
"Kazakhstani Nuclear Power Plant" specialized company was established to develop feasibility study for NPP construction

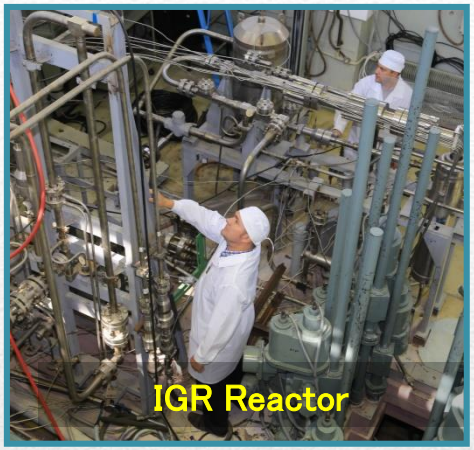


Schematic map of the electricity networks 220 kV and above of Kazakhstan unified electric power system for the period till 2030

Research Reactor Conversion

Fuel conversion with enrichment 36% to 19.75% upon Uranium-235



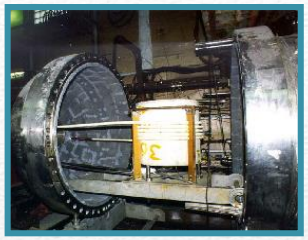


Fuel conversion with enrichment 90% to 19.75% upon Uranium-235 under Contracts with DOE, ANL, Batelle Energy Alliance (USA)
and FSUE "SRI SIA "LUCH" (RF)

IAEA inspectors install seals on TUK-19

Acceptance of VOTK-E Experimental Channels at "Baikal-1" RRC and Graphite Assemblies with Low Enriched Uranium at IGR RRC

Studies to Substantiate the Safety of Reactors


ANGARA test bench


EAGLE test bench

VChG-135 test bench

CORMIT Project (Toshiba, Marubeni, Japan)
Corium and Refractory Materials Interaction Test is preparation and performance of experimental research of core melting interaction with refractory materials of melting under reactor trap protective covering

Fukushima Project (Toshiba, Marubeni, Japan)
Modeling and further study the properties of core melt solidified fragments of NPP Fukushima-1 reactor with the purpose to draw up recommendations on mechanisms structure for solidified fragments reprocessing

EAGLE-3 Project (JAEA, Japan)
Experimental study of cooling processes for molten fuel simulator in the pool with sodium (EAGLE test bench) and study of experimental devices, tested in IGR reactor aimed at solution of key safety problems addressing at mitigation of consequences in result of core melting accident at fast neutron reactor

SAIGA Project (CEA, France)
Performance of reactor tests for ASTRID generation IV reactor core elements using experimental base of NNC RK

MYRRHA (7-th Framework Program EU FP7-Fission-2012)
Experimental justification of thermal fuel reliability of MYRRHA research reactor in transient and emergency modes of operation up to fuel melt

Physical Start-Up of Kazakhstan's Tokamak KTM

- Kazakhstan became the 9-th country in the world, that possesses its own tokamak
- Tokamak KTM is designed to carry out researches and tests of structural materials for the future thermonuclear reactors in energy load modes (up to 20 MW/m^2)

Main Hall of Tokamak KTM

Bernard Bigot, Director General of the ITER Organization and Erlan Batyrbekov, Director General of NNC RK

- The first physical start-up of tokamak KTM was realized on June 9 – on the opening day of the International Exhibition "Astana EXPO-2017"
- On June 11 an Agreement on cooperation with the International Organization on Thermonuclear Power ITER was signed in Astana during Conference "Nuclear Power Sustainable Development Support"

Development of Nuclear and Radiation Technologies

On the basis of the Institute of Nuclear Physics in Almaty:

- New building for radiation sterilization with ILU-10 electron accelerator is put into operation
- Manufacture of Radioisotope Products and Radiopharmaceuticals
- Development of the technologies for the production of radioisotopes without highly enriched uranium use
- "Training Center for Nuclear Safety" is opened for specialists training in area of accounting,

Building of Radiation Sterilization with ILU-10 Accelerator

Radioisotope and Radiopharmaceuticals Production

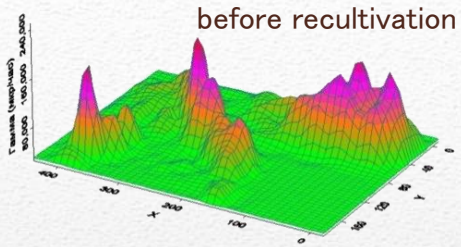
Opening of the Training Center for Nuclear Safety

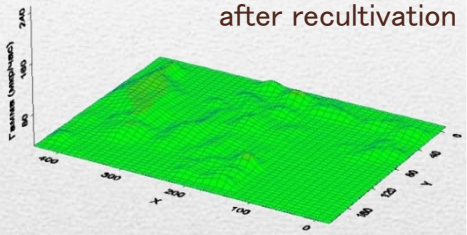
Bringing the Contaminated Areas to a Safe Condition

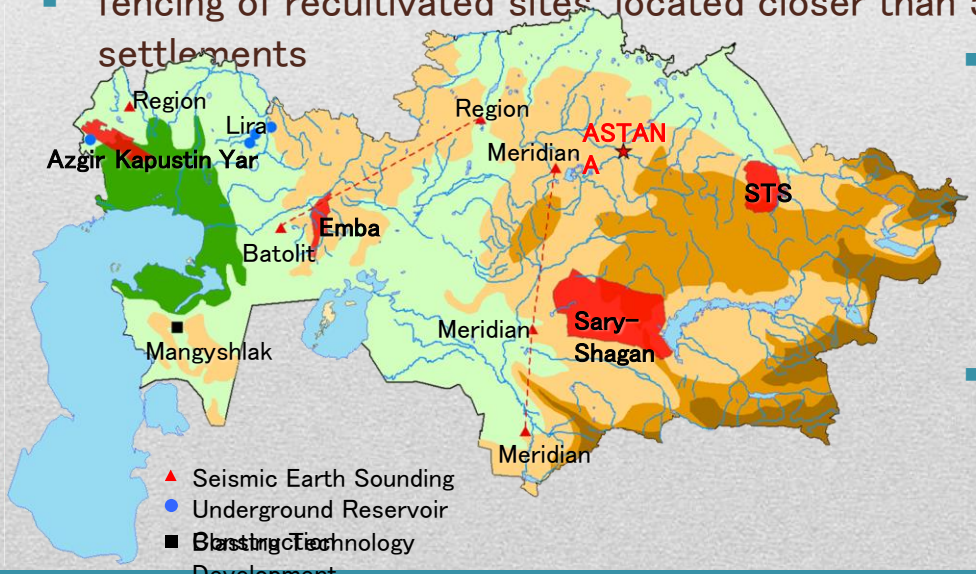
67 sites of uranium mining and geologic exploration are recultivated containing 99% of radioactive wastes

Typical program of rehabilitation measures at the former uranium mines included:

- mine liquidation
- layer–by–layer removal of contaminated soil
- decontamination and construction structures dismantling
- burial of contaminated construction materials and wastes
- leveling of poor ore piles
- piles covering with clean ground
- fencing of recultivated sites, located closer than 5 km away from settlements







- Nuclear explosions (including peaceful ones) were carried out at the territory of Kazakhstan within the period from 1949 to 1989 at Semipalatinsk Test Site, Azgir Test Site, Lira Test Site and others and led to the formation of great quantity of radioactive wastes
- One part of wastes is represented by contaminated soils, the another part is gathered in cavities of underground nuclear explosions

In 2016–17 operations on remediation of "Experimental Field" site were carried out at

THANK YOU
FOR ATTENTION!