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MATERIAL MANAGEMENT

Case of RRC “Kurchatov Institute”

KURCHATOV INSTITUTE

- Russian Research Center in the field of atomic science and technique
- The specific feature of the Institute's activity is a combination of fundamental and applied research.
  - Nuclear physics
  - molecular physics
  - solid state physics
  - plasma physics

http://www.insc.ru/ntd/organizat/kiae.html

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KURCHATOV INSTITUTE
Reactors in operation

- Research reactors (4)
- Water-water power reactors (8)
- Channel reactors (3)
- Marine nuclear power facilities (4)
- High-temperature power engineering and special plants (5)

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Russian Organizations taking part in creating of Regulations and Standards in the Nuclear Energy Industry

- "Hydropress" Pilot Design Bureau
- "VNIPIET" AII-Russian Planning and Design Research and Technological Association
- Research and Design Institute for Power Engineering: RDIPE
- "Atomenergoproekt" State Planning and Design, Research and Survey Institute: "Atomenergoproekt"
- Institute of Physics and Power Engineering: IPPE
- Russian Research Center "Kurchatov Institute": "Kurchatov Institute": RRC "Kurchatov Institute"
- Elektrogorsk Research Center for Nuclear Power Plants Safety
- Experimental Design Bureau For Machine Building: EDMB
- AII-Russian Research Institute for Inorganic Materials named after Academician A.A. Bochvar: ARIIM
- ALL-Russian Research Institute of Technical Physics - Russian Federal Nuclear Center: ARITPh (VNIITF)
- AII-Russian Research Institute of Experimental Physics - Russian Federal Nuclear Center: ARIEPh (VNIIEF)
- Scientific and Engineering Center for Nuclear and Radiation Safety (SEC NRS)

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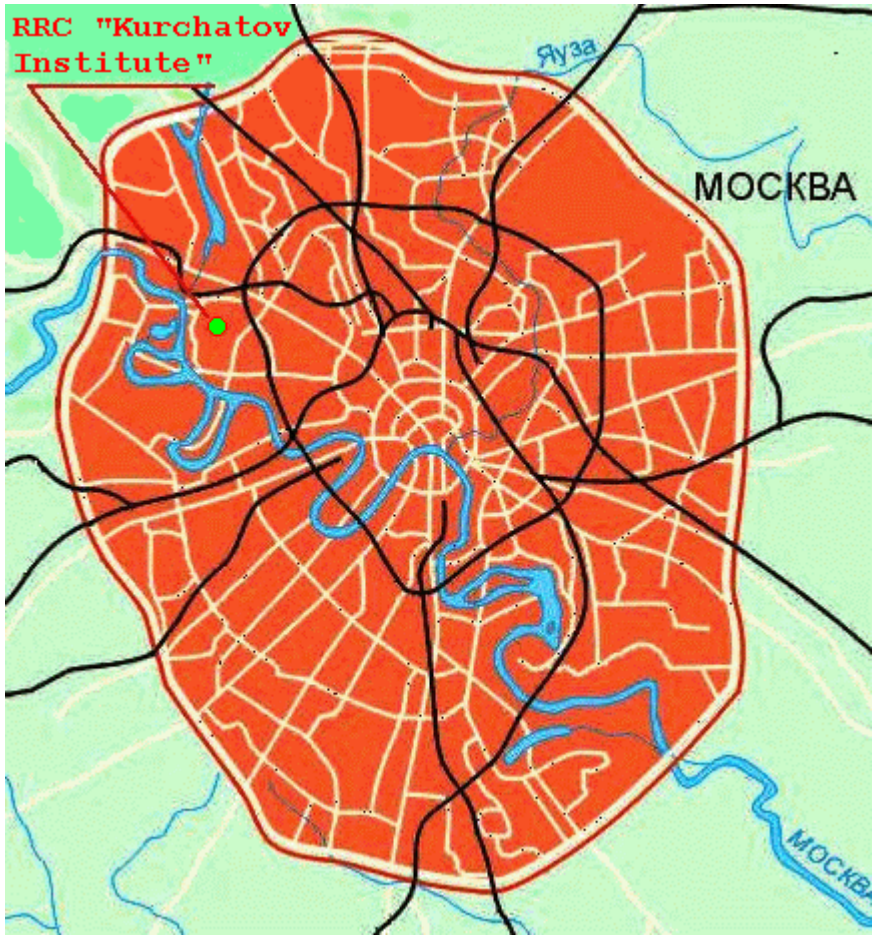
RRC Kurchatov Institute site in Moscow



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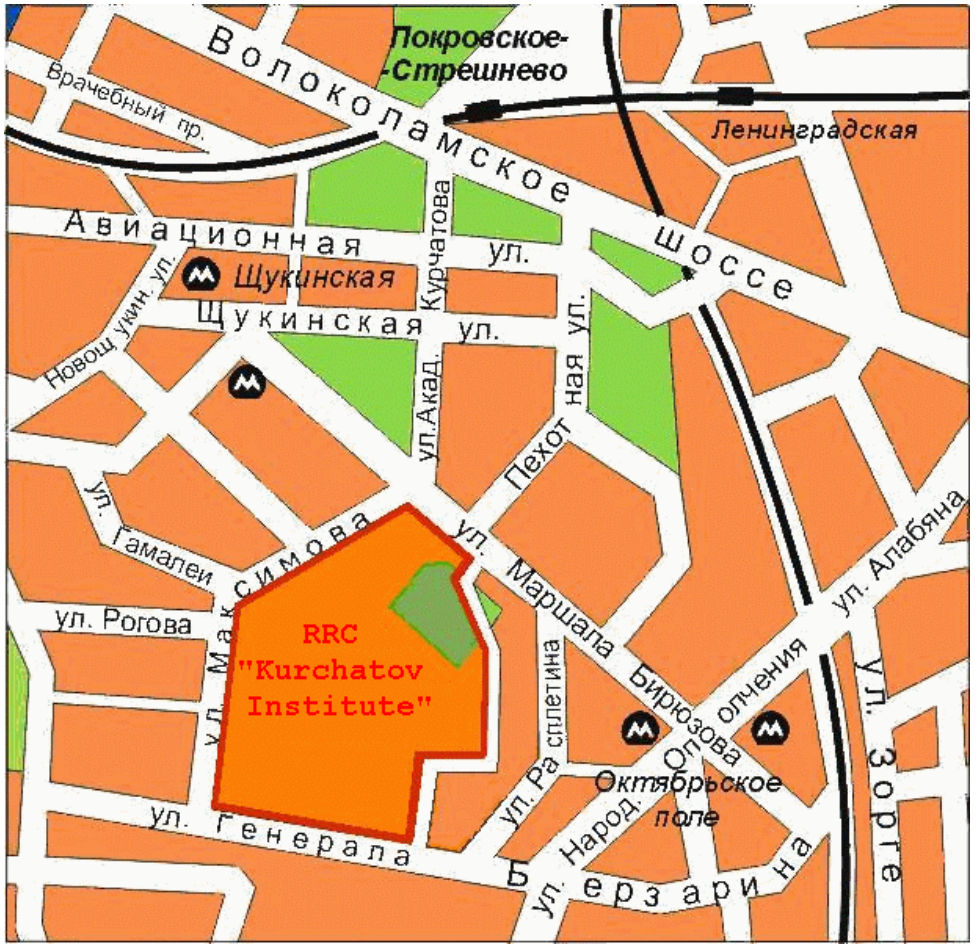
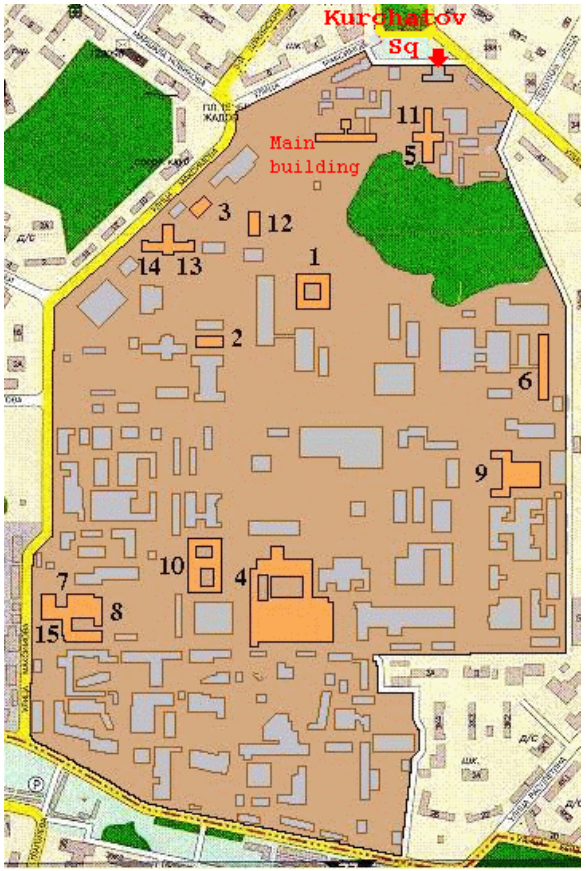
RRC Kurchatov Institute in the district



RRC Kurchatov Institute
Layout diagram of Institutes and complexes



Main building - Centre's management, directorate.

1. Institute of Nuclear Reactors (bldg 158)
2. Institute of Reactor Technologies and Materials (bldg 109)
3. Institute of Safe Nuclear Energy Use (bldg. 76)
4. Institute of Nuclear Fusion (bldg.73)
5. Institute of General and Nuclear Physics (bldg.5)
6. Institute of Superconductivity and Solid State Physics (bldg.137)
7. Institute of Molecular Physics (bldg 21)
8. Institute of Applied Chemical Physics (bldg 103a)
9. Institute of Hydrogen Power and Plasma Technologies (bldg 102)
10. Institute of Information Technologies (bldg 20a)
11. Institute of High Technologies and Experimental Machinery" (bldg 5
12. Scientific and Technological Complex "System Analysis" (bldg 322)
13. Scientific and Technological Complex "Electronics" (bldg.101)
14. Affiliated enterprise "Computer Complex" (bldg 101)

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RRC Kurchatov Institute
SPENT FUEL AND RADIOACTIVE WASTE

- Waste storage facility
  - Waste
    - 1,200 cubic meters (2000MT)
    - Activity: ~-100,000 Ci
  - Spent Fuel
    - approximately 900 spent fuel assemblies (6MT)
    - Activity: 3,000,000 Ci
  - Between 80-90 percent of the five-acre facility is filled
  - The Kurchatov Institute has proposed building a new radwaste storage facility

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RADIATION CHECK AT KURCHATOV INSTITUTE

- Nuclear-related activity at the Kurchatov Institute has not caused harmful changes in the radiation background;
- Radioactive emissions into the atmosphere do not exceed 5 percent of the maximum permitted concentration.
- The background radiation level at the Institute (approximately 10-20 microroentgens/hour) is equal to the average level in Moscow.
- However, the inspection detected several locations at the Institute with levels in excess of the gamma radiation background.
- Measures were taken to neutralize the excessive radiation
- The Kurchatov Institute was ranked second among the six facilities investigated in terms of their environmental "cleanliness" and compliance with radiation safety requirements

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REACTORS: 10, four of which are not operational

Table I: Research Reactors, Kurchatov Institute, Moscow

Unit	Type	Power	Fuel Enrichment	Status
Argus	homogeneous	20kWt	90% HEU	operational
F-1	graphite	24kWt	natural uranium, 2% enriched	operational
Gamma	tank	125kWt	20% - 90% HEU	operational
Gidra	homogeneous	pulsed	90% HEU	operational
IR-8	pool	8-80MWt	90% HEU	operational
MR	tank	40-50MWt	90% HEU	not operational
OR	tank	300kWt	36% HEU	operational
RFT	channel	20MWt	10-90% HEU	not operational
Romashka	homogeneous	40kWt	90% HEU	not operational
VVR-2	tank	3MWt	2-36% HEU	not operational

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REACTOR REMOVAL PROJECT APPROVED BUT NOT FUNDED

- On 28 July 1998, the Russian government approved a proposal to dismantle the research reactors at the Kurchatov Institute.
- The main priorities before 2005 are to remove the three most dangerous reactors: MR, VVR-2
- Plans include removing 3,500-4,000 cubic meters of nuclear waste.
- The cost of dismantling, transport, and clean-up is estimated at approximately $44 million.

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Decommissioning in preparation

- decommissioning of already stopped research reactors MR, WWR-2 and “ROMASHKA”
- liquidation of existing sites of storage of nuclear and radioactive materials
- rehabilitation of these sites

Inventory

- Documentation about construction
- History of the use of the installation
- Physical inventory
- Radiological inventory (*)

(*) The radiological inventory is made difficult because of the multi-purpose use of the installations and the lack of archives

This leads to a non-reproducibility and an non-homogeneity which could require a extended radiological characterisation of the installations

Compromise would be found between the need of characterisation and the radiological exposition of the personal

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Needed to allow Management of Material

- Base for licensing of decommissioning (regulatory aspects)
- Treatment and conditioning facility for waste generated by decommissioning
- Acceptation criteria for eventual temporary storage of conditioned waste
- Installations for temporary storage
- Acceptation criteria for final disposal

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KURCHATOV INSTITUTE

- Eleven Institutes:
  - Institute of Nuclear Reactors (1800 pers.)
  - Institute of Reactors Technology and Material Research (880 pers.)
  - Institute of Nuclear Energy Safety Problems (100 pers.)
  - Institute of Nuclear Fusion (1450 pers.)
  - Institute of General and Nuclear Physics (950 pers.)
  - Institute of Superconductivity and Solid State Physics (400, pers.)
  - Institute of Molecular Physics (500 pers.)
  - Institute of Applied Chemical Physics (200 pers.)
  - Institute of Hydrogen and Energy Plasma Technologies (300 pers.)
  - Institute of Information Technologies (100 pers.)'
  - Information Computer Center (180 pers.).
- Two Science and Technology Complexes:
  - Research and Technological Complex "System Analysis" (100 pers.)
  - Research and Technological Complex "Elektronika" (350 pers.).

Call (*) for an collaboration between EU and Russia

- Sponsoring of the participation of Russian Eudedraf courses
- Organisation of Eundedraf sessions in Russia
- Mixed EU/Candidate States/Russia teams during the phase of preparation of decommissioning in the Candidate States

- EU and Russia have to convince that decommissioning of old installation must become a priority in spite of other social and financial challenges

(*) Personal initiative