ГОСУДАРСТВЕННАЯ КОРПОРАЦИЯ ПО АТОМНОЙ ЭНЕРГИИ «РОСАТОМ»

«Experience of Uranium-Graphite Reactors Decommissioning Using the Safe In-Situ Entombment Approach»

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Goal of the JSC “PDC UGR” Creation

JSC “Pilot & Demonstration Center for Decommissioning of Uranium-Graphite Nuclear Reactors” (JSC “PDC UGR”) **was established in compliance with the Program of Nuclear Industry Development** (paragraph 4.1 of the Plan of Organizational & Technical Measures to Create an **Industry-Wide System for Nuclear and Radiation Hazardous Facilities Decommissioning**) in September, 2010 (State Registration of September 24, 2010) as a daughter company of the JSC “Siberian Group of Chemical Enterprises” (JSC “SGChE”).

In accordance with the Decree by the President of the Russian Federation No.1432 dated October 27, 2011, the JSC “PDC UGR” was included into the list of the legal entities that **have a right to own nuclear installations and nuclear materials.**

On February 14, 2011 the JSC “PDC UGR” was acknowledged as an **organization qualified to operate nuclear facilities** (facilities and complexes with nuclear reactors I-1, EI-2, ADE-3, ADE-4, ADE-5, nuclear material storage facilities and radioactive waste storage facilities).

Goal of the “PDC UGR” Creation

“PDC UGR” Corporate Objectives:
Provision of commercial decommissioning services for the single-type nuclear facilities based on **the standardized technologies** suitable for **distribution at the nuclear industry enterprises** and exporting.

Base for the decommissioning technology development -
2 industrial sites of the Reactor Plant
(5 shut-down uranium-graphite reactors owned by the Enterprise since 2012).

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Legal Basis for EI-2 Uranium-Graphite Reactor Decommissioning

In 2009 management of Rosatom Corporation approved a concept of uranium-graphite reactors decommissioning using the safe in-situ entombment approach.

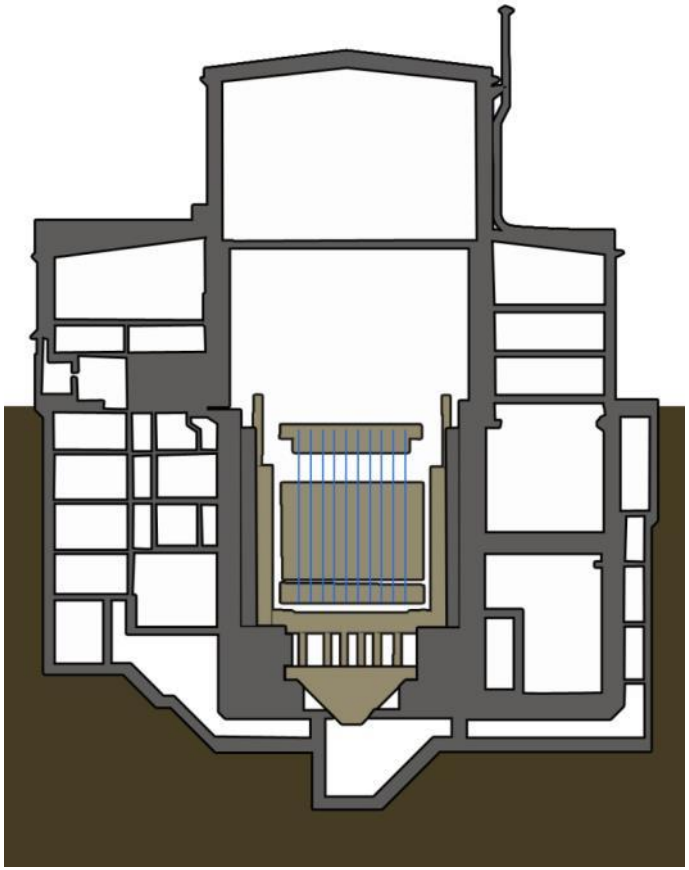
In 2011 a local concept was developed and approved by Rosatom Corporation for decommissioning of the SGChE uranium-graphite reactors using “radiation safe in-situ entombment”.

On July 10, 2011 license GN-04-115-2517 was obtained for the work performance and services provision to utility organizations associated with the preparation for decommissioning and decommissioning of the nuclear facilities as a part of uranium-graphite reactors.

On May 28,2012 design documentation was approved for decommissioning of uranium-graphite reactors ADE-3, ADE-4, ADE-5, I-1, EI-2, sites No.2 & 11 of the Reactor Plant.

On December 05, 2013 license GN-04-106-2824 was obtained for decommissioning of EI-2 uranium-graphite reactor complex.

Concept of EI-2 Uranium-Graphite Reactor Decommissioning (2012-2015)



1. Complete dismantling of support systems and equipment in Building 190 except for reactor installation.

2. Concrete placement in the bottom elevation rooms and sub-reactor areas up to the bottom biological shielding (completed).

3. Void-free filling of in-core areas using the barrier mixtures based on natural clay.

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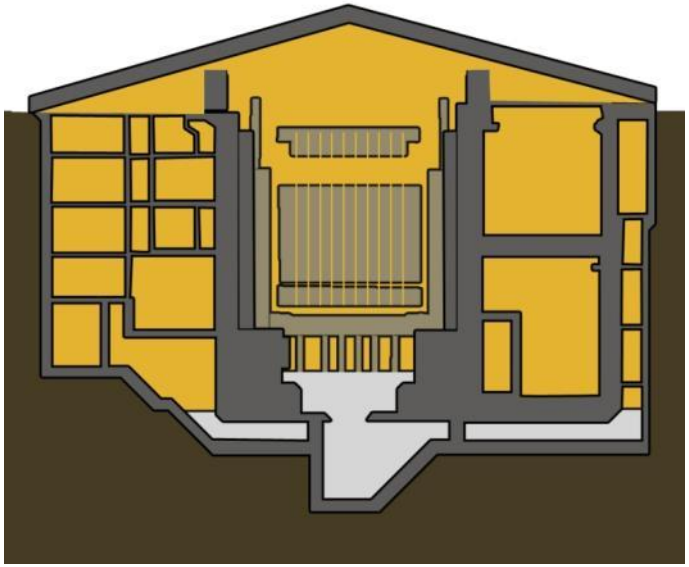
Concept of EI-2 Uranium-Graphite Reactor Decommissioning (2012-2015)



4. Void-free filling of the underground reactor-adjacent areas (Building 190) by barrier materials.

5. Decontamination of engineering structures and dismantling of superstructures of Building 190.

6. Setting-up a barrier for weather impact on the entombment facility.

EI-2 uranium-graphite reactor decommissioned as of the end of 2015 (target value of the Federal Target Program) is defined as a mothballing facility for special radioactive wastes.

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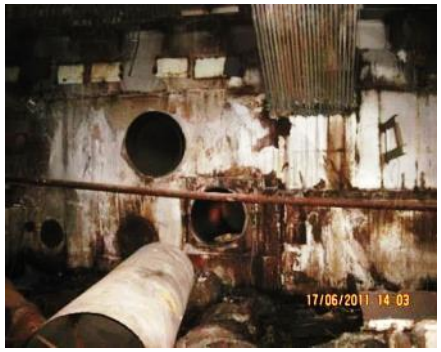
Decommissioning Activities at EI-2 Uranium-Graphite Reactor

During preparation for EI-2 uranium-graphite reactor decommissioning the following activities were performed:

- Dismantling of top metal structures (water communications & pipelines of “E” scheme);
- Dismantling of discharging devices and cooling systems of fuel channels;
- Concrete placement in reactor cavities and sub-reactor areas.



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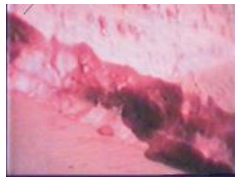
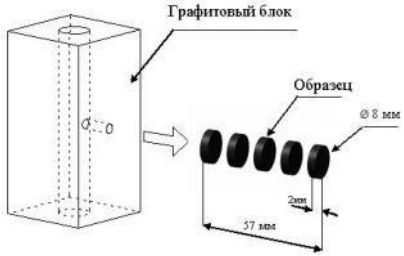
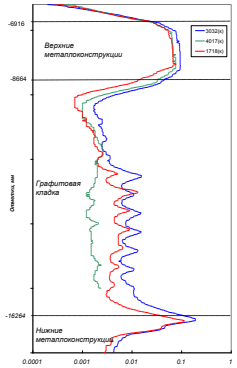
Decommissioning Activities at EI-2 Uranium-Graphite Reactor

During preparation for EI-2 uranium-graphite reactor decommissioning the following activities were performed:

- Technologies for in-core operations were proven:
- introscopic research of reactor structures;
- collection of samples of irradiated reactor graphite;
- remote drilling, cutting, milling of structural elements.







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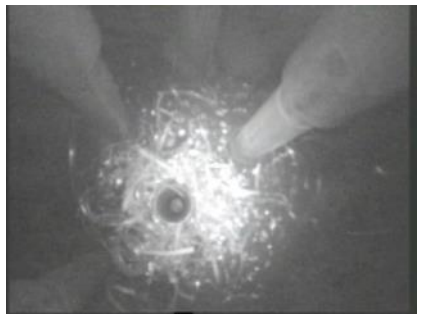
Decommissioning Activities at EI-2 Uranium-Graphite Reactor

Dismantling & preparation activities

- Dismantling of the process equipment & systems at EI-2;
- Dismantling of the process equipment and cooling pond for spent nuclear fuel at EI-2;
- Retrieval and conditioning of sludge deposits of ShT-2 at EI-2;
- Preparation of fuel channel paths and reactor space for the following-on filling by barrier material.





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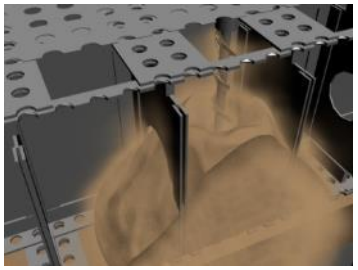
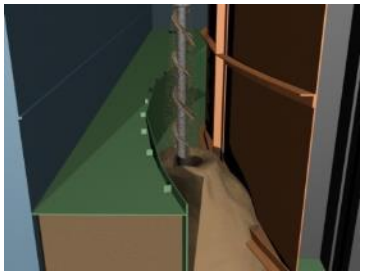
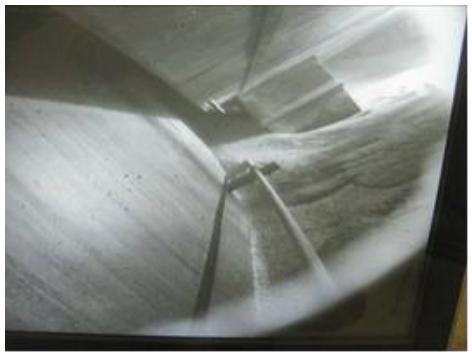
Decommissioning Activities at EI-2 Uranium-Graphite Reactor

Void-free filling of reactor space by barrier material

- Void-free filling technology simulation;
- Mock-up testing
- Work performance on reactor space filling.







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Decommissioning Activities at EI-2 Uranium-Graphite Reactor

Demolition of non-design storage facilities for radioactive waste

- In 2012 a non-design storage facility of “mound” type was demolished.

- In 2013-2014 non-design storage facility “Gasholder” was demolished (Building 171).

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Decommissioning Activities at EI-2 Uranium-Graphite Reactor

Dismantling of buildings & structures

- Buildings demolition;

- Cooling towers demolition according to the technology developed by the JSC “PDC UGR” **“demolition from below”.**

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Conclusion

- JSC “PDC UGR” has the required technology, human resources and experience for nuclear facilities decommissioning.
- One of the JSC “PDC UGR” main advantage at the developing competitive market of decommissioning services is optimization of innovation engineering decisions and their implementation.
- Innovation engineering decisions and practical experience in nuclear facilities decommissioning make it possible to implement the strategy of Back-end Division in nuclear facilities decommissioning.

Thank you for your attention