Chernobyl
INTERIM SPENT FUEL STORAGE FACILITY (ISF-2)
ISF-2 Characteristics

• Storage of 21,297 Spent Fuel assemblies (SFA)
• 2,500 assemblies processed and stored per year
• Spent Fuel Storage Area (SFSA) includes 232 Concrete Storage Modules (CSM)
• 231 Double-Walled Canisters to be supplied (DWC)
SNF Processing Chart

ISF-1

- DWC transportation into SFSA
- Sealing of DWC

TK-700

- Drying of fuel bundles in DWC
- Loading of fuel bundles into FT and further into DWC

SFPF

- SFA separation into fuel bundles

CHTS

CSM
ISF-2 is designed for processing and storage of Chernobyl RBMK reactors’ spent nuclear fuel (SNF)

**Extension rod (ER)**

**Upper fuel bundle**

**Lower fuel bundle**

**SFA**

**3644**

**10054**

**8-20 mm gap**
Two main parts of the ISF-2:

• Spent Fuel Processing Facility
  - SFPF

• Spent Fuel Storage Area
  - (SFSA)
The Main Facility Processing Systems

- Transportation - TK-700 Railcar Handling System
- Fuel Cutting & Handling Systems
- Fuel Tubes (FT) Handling System
- Fuel Drying System (FGD)
- Double-Walled Canister (DWC) Handling System
Fuel Transportation System:
- Spent Fuel loaded into TK-700 railcar in existing ISF1 facility;
- TK-700 railcar takes fuel to the ISF-2 facility for unloading into the main 'Hot Cell' (Room 501);
Main Fuel Process and Handling Area. Overview
Spent Fuel handling system:

- Removal of spent fuel from the TK-700 & Transfer into main “Hot Cell”
  - Fuel Assembly cut into 3 sections using the cutting machine (2 fuel bundles and 1 extension rod)
  - The individual fuel bundles placed in fuel storage tubes.

SFA is attached to Holder Slide prior to cutting operations.
Fuel assembly positioned for detachment of the Extension Rod

Upper Spent Fuel Bundle

Circular Saw of Cutting Machine

Cutting Machine SFA (pictured during Factory Acceptance Test)

Extension rod

Interim Spent Fuel Storage Facility (ISF-2)
Fuel Tube (FT) Handling System:

- Receiving SFA bundles in FT's
- Transporting and loading of FT's with SFA bundles inside DWC

*The fuel storage tubes are made from Metamic, a neutron absorbing material; The bottom of Fuel Tube is punched to allow efficient drying of the fuel prior to final storage*

Punching and loading of FT inside DWC before drying
Double Walled Canister consists of three components:

- Enclosure (double-wall) vessel
- Internal Basket
- Fuel Tubes (FT) 186 pcs

- Length - 4444 mm
- Diameter - 1876.4 mm
- DWC empty weight - 15 704 kg
- DWC filled weight - 31 000 kg

Double Walled Canister
The fuel drying system (FGD) is designed to safely remove residual water from the central rod of the fuel bundles and to provide maximum possible removal of water that can be entrained inside fuel elements, from all SFA bundles loaded inside DWC.
Double Walled Canister handling system

- Storage of empty canisters in SFPF
- Drying SFA’s by means of FGD
- Continuous monitoring DWC’s
- Transporting DWC’s from SFPF
- DWC installation in Concrete Storage Modules (CSM)

DWC storage principle in SFSA

Installation of the canisters into the concrete storage modules

Concrete Storage Modules
• The Fuel Storage area consists of 58 concrete storage modules (CSM) with 4 cells each (232 cells in total)
• The Double Walled Canisters are to be stored in CSM for a period of 100 years.
• The DWC’s shall be continuously monitored during the entire storage period.
The analysis provided in the Design (Volume 13 “Environmental Impact Assessment”) shows that at normal operating conditions of ISF-2, the radiation effects on the objects of natural, social and anthropogenic environments will be significantly lower than the radiation, health and safety regulations (by 2-5 orders) and is acceptable from the environmental safety point of view.

Environmental radiation impact of ISF-2 in case of potential design-basis and beyond-design-basis accidents will not exceed radiation, health and safety regulations established by NRBU-97 for radiation accidents.

Project “Completion of an On-Site Dry Storage Facility (ISF-2) at Chernobyl NPP” received a positive Conclusion of the Comprehensive State Expert Review.
Planned dates for completion of key milestones:

<table>
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<th>Construction and Installation works</th>
<th>September 2016</th>
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<tr>
<td>Pre-commissioning</td>
<td>September 2016</td>
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<tr>
<td>Tests of equipment and systems (Cold Tests)</td>
<td>September ÷ December 2016</td>
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<tr>
<td>Commissioning (Hot Tests)</td>
<td>Q1 2017</td>
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<tr>
<td>Commencement of ISF-2 operation</td>
<td>Q4 2017</td>
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<tr>
<td>Complete supply of all DWCs</td>
<td>April 2019</td>
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Financing ISF-2 Construction

Nuclear Safety Account

European Bank for Reconstruction and Development

Administrator:
European Bank for Reconstruction and Development (EBRD)

Donor countries (Contributors):
France, Germany, United Kingdom, European Union, Japan, the USA, Italy, Canada, Russia, Sweden, Switzerland, Ukraine, Finland, the Netherlands, Belgium, Norway, Denmark
Companies from USA, Germany, France, Italy, Belgium, Slovakia, Poland, Ukraine and other countries take part in the fabrication, supply and installation of the equipment.

THE CONTINUED JOINT INTERNATIONAL SUPPORT WILL ENSURE THE COMPLETION OF THE ISF-2 FACILITY, WHICH IS IMPORTANT FOR THE SAFETY OF CHERNOBYL NPP AND BEYOND.
Contract No.C2/10/062 is being implemented within the scope of Grant Agreement 006 between EBRD, Government of Ukraine and Chernobyl NPP from Nuclear Safety Account
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