



Nuclear Power and the Fuel Cycle Options for Jordan

**International Conference on Management of Spent Fuel from
Nuclear Power Reactors –
An Integrated Approach to the Back-End of the Fuel Cycle**

IAEA

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JORDAN ATOMIC ENERGY COMMISSION



Nuclear Power in Jordan

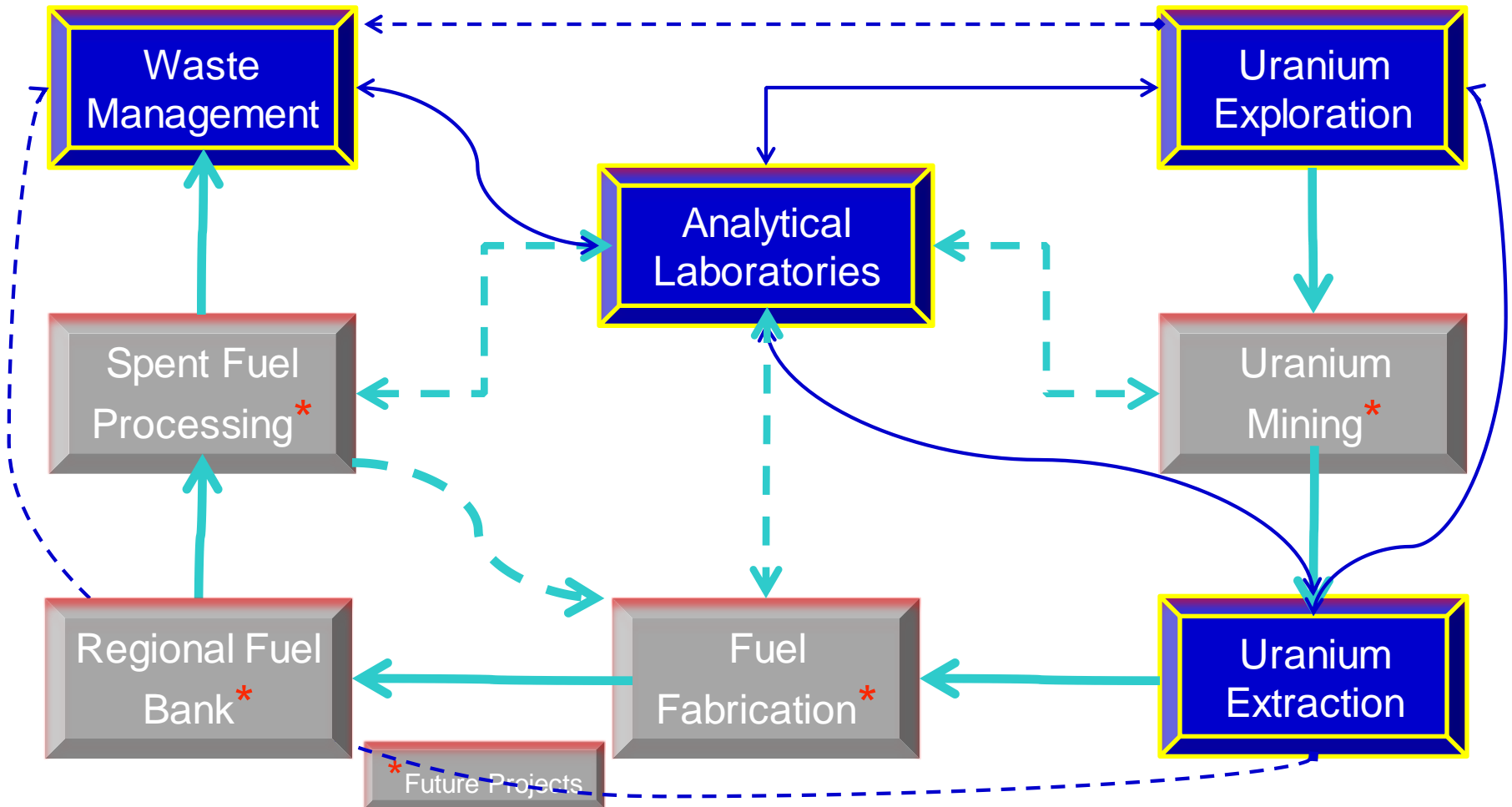
- The Government of Jordan has taken a decision in August 2013 to adopt nuclear energy as part of its energy mix to help alleviate Jordan's energy challenges.
- The Jordan Atomic Energy Commission (JAEC) has selected RUSATOM Oversees (RAOS) as its strategic partner for the operation of Jordan's first nuclear power plant (JNPP), which consists of two 1000-MWe VVER Russian PWRs (based on the AES-92 design).



Mission

- To ensure *safe, secure, economically-feasible*, and *self-sustaining* production of nuclear fuel capable of exceeding Jordan's energy needs **{FRONT END}**
- To *safely* and *securely* manage spent nuclear fuel and nuclear and radioactive waste generated from Jordan's peaceful nuclear program without undue burden to future generations **{BACK END}**

JAEC's - Nuclear Fuel Cycle Activities



Jordan Nuclear Power Plant (JNPP)

- ✓ Two-1,000 MWe Reactors (VVER/AES-92)
- ✓ IGA Signed (March 2015)
- ✓ PDA signed (September 2014)
- ✓ Project Company (+50% Jordan/-50% ROSATOM)



Preparing for the JNPP

- ✓ A number of JNPP Operational Studies are ongoing, which include:
 - Detailed Site Characterization
 - Water Supply
 - Water Demand
 - Grid Stability
 - Electric Demand/Market forecast

- ✓ A number of agreements/studies related to the NFC are being formulated/investigated, which include:
 - Nuclear Fuel Supply
 - Radioactive Waste Management
 - Spent Nuclear Fuel Management
 - Decommissioning



Fuel Supply Agreement - *NFC Front End*

❑ TVEL/ROSATOM to supply fuel to NPP

- assurance by the Russian Federation for supplies for the lifetime of JNPP and @ market price, per the IGA
- PDA commits to ten year contract development
- Fuel Supply Agreement to be formulated during the next 12months

❑ Jordanian Uranium mid-scale Plant expected to be operational in 5-7 years and to produce ≈ 400 tons/year: Use Jordanian Uranium as feed material to TVEL for NPP



RWM - *NFC Back End*

☐ Jordanian RWM Policy Submitted to GoJ for Adoption

☐ Waste Generator Pays

- JNPP
- JRTR
- Industry (mining, medical)
- GoJ → legacy waste (DSRS, orphan sources)

☐ LILW Facility

- Siting
- WMO
- Law(s) to protect RWM funds needed

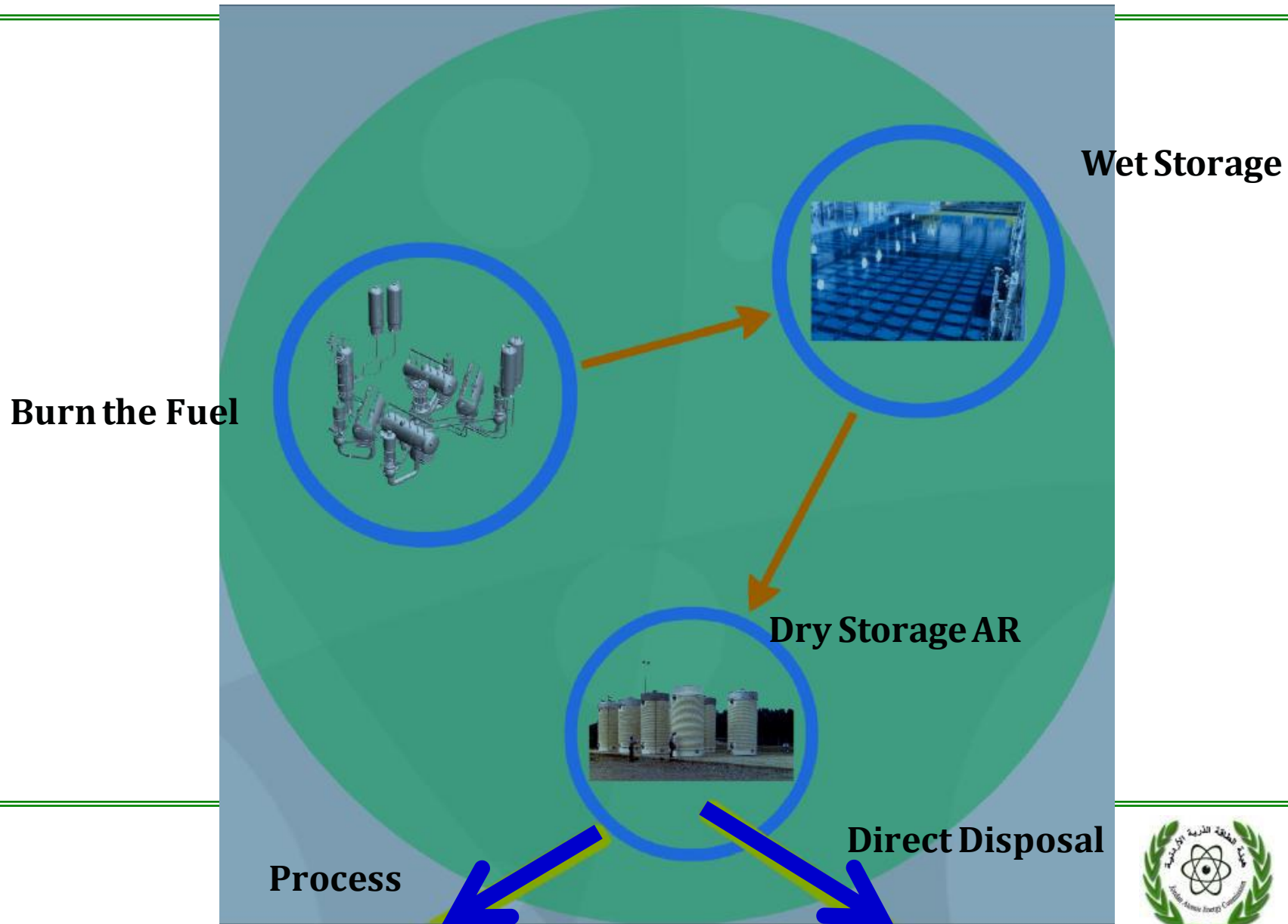


SNF- *NFC Back End* ...(1)

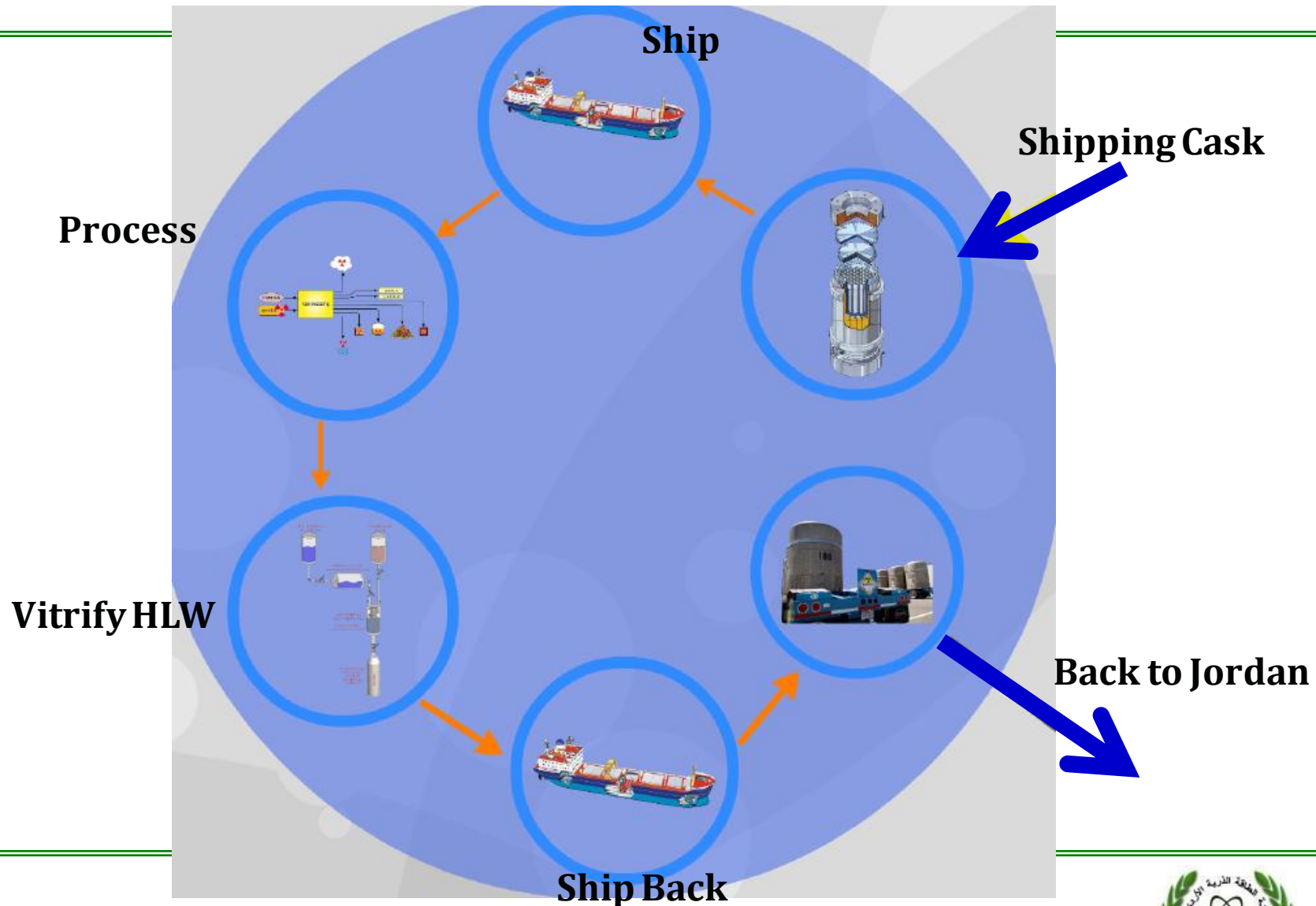
- ❑ **We are a *Newcomer* State to Nuclear Power**
- ❑ **All Options for SNF Management are being considered**
 - Hold and See
 - Direct Disposal
 - Return of SNF to Russia (*HLW ultimately shipped back to Jordan*)
- ❑ **Factors/Variables Considered**
 - Public
 - Safety
 - Cost



SNF- *NFC Back End* ...(2)



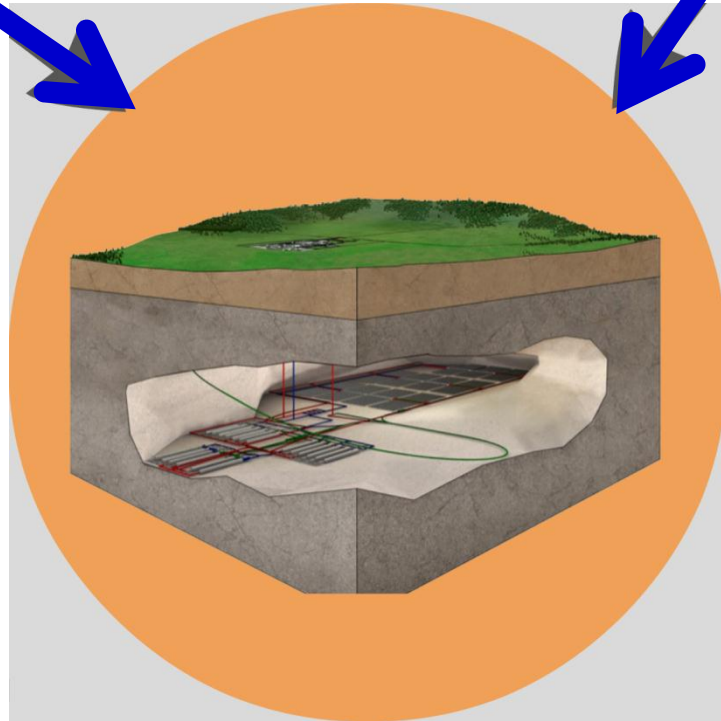
SNF- *NFC Back End* ...(3)



SNF- *NFC Back End* ...(4)

From Processing

From Dry Storage



SNF- *Options*

Hold -n- See	Direct Disposal	Processing
<input checked="" type="checkbox"/> Burdens Future Generations	<input checked="" type="checkbox"/> Greater Source Term	<input checked="" type="checkbox"/> Transport & Processing Risk
<input checked="" type="checkbox"/> Increased S&S Vulnerability	<input checked="" type="checkbox"/> Larger Repository	<input checked="" type="checkbox"/> Cost
<input checked="" type="checkbox"/> Funds Vulnerable	<input checked="" type="checkbox"/> Wasted Fuel	<input checked="" type="checkbox"/> Repository is Still Required
<input checked="" type="checkbox"/> Potential Better Solutions in Future	<input checked="" type="checkbox"/> Wasted Actinides	<input checked="" type="checkbox"/> Recycled Fuel
	<input checked="" type="checkbox"/> Long-Term Stability/Safety Issues	<input checked="" type="checkbox"/> Feed for Gen IV Rxs
	<input checked="" type="checkbox"/> Cheaper than Processing	<input checked="" type="checkbox"/> Less Waste for Disposal & Reduced Source Term
	<input checked="" type="checkbox"/> Reduced Risks of Transport/Processing	





Thank You! شكرا
Questions, Comments?

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