



The Current Status of the Spent Fuel Management in HANARO

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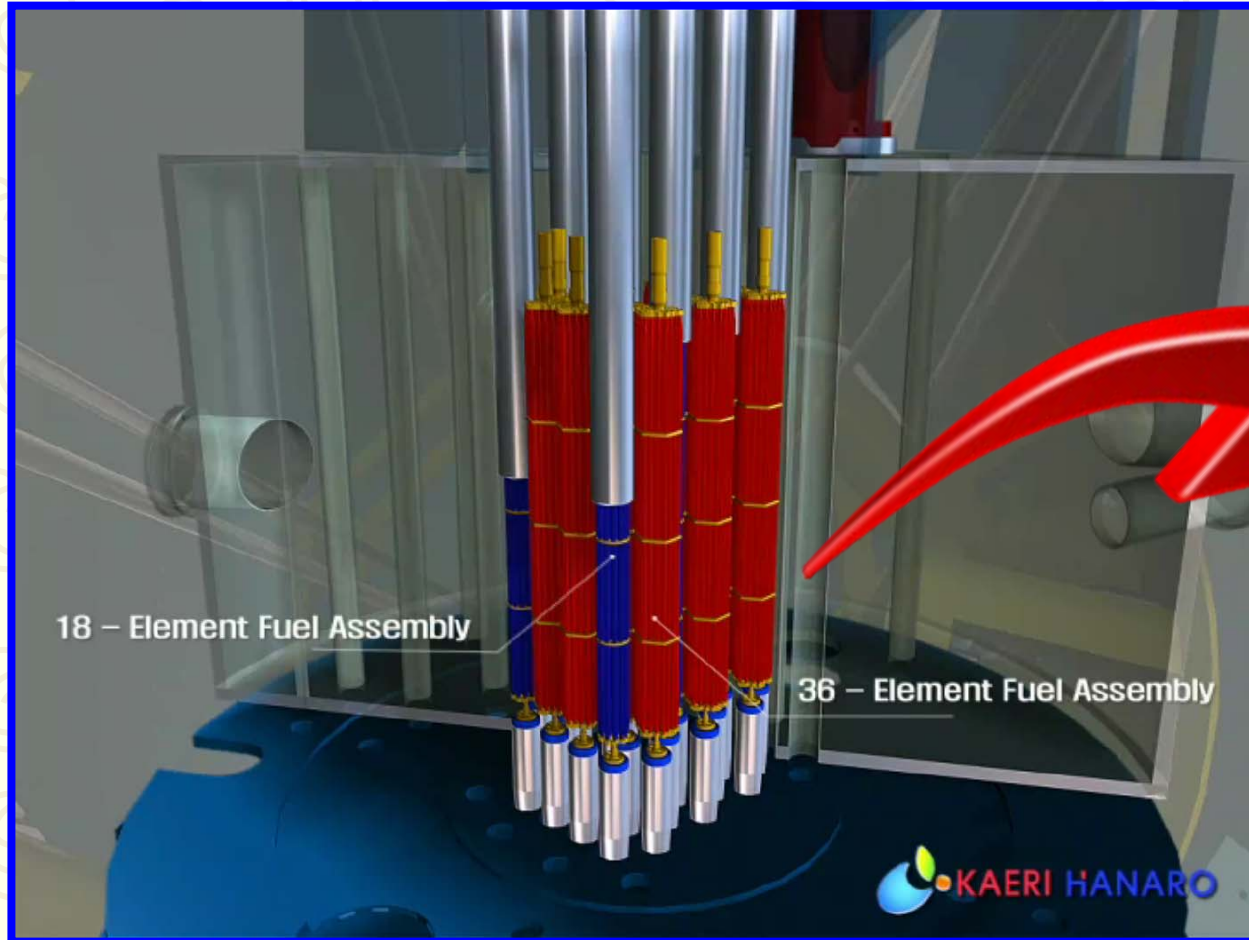
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I. The Status of the Spent Fuel Management



I. The Status of the Spent Fuel Management



HANARO Spent Fuel Storage

I. The Status of the Spent Fuel Management

- TRIGA Mark II and III were shut down permanently in 1996 for decommissioning.**
- The total number of spent fuel from their operation was 299 fuel rods (0.05 * MTU).**
*** MTU - metric tons of uranium**
- They were shipped back to the DOE, U.S.A. by the “Take-Back” program in 1998.**

I. The Status of the Spent Fuel Management

- ❏ **Operating the spent fuel cooling and purification system continuously**
- ❏ **Controlling parameters**
 - **Conductivity**
 - **pH**
 - **Cl⁻ + F⁻**
 - **Turbidity**
- ❏ **Monitoring SF pool surface radiation and analyzing radio-nuclides for monitoring of the SF leakage periodically.**

I. The Status of the Spent Fuel Management

Parameters	Measurement Value	Allowable Value	Periods
Pool Temperature	22 ~ 32 °C	10 ~ 40 °C	8 hours
Surface Radiation of SFP	0.26 µSv/hr	25 Sv/hr	8 hours
Conductivity	0.31/0.15 uS/cm	5 uS/cm	8 hours
Radio-nuclides	Cs-137, etc.		Monthly
pH	5.7	5.5 ~ 6.6	½ year
Cl ⁻ + F ⁻	< 0.05 µg/mL	< 0.2	½ year
Turbidity	< 0.5 NTU	< 1	½ year

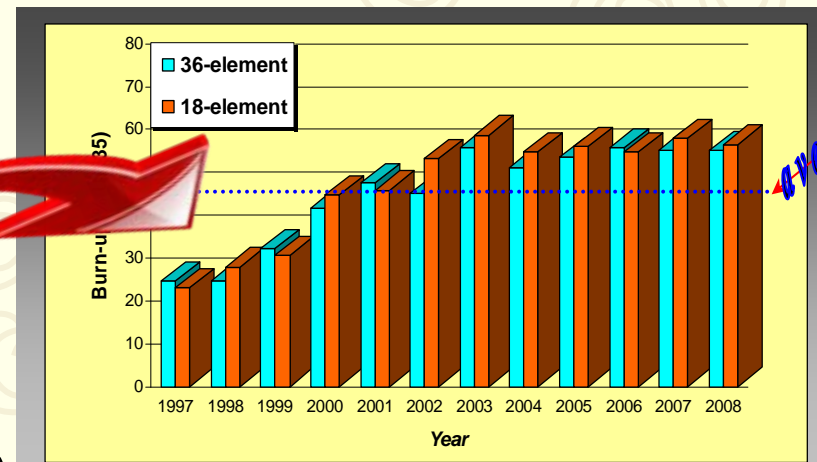
I. The Status of the Spent Fuel Management

Type of Fuel	Number of Elements	Average Burn-up (%U-235)	Origin Country		Weight of U-235	Weight of Uranium (g)
			US	Russia		
18-element	110	46.90	102	8	27,345	138,384
36-element	200	45.20	133	67	86,582	438,272
Total	310	-	235	75	113,927	576,656

❑ The total number of the spent fuel as of 2008 was **324** assemblies and **310** of them are stored at the spent fuel storage pool.

❑ Average burn-up rate of the discharged fuel went up to **55 % in the beginning**.

❑ The origins of the fuel enrichment were the USA and Russia.



Average burn-up of the discharged fuel

II. The Enlargement of the Spent Fuel Storage

- The capacity of the SF storage is for storing the spent fuels from TRIGA Mark as well as from HANARO for 20 years.**
- The racks for 36 element assemblies will reach its capacity in 2024 and the ones for 18 element ones will reach its capacity in around 2027.**
- The life expansion of HANARO is inevitable.**

II. The Enlargement of the Spent Fuel Storage

■ The Ways to enlarge the SF

- Change the design of the storage module**
- Use the space for TRIGA spent fuels**

II. The Enlargement of the Spent Fuel Storage

<Before>

As of 2008

Type of Fuel	Total Capacity for Spent Fuel	Total Number of Spent Fuel	Ratio of Occupied SF	Limits of Storage Capacity
18-element	432	115	26.6%	2027
36-element	600	209	34.8%	2024

<After>

Type of Fuel	Total Capacity for Spent Fuel	Before/After	Enlarged Ratio	Limits of Storage Capacity
18-element	720	720/432	67%	2042
36-element	984	600/984	64%	2038

III. Options for Final Disposal

Option A.

➔ **Return the spent fuel from HANARO to the country of origin**

Option B.

➔ **Use pyro-processing technology which is a national strategy of Korea.**

*Thank you
for your attention*

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