Spent Fuel Cask Manufacturing and Technology in Japan (II)

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Transition of SF Management Status in Japan

past
- Tokai RPP
- Overseas Reprocessing

present
- Rokkasho RPP
- Current ISFSI
- Mutsu CISF

future
- New ISFSI
- CISF

Japan
- Transport
- Storage
- Storage/Transport/Repro

U.S.A
- Storage (ISFSI)
- Transport to Storage or CISF/Transport to Repository

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Reprocessing Projects in Japan

- Tokai Reprocessing Plant
- Overseas Reprocessing
  La Hague/ Sellafield
- Rokkasho Reprocessing Plant
Reprocessing Project (1) Tokai Reprocessing Plant

- A pilot plant with 210 tons capacity
- Operated from 1981 to 2010
- Total reprocessed amount: 1140 tons

Tokai Reprocessing Plant
(source: http://www.jaea.go.jp)

- The first large scale transport cask in Japan
- Hitachi Zosen developed
- 5 Casks delivered

HZ-75T Cask
Reprocessing Project (2) Overseas Reprocessing

- Reprocessing contract with France and UK
- 5600 tons LWR spent fuels reprocessed
- 3 cask vendors in Japan participated on the project as fabrication sub-contractors
- The first experience of mass production of casks
Reprocessing Project (3) Rokkasho Reprocessing Plant

- A private reprocessing plant with capacity of 800 tons/year
- SFs transported to 3000 tons storage pool, and active test
- Under examination according to new regulations

Rokkasho Reprocessing Plant
(source: http://www.jnfl.co.jp/)

- 4 cask vendors in Japan cooperated to develop the transport casks.

NFT-14P
Storage Projects in Japan

- Fukushima Daiichi NPS ISFSI
- Tokai No.2 NPS ISFSI
- Hamaoka NPS ISFSI
- Mutsu CISF
Fukushima Daiichi NPS ISFSI

• The storage casks were horizontally stored before the accident.

• They were safe, no damage by the Tsunami

• In Japan, this is being used as evidence that a cask storage is safer than a pool storage.

• The casks were moved to the temporary storage facility where two kinds of cask are used, one storage cask and one transportable storage cask.
Tokai No. 2 NPS ISFSI

- the ISFSI at Tokai No. 2 NPS were constructed in 2010 relying on vertical storage casks.
- 3 types of casks delivered by 3 cask vendors

- Hitachi Zosen has delivered 17 units. These are shown in the photo.
Hamaoka NPS ISFSI

• Project of ISFSI at Hamaoka NPS is currently advancing.

• Its capacity is 400 tons.

• It will use a transportable storage cask.

• ISFSI plans are also examined by utilities, especially at PWR NPS that already obtained the permission to re-start operation.
TEPCO and JAPC are jointly constructing the CISF in Mutsu City. Project started in 2010.

- phase 1 capacity: 3000 tons,
- phase 2 capacity: 2000 tons

Still under licensing application of examination according to new regulations

A transportable storage cask to be used, which will be moved to RPP after storage

Each cask vendor developing its cask for step 2 fuels
Vender’s (HZC’s) Development Effort for Manufacturing

- The cask vendors in Japan are both designers and fabricators.
- They have developed fabrication technology too.
- For example, Hitachi Zosen is developing different basket design and fabrication technology for the baskets.
- Hitachi Zosen also developed technology to reduce distortion during fabrication.
Canisters Fabrication for U.S. Market (Hitz)

- Hitachi Zosen is also a fabricator for U.S. concrete cask canisters
- About 800 units delivered
- Because of the demanding canister requirements and tight fabrication tolerances, Hitz’s fabrication technology have been valuable
Summary

• Aligned with the national policy of Japan, cask vendors in Japan focused their developing effort to transport cask (dual purpose metal casks).

• This is different from U.S. who focused the effort to storage casks from earlier time.

• Although the study and development of storage facilities is now being implemented in Japan, it basically assumes to transport spent fuels to RPP as the ultimate objective.

• In such situation, there is no immediate plan to use concrete casks in Japan.

• However, the delay of Rokkasho RPP is clear, and there may be operational anxiety with focus on other storage solutions.

• I expect concrete storage casks to become a valuable option.