

Spent Fuel Removal at Fukushima

- is the mission really accomplished?"

Background by Gordon Edwards,

November 5, 2014

"Mission accomplished." George W. Bush would have loved it!

It is a relief to know that all of the irradiated nuclear fuel in the spent fuel pool at the unit 4 reactor has been safely transferred to a common pool in another building. And so soon! Only three years and seven months after the triple meltdown at Fukushima Dai-ichi on March 11, 2011.

But there are still fresh (unirradiated) fuel bundles in the pool, and they won't be all gone until the end of December -- so there are another 3 months to go. Fresh fuel assemblies are more likely to undergo an accidental criticality event -- an inadvertent restart of the nuclear chain reaction -- so we're not exactly out of danger yet.

"Mission almost accomplished" perhaps.

And then there are the three other spent fuel pools in units 1, 2, and 3 -- the reactors that actually did melt down, unlike unit 4 that didn't. Unit 4 was completely offline and defuelled at the time of the 2011 disaster. The core couldn't melt down because there was no fuel in the core. That's why there is still unirradiated fuel in the unit 4 spent fuel pool.

"Easiest part of the mission almost accomplished" perhaps.

And then of course there are the three molten cores themselves. After figuring out how to empty the irradiated fuel from the spent fuel pools of units 1, 2, 3, there is still the irradiated fuel in the reactors themselves -- fuel that in 2011 melted like candle wax at a temperature of 5000 degrees F (2800 degrees C) and congealed into a blob like lava somewhere or other -- at the bottom of the reactor containment vessels, or on the floors of the 3 reactor buildings, or in the ground beneath the 3 reactor floors, as at Chernobyl...

"The first step in the easiest part of the mission is almost accomplished," perhaps.

Spent Fuel Removal at Fukushima – Complete?

It is in fact an achievement to have safely removed the undamaged irradiated fuel from the unit 4 pool -- a routine operation at a nuclear power plant under normal circumstances, but in this case requiring an entirely new steel infrastructure to be erected over the badly damaged building to support the needed crane to lift the intensely radioactive fuel assemblies into transport flasks supplied with their own cooling systems.

And it is worth some degree of celebration.
But maybe it's a bit over-the-top to say, "Mission Accomplished".

Gordon Edwards.

Mission to remove used fuel complete at Fukushima

by World Nuclear News, November 5, 2014

<http://tinyurl.com/mgrrz57>

A year-long operation to remove all the used fuel assemblies from the storage pool at the damaged Fukushima Daiichi unit 4 has been successfully completed. Some fresh fuel remains in the pool, but this should be removed by the end of the year.



The cask holding the last used fuel assembly is moved to the shared storage pool. (Image: Tepco)

Spent Fuel Removal at Fukushima – Complete?

The last of the 1331 used fuel assemblies at the unit were removed and transferred to a common pool in a separate building on 5 November, Tokyo Electric Power Company (Tepco) announced.

Since last November, the used fuel assemblies in unit 4's storage pool have been removed one by one from storage racks and placed into a transportation cask. This has then been moved across the site to be unloaded at the site's shared storage facility. This process was repeated a total of 63 times until all the used fuel had been removed from the pool.

The fuel removal process was suspended between 1 July and 3 September due to an annual inspection for the overhead crane used for the operation. It resumed on 4 September.

Tepco said the removal of the used fuel marks "a solid step toward the decommissioning of the plant."

Unit 4 was off line for maintenance at the time of the 2011 accident with its full core load of fuel, as well as used fuel from previous operation, stored in a fuel pool at the top of the reactor building. Although this meant there was no possibility of a reactor accident at unit 4, there was a risk of the pool overheating. The stability of the pool was then reduced by major structural damage to the building caused by the ignition of hydrogen that leaked through ventilation systems shared with unit 3. The building has since been reinforced, and heavy debris and rubble has been removed from its roof. The used fuel transfer operation was managed within a new cover over the building which includes all the fuel handling equipment of a normal nuclear power plant.

Some 180 fresh fuel assemblies remain to be transferred from unit 4's pool to the common pool. Tepco said that the transfer of this fuel will be easier "as the radiation levels in the new fuel rods are low enough to be handled manually." However, it added, "The task will be handled with the same vigilance and commitment to safety that has characterized the removal effort so far."

The removal of the unused fuel is expected to be completed by the end of December.