PowerLine JAPAN
The Federation of Electric Power Companies of Japan Vol.32 August 2008

Current Nuclear Energy Updates: December 2007 – May 2008

Government Gives Green Light to World's First Full-MOX Nuclear Power Plant

On April 23, 2008, the Ministry of Economy, Trade and Industry permitted Electric Power Development Co., Ltd. (J-POWER) to construct the Ohma Nuclear Power Plant, a 1,383MW advanced boiling water reactor, in the town of Ohma in Aomori Prefecture. This is the world's first full-MOX nuclear power plant; it is designed to use MOX fuel (a mixture of uranium and plutonium oxides) in the entire reactor core, thus playing a pivotal role in enhancing the flexibility of Japan's MOX fuel utilization program.

J-POWER commenced construction work on May 27, with the expectation to start operations in 2012. This marks the first construction of a nuclear power plant at a new site in Japan within the past ten years.

Ohma Nuclear Power Plant (Conceptual drawing)

Progress Made in the Use of MOX Fuel in LWRs

On May 5, Chubu Electric Power began the fabrication of MOX fuel in France for loading in its Hamaoka Unit 4 (BWR, 1,137MW), following on Kyushu Electric Power (October 2007) and Shikoku Electric Power (April 2008).

Meanwhile, on March 31, Kansai Electric Power entered into a MOX fuel fabrication contract with a domestic manufacturer for MOX fuel use in its Takahama Units 3 and 4 (PWRs, 870MW x 2).

On April 18, Hokkaido Electric Power proposed to the Hokkaido prefectural government and four local municipalities to undergo prior consultation regarding the use of MOX fuel in its Tomari Unit 3 (PWR, 912MW), which is scheduled to start operation in December 2009. The application filed by Chugoku Electric Power for the use of MOX fuel in its Shimane Unit 2 (BWR, 820MW) is under examination by regulatory authorities.

The Japanese electric power industry aims to utilize MOX fuel in 16 to 18 light water reactors (LWRs) by fiscal 2010.

POWER TOPICS

G8 Hokkaido Toyako Summit Launched Initiative on 3S-based Nuclear Energy Infrastructure

The G8 Hokkaido Toyako Summit, held in early July, stated that nuclear nonproliferation safeguards, nuclear safety, and nuclear security (3S) were fundamental principles for the peaceful use of nuclear energy, and Japan proposed to launch an international initiative on 3S-based nuclear energy infrastructure.

Over the years, Japan has pressed ahead steadily with nuclear power generation and has worked to establish a closed domestic nuclear fuel cycle in order to further utilize nuclear energy. Japan expects to make a positive global contribution through its solid, long-term experience and technology in the area of peaceful use of nuclear energy.

G8 Hokkaido Toyako Summit Launched Initiative on 3S-based Nuclear Energy Infrastructure

The G8 Hokkaido Toyako summit confirmed that a growing number of countries are expressing interest in nuclear power as a means of addressing climate change and energy security concerns.

Japan, with its limited natural resources, has relied on nuclear power generation to play a crucial role in helping the nation achieve energy security and prevent global warming. From the outset of the nuclear power development program, Japan has also worked to establish a closed domestic nuclear fuel cycle in which spent fuel is reprocessed to recover reusable fuel.

The Rokkasho Reprocessing Plant, which forms the core of nuclear fuel cycle operations, is carrying out final tests to begin full operations later this year. The reprocessing plant recovers uranium and plutonium from spent fuel to produce MOX powder. MOX powder, which deters proliferation, will be fabricated into fuel at a MOX fuel plant; this fuel is then reused in LWRs. The fabrication of MOX fuel is now contracted to overseas manufacturers; however, Japan Nuclear Fuel Limited is applying for a license to fabricate MOX fuel in hopes of bringing a MOX fuel plant into service by 2012. (Fig. 1)

Japan makes it a policy to reprocess all spent fuels. However, Japan's 55 operational nuclear power plants will produce approximately 900 to 1,000 tons of spent fuel annually, whereas the Rokkasho Reprocessing Plant has the capacity to reprocess a maximum of 800 tons of spent fuel annually. As a result, each year 100 to 200 tons of valuable energy resources must be stored and managed safely. To meet this need, plans are in the pipeline to construct a storage center for recyclable fuel (Fig. 2) in the city of Mutsu, Aomori Prefecture. Accordingly, the Recyclable-Fuel Storage Company, a joint concern established by Tokyo Electric Power and Japan Atomic Power Company, is carrying out preliminary work.

In the meantime, the high-level radioactive waste (which is left over after usable uranium and plutonium are recovered through reprocessing spent fuel) is to be stored at a high-level radioactive storage management facility for 30 to 50 years. Waste that has thus far been returned by overseas reprocessors to Japan has already been stored and managed (Fig. 3), and the storage of waste produced by the Rokkasho Reprocessing Plant will begin in the near future.

This nuclear waste will ultimately be disposed in a stable geological formation at a depth of more than 300 meters. Japan is now inviting interested municipalities to consider volunteering as candidates for a final repository site.

The Nuclear Fuel Cycle

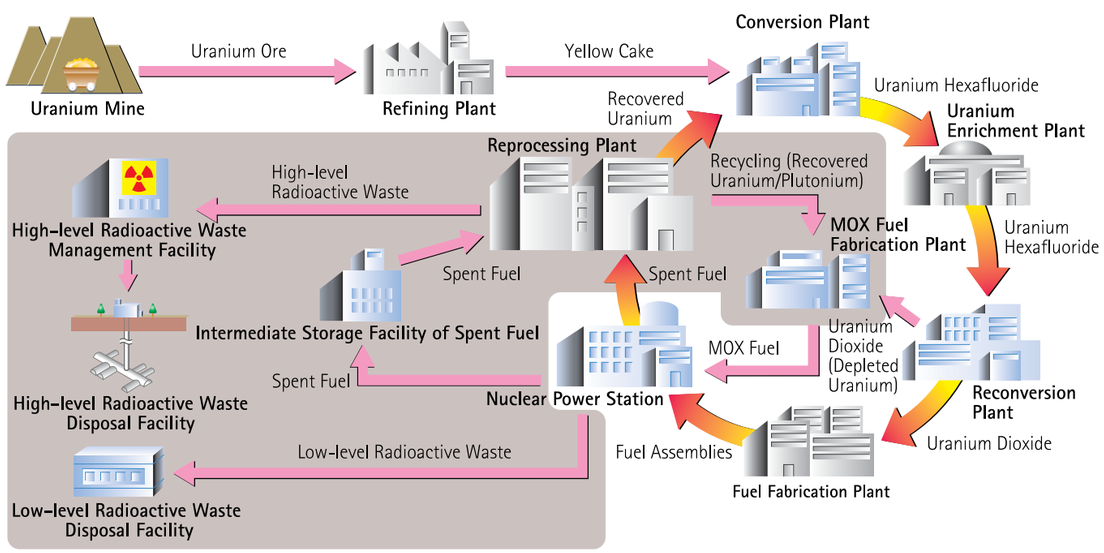

Figure1: MOX Fuel Plant

Figure 2: Interim Storage Facility

Figure 3: Vitrified Waste Storage Center