



# **Metal Casks Storage Schedule of Recyclable Fuel Storage Center in Mutsu**

November 2010

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Recyclable-Fuel Storage Company (RFS)

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# 1. Corporate Overview

Recyclable-Fuel Storage Company was established with the joint capital investment of Tokyo Electric Power Company and the Japan Atomic Power Company for the purpose of storing and managing recyclable fuel generated from the two companies' nuclear power stations.

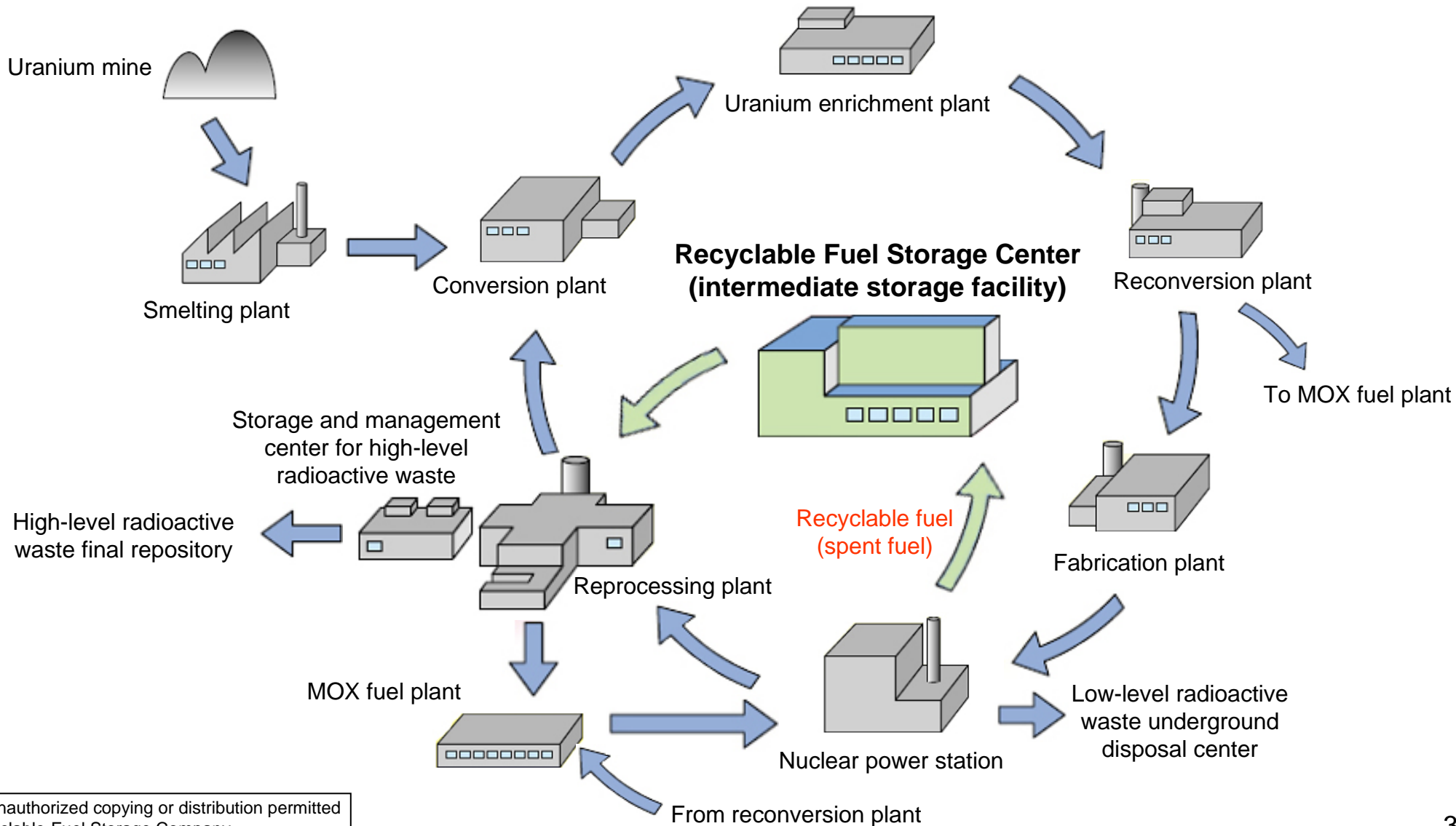
## <Corporate overview>

Name of company:	Recyclable-Fuel Storage Company (abbreviated as RFS)
Address:	596-1, Aza Mizukawame, O-Aza Sekine, Mutsu-shi, Aomori
Date of establishment:	November 21, 2005
Capital:	3 billion yen
Shareholders:	Tokyo Electric Power Company (80%) The Japan Atomic Power Company (20%)
Number of employees:	47 (as of November 2010)

## 2. Necessity of Commercial Operations (1)

### — Nuclear Fuel Cycle —

Summarized flow of nuclear fuel cycle



## 2. Necessity of Commercial Operations (2)

### — Framework for Nuclear Energy Policy —

The Framework for Nuclear Energy Policy, formulated by Japan Atomic Energy Commission, was approved by the Cabinet on October 14, 2005.

- Building nuclear fuel cycles  
(Excerpt) Japan's basic policy has been to build nuclear fuel cycles for reprocessing of spent fuel and effective utilization of collected plutonium and uranium, etc.  
(Excerpt) .....intermediate storage of spent fuel makes temporal coordination possible until it is reprocessed, and it is therefore important as a means for contributing to the flexible operation of the overall nuclear fuel cycle.  
(Excerpt) Spent fuel will be reprocessed within the available reprocessing capacity for the time being, and the surplus volume exceeding the capacity will be stored intermediately.

## 2. Necessity of Commercial Operations (3)

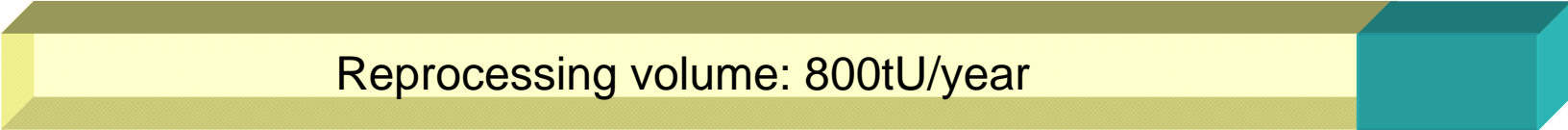
### — Necessity of Building “Recyclable Fuel Storage Center” (in Japan) —

- 54 nuclear power reactors are currently operating in Japan



Current volume of spent fuel generation: approx. 900-1,000tU/year

- Processing capacity of reprocessing plant under construction in Rokkasho Village



Reprocessing volume: 800tU/year

↑  
*Amount that  
requires storage*

In addition to current storage at power stations, there is a need to build intermediate storage facilities outside power stations around the country in future.

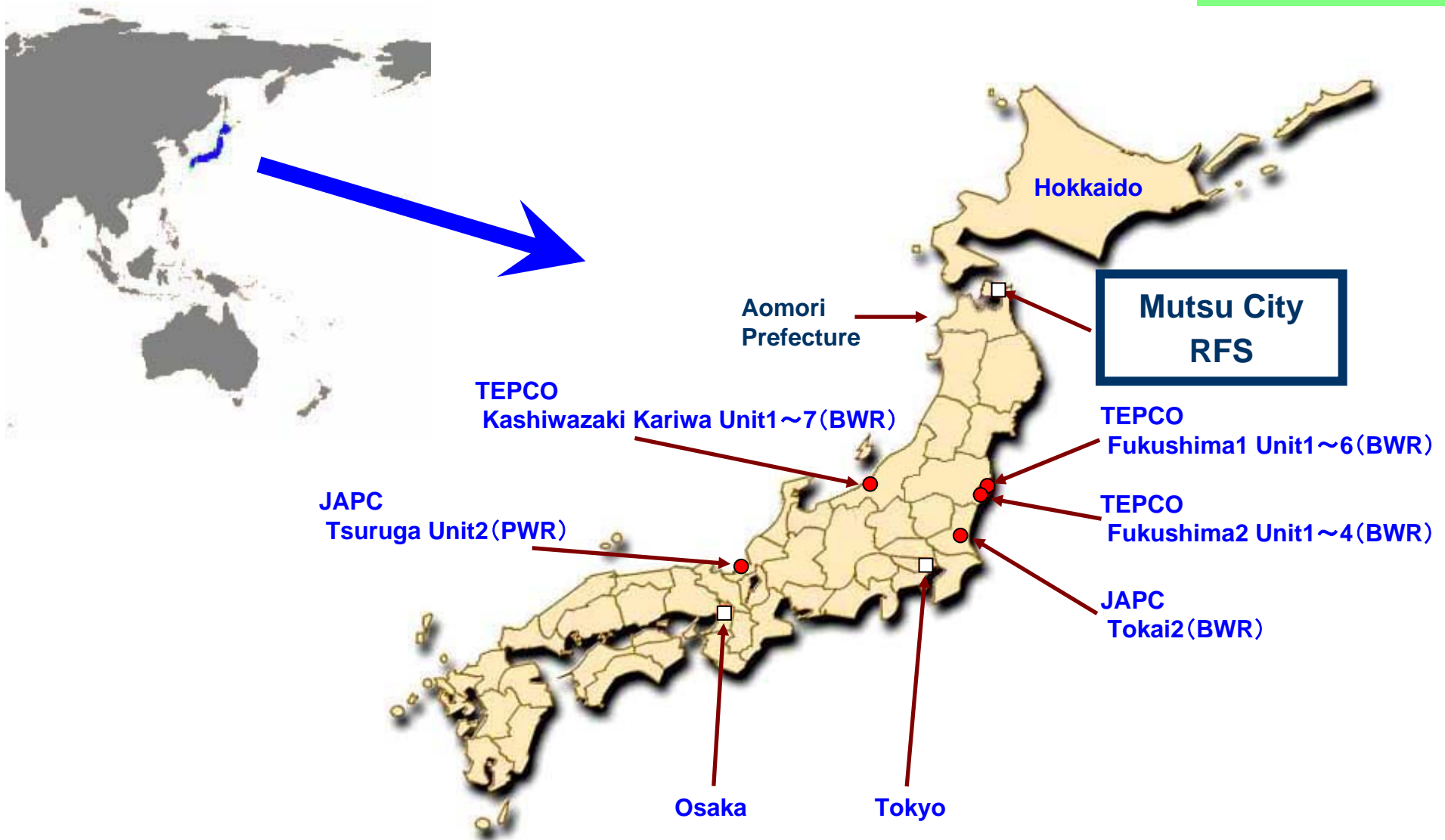
\* The “Recyclable Fuel Storage Center” will store recyclable fuel generated from two companies, Tokyo Electric Power Company and the Japan Atomic Power Company.

### 3. History of Major Developments

June, 2000	Partial revision of the “Act on the Regulation of Nuclear Source Material, Nuclear Fuel Material and Reactors” enforced (enabling the storage of spent fuel outside nuclear power station sites)
November 2000	Technical survey concerning the siting of “Recyclable Fuel Storage Center” requested by Mutsu municipal government
April 2003	Report on feasibility study of siting submitted to Mutsu municipal government
July 2003	Siting request by the mayor of Mutsu-shi accepted by Tokyo Electric Power Company
October 19, 2005	Siting of “Recyclable Fuel Storage Center” approved by Aomori Prefectural government and Mutsu municipal government  “Memorandum of Agreement on Intermediate Storage of Spent Fuel” signed by Aomori Prefectural government, Mutsu municipal government, Tokyo Electric Power Company and the Japan Atomic Power Company
November 21, 2005	Recyclable-Fuel Storage Company established in Mutsu-shi with the joint capital investment of Tokyo Electric Power Company and the Japan Atomic Power Company
March 22, 2007	Application for permission of spent fuel storage operation for the “Recyclable Fuel Storage Center” submitted to Minister of Economy, Trade and Industry
May 13, 2010	Granting of permission for spent fuel storage operation for the “Recyclable Fuel Storage Center”
August 27, 2010	Approval of design and construction method
August 31, 2010	Commencement of construction work for spent fuel storage facility

# 4. Outline of Facility

— Site (1) —





# 4. Outline of Facility

## — Site (2) —

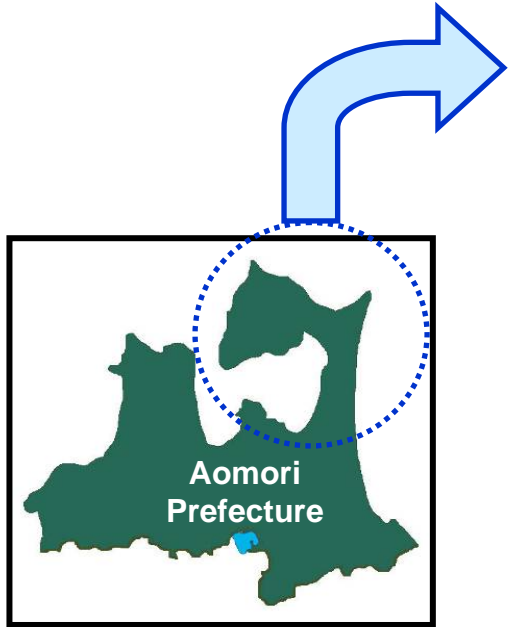
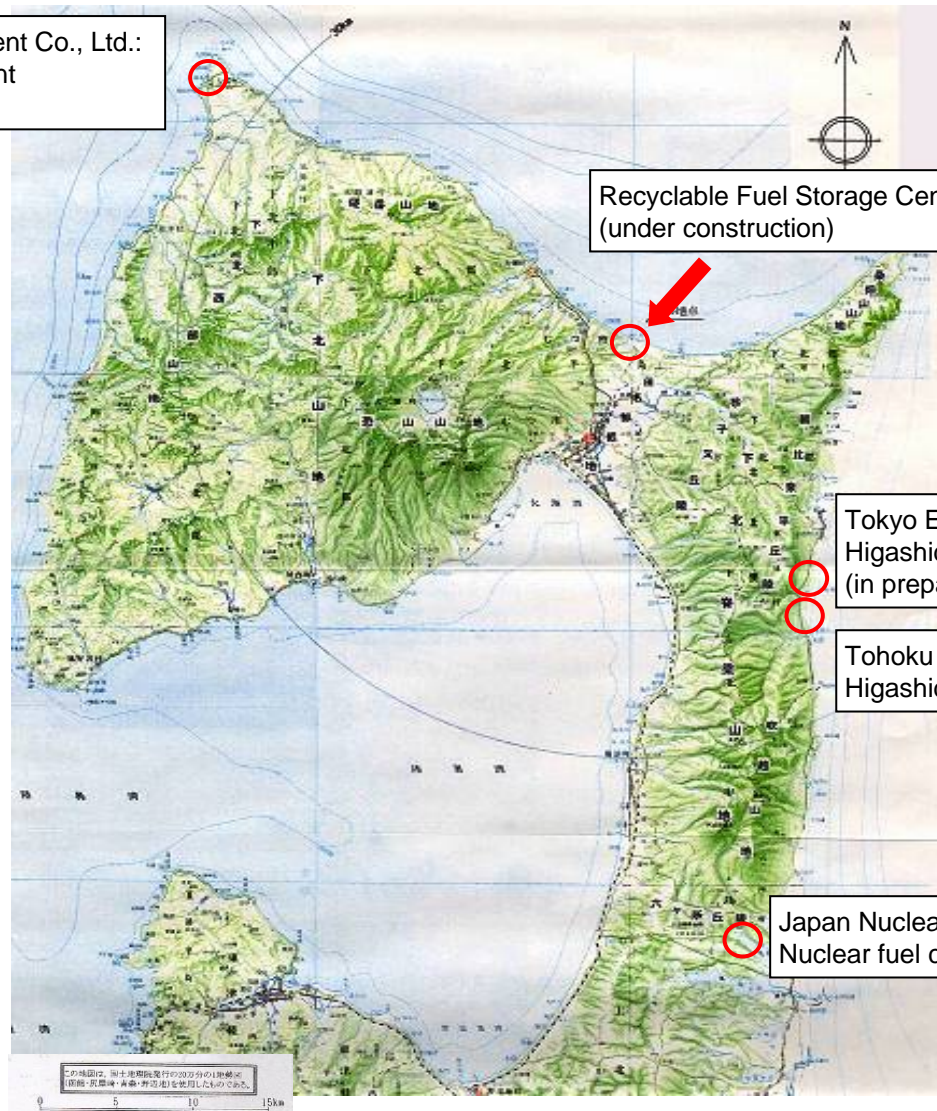
Electric Power Development Co., Ltd.:  
Ohma Nuclear Power Plant  
(under construction)

Recyclable Fuel Storage Center  
(under construction)

Tokyo Electric Power Company:  
Higashidori Nuclear Power Station  
(in preparation for construction)

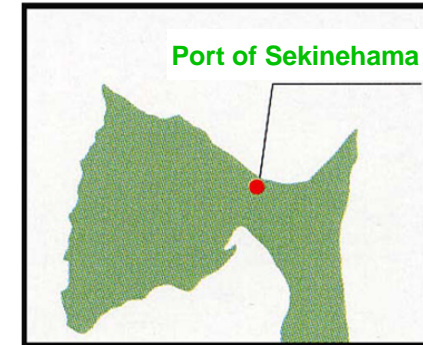
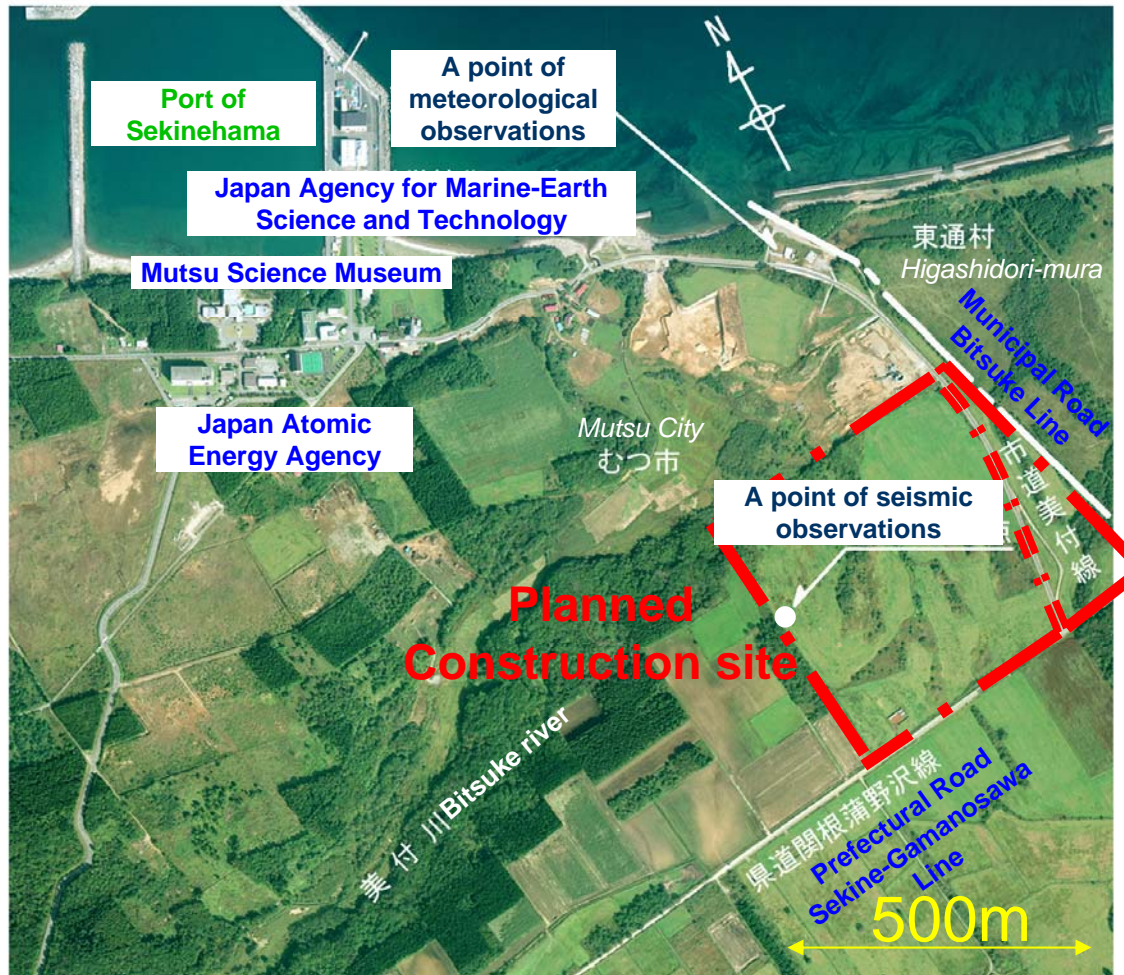
Tohoku Electric Power Company:  
Higashidori Nuclear Power Station

Japan Nuclear Fuel Limited:  
Nuclear fuel cycle facility



# 4. Outline of Facility

## — Site (3) —



## 4. Outline of Facility

### — Storage Amount/Storage Period — (1)

#### ○ Storage volume

**Amount covered by current permission: 3,000 tons**

Final storage amount: 5,000 tons

Amount generated from Tokyo Electric Power Company: approx. 4,000 tons

Amount generated from the Japan Atomic Power Company: approx. 1,000 tons

(Note) The first storage building with a reprocessing capacity of approx. 3,000 tons will be constructed for the time being, with the second building scheduled to be built later)

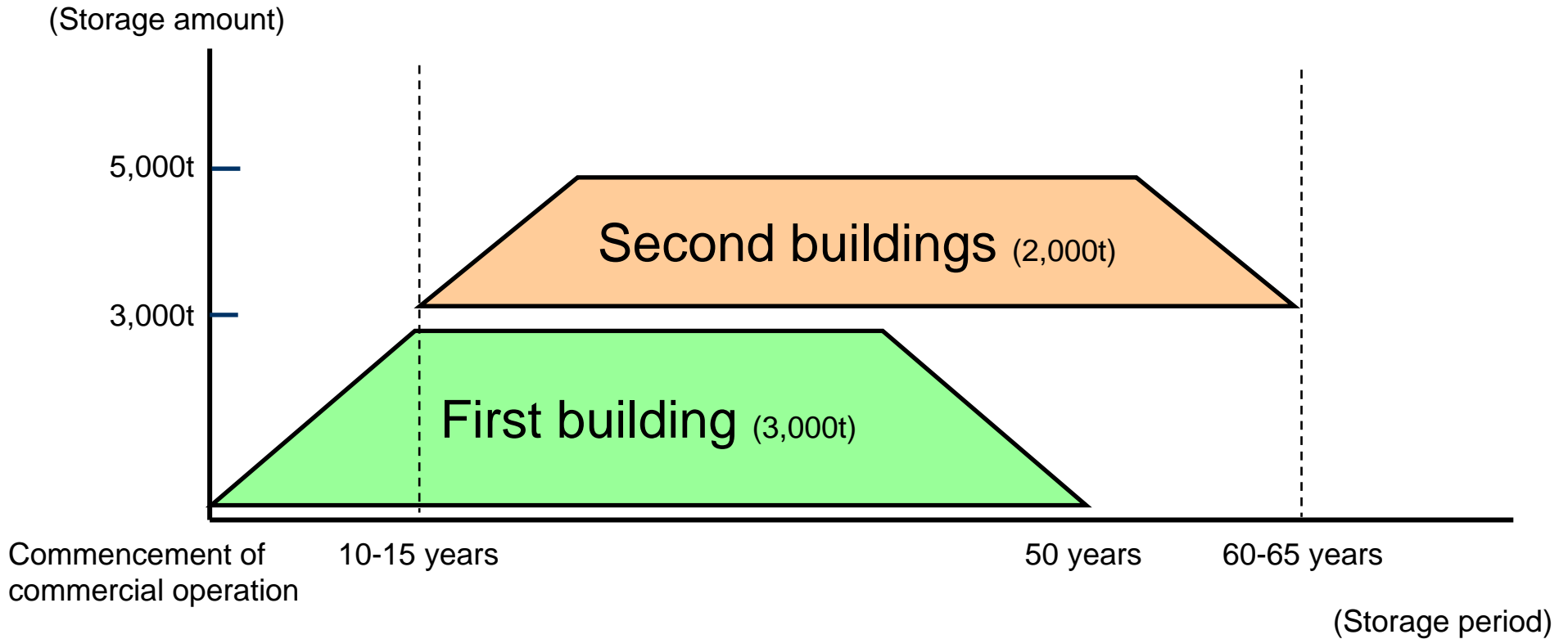
#### ○ Storage period

The service period is 50 years for each facility, and up to 50 years for each cask.



# 4. Outline of Facility

## — Storage Amount/Storage Period — (2)

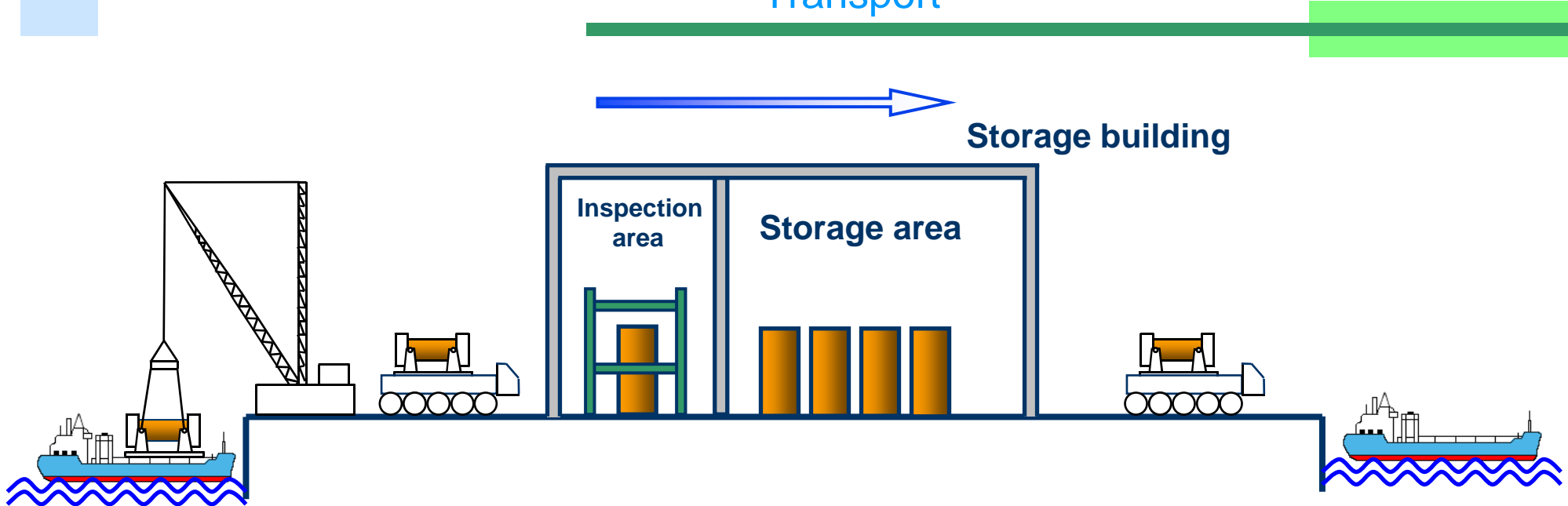


○ Carrying-in of recyclable fuel

Recyclable fuel of approx. 200-300 tons will be carried in each year in about four shipments

(Max. 8Casks / 1Shipment)

# 4. Outline of Facility — Transport —



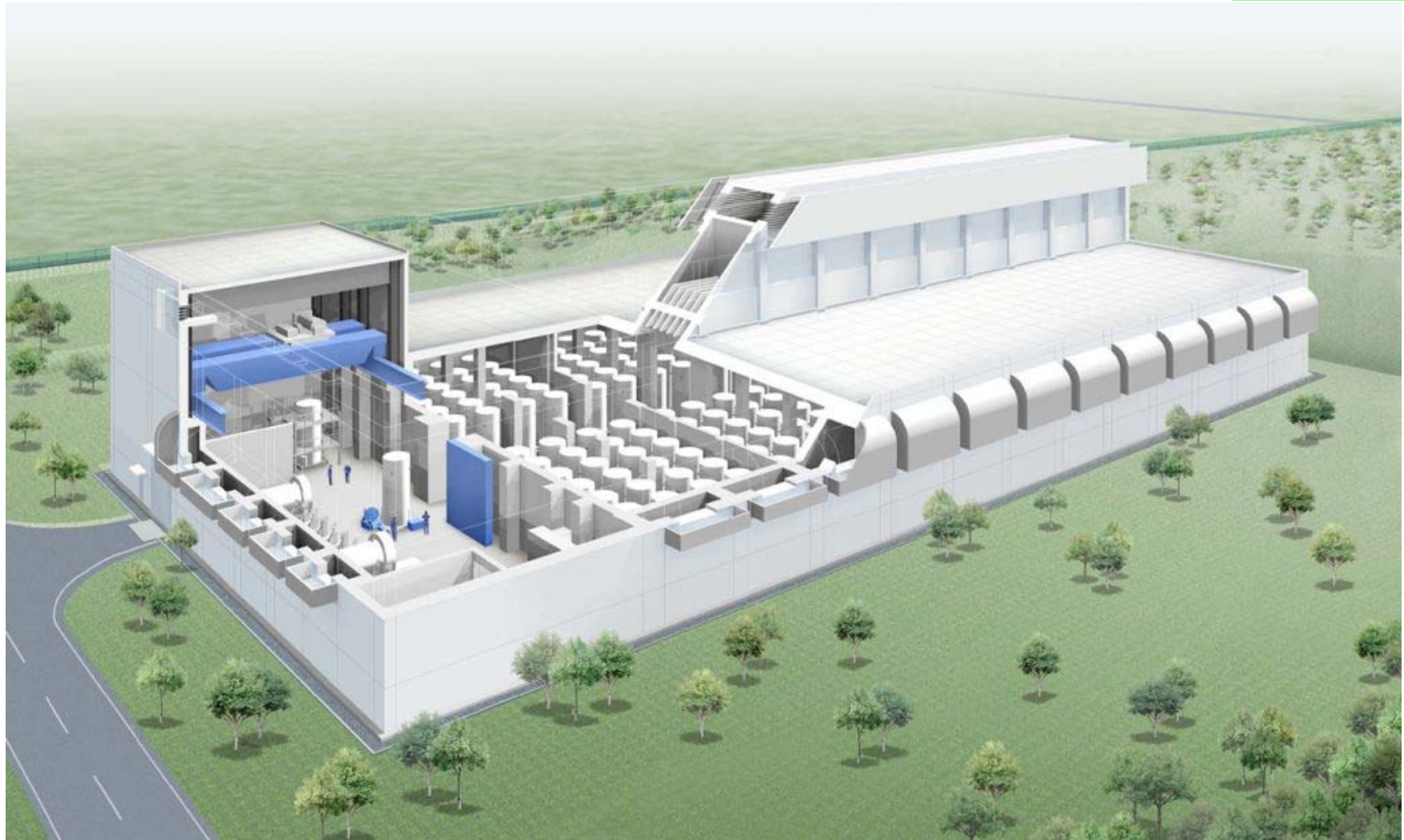
**Receiving of casks**  
● Pre-storage inspection

**During storage**  
● Monitoring  
● Periodic inspections

**Shipment of casks**  
● Pre-shipment inspection

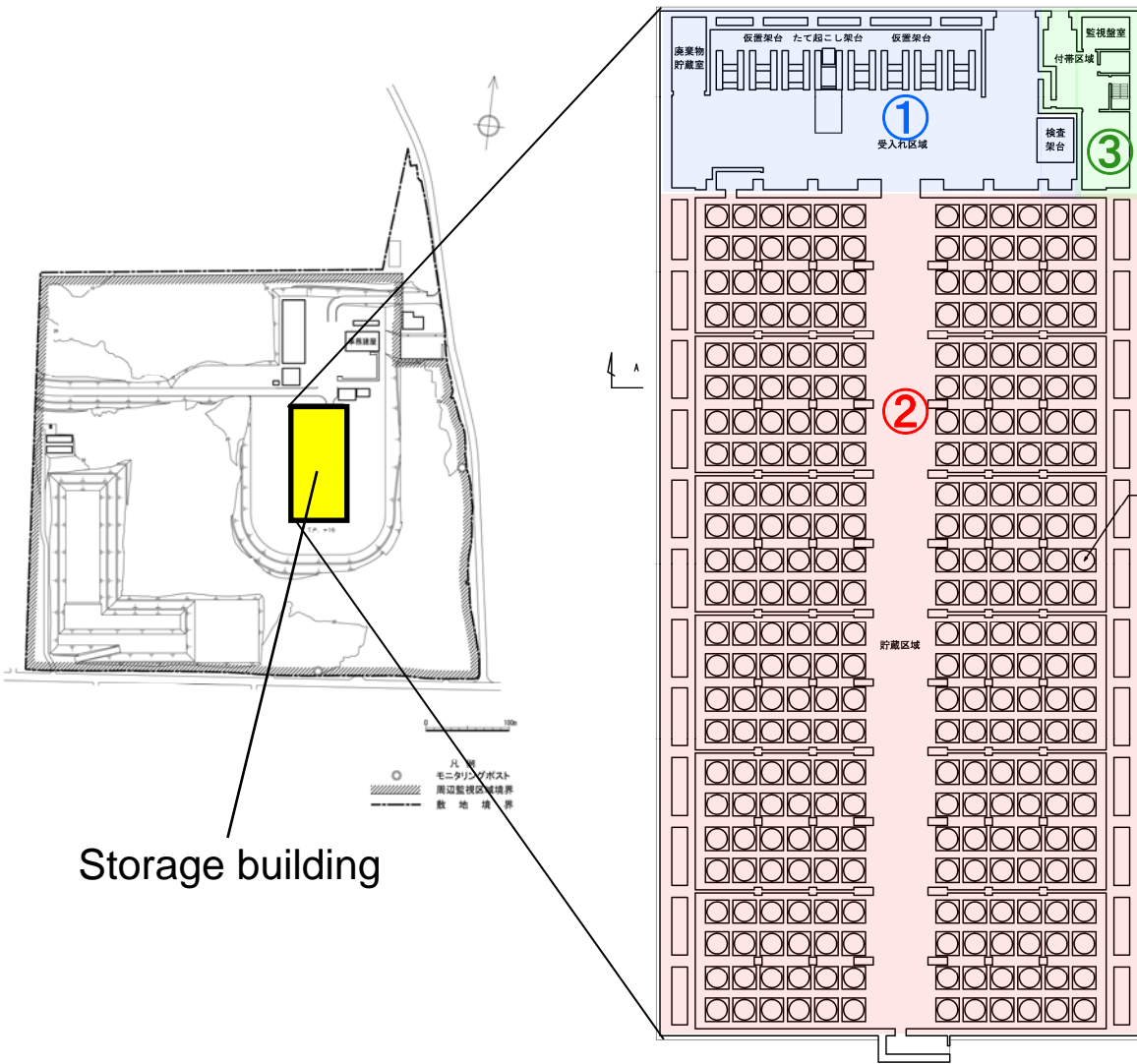
## 4. Outline of Facility

### — Storage Building — (1)



(Width) approx. 62m x (Depth) approx. 131m x (Height) approx. 28m (capacity: approx. 3,000 tons)

# 4. Outline of Facility — Storage Building — (2)



Storage building

## [Outline of storage building]

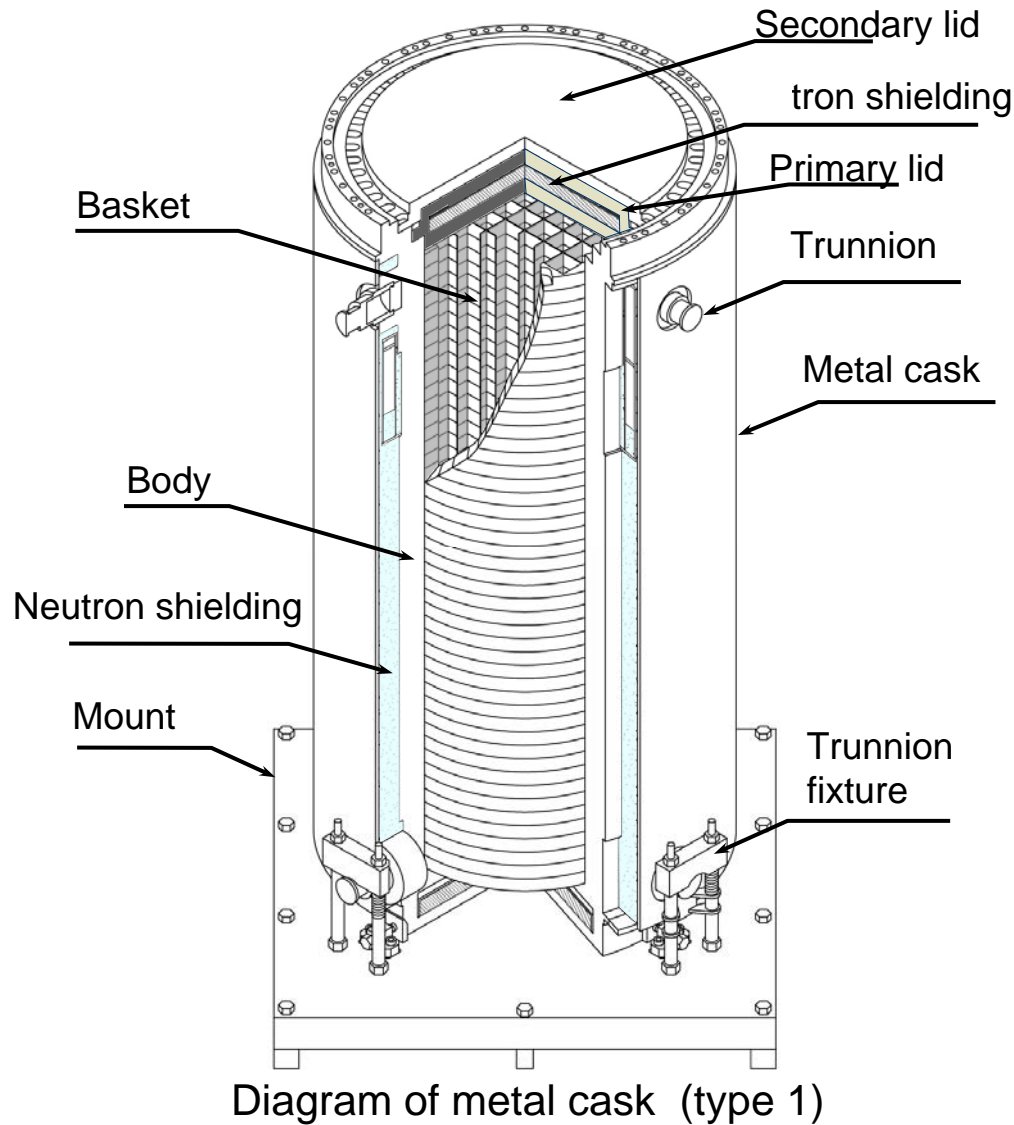
- One floor above ground
- Floor plan: 131m x 62m
- Height: 28m
- utilizing convection of air.
- Metal casks: 288
- Weight of uranium metal: 3,000t
- BWR fuel : 2,600t
- PWR fuel : 400t

## [Areas]

- ① Acceptance area  
temporary mounts, traveling crane
- ② Storage area  
\* carried by cask transport vehicles.
- ③ Auxiliary area  
panel display devices , other equipment .

# 4. Outline of Facility

## — Metal Cask —



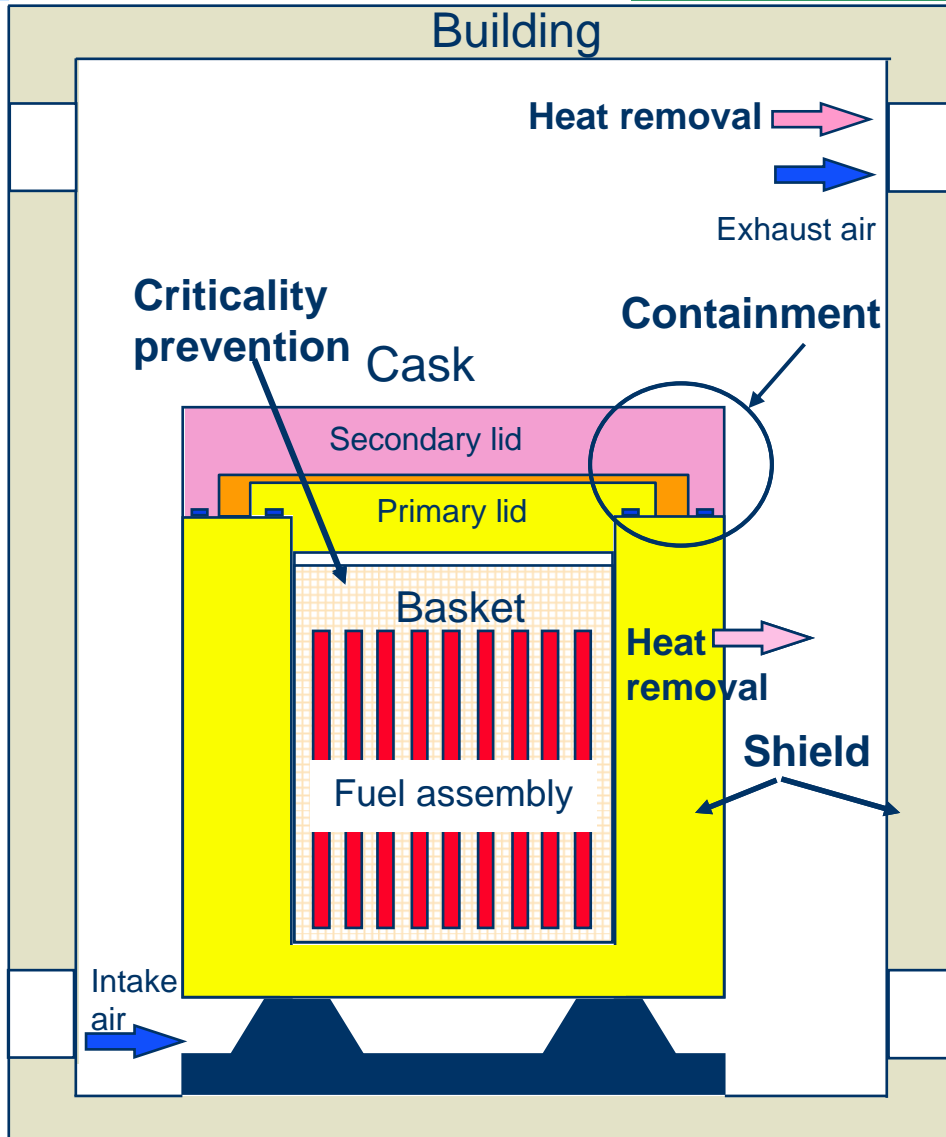
Item		BWR(Large)		BWR (Medium)	PWR
		Type 1	Type 2		
Dimension	Length	5.4m	5.4m	5.5m	5.1m
	Outer dia.	2.5m	2.5m	2.4m	2.6m
Total mass*		119t	119t	116t	118t
Number of fuel		69	69	52	26
Main material		Low alloy steel, carbon steel (body, lids) Boron-added stainless steel (basket) Boron-added aluminium alloy (basket) Resin (neutron shielding material) Propylene glycol solution (neutron shielding)			
Internal fill gas		Helium gas			
Confine structure		Double lid system (primary and secondary lids)			

\* Including spent fuel assemblies



# 5. Concept of Safety Design

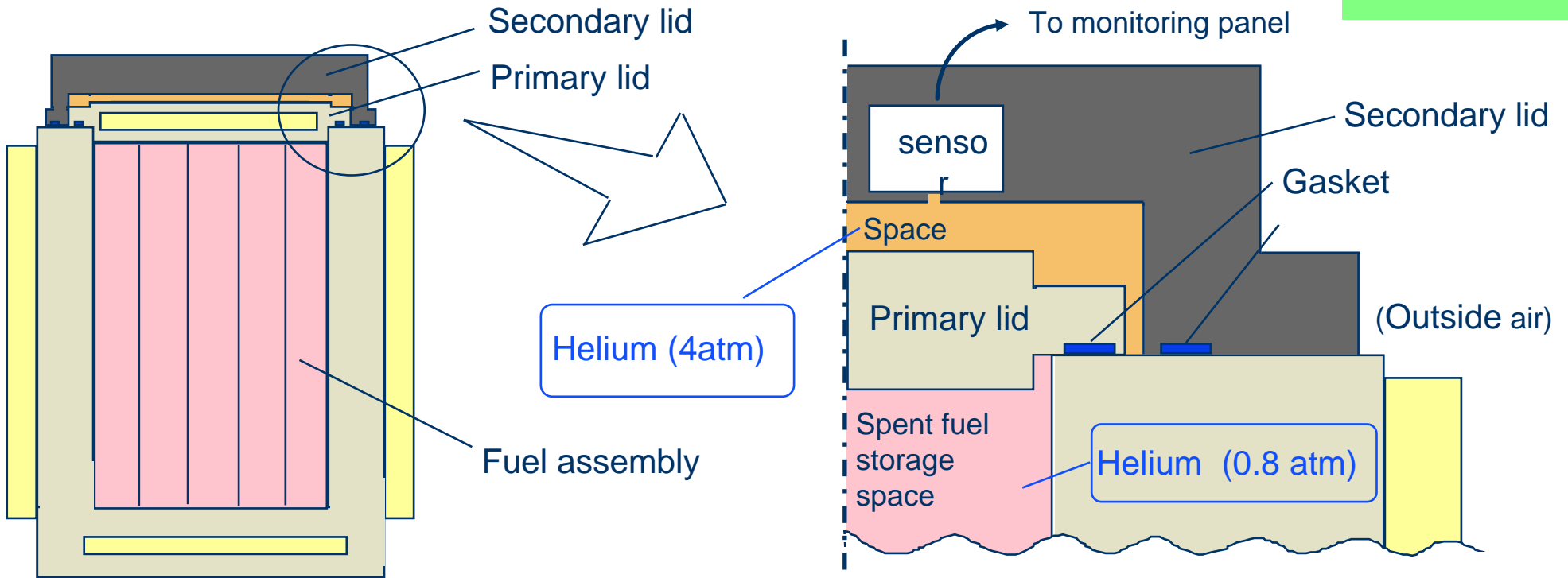
— Basic Safety Functions — (1)



- (1) Containment**
- (2) Shielding**
- (3) Sub-criticality**
- (4) Heat removal**

# 5. Concept of Safety Design

## — Basic Safety Functions — (2)



(1) If a leak in the primary lid occurs

Space between lids  $\xrightarrow{\text{Helium gas}}$  Inside the cask

(2) If a leak in the secondary lid occurs

Space between lids  $\xrightarrow{\text{Helium gas}}$  Outside air



Sensor gives alarm if pressure drops

Even if a leak at a metal gasket occurs, no radioactive material inside the cask is released outside the cask.

# 5. Concept of Safety Design

## — Safety Monitoring —

Monitoring is scheduled for the items shown below among the four basic safety functions for confinement, shielding, criticality prevention and heat removal.

(1) Monitoring items for confinement functions

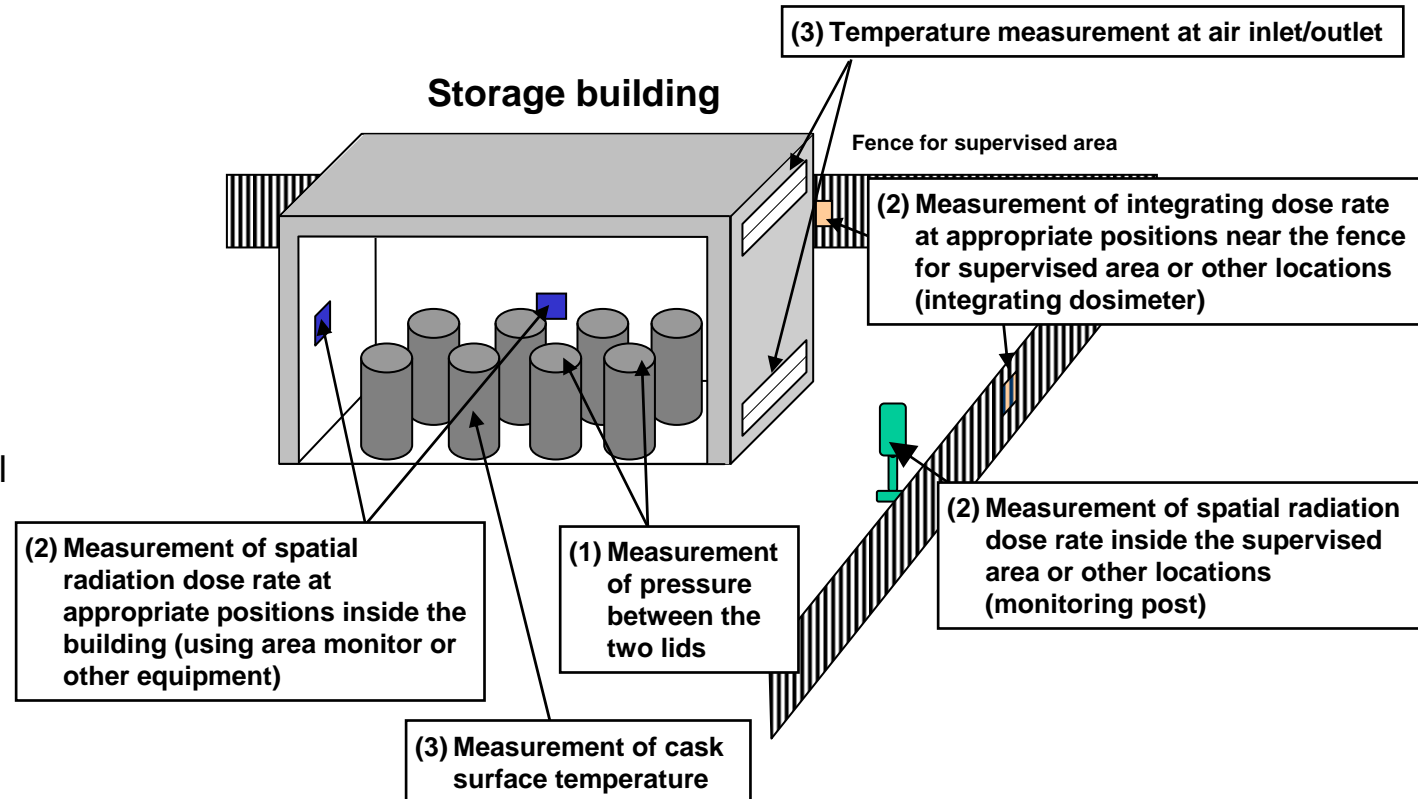
- Pressure between the two lids

(2) Monitoring items for shielding functions

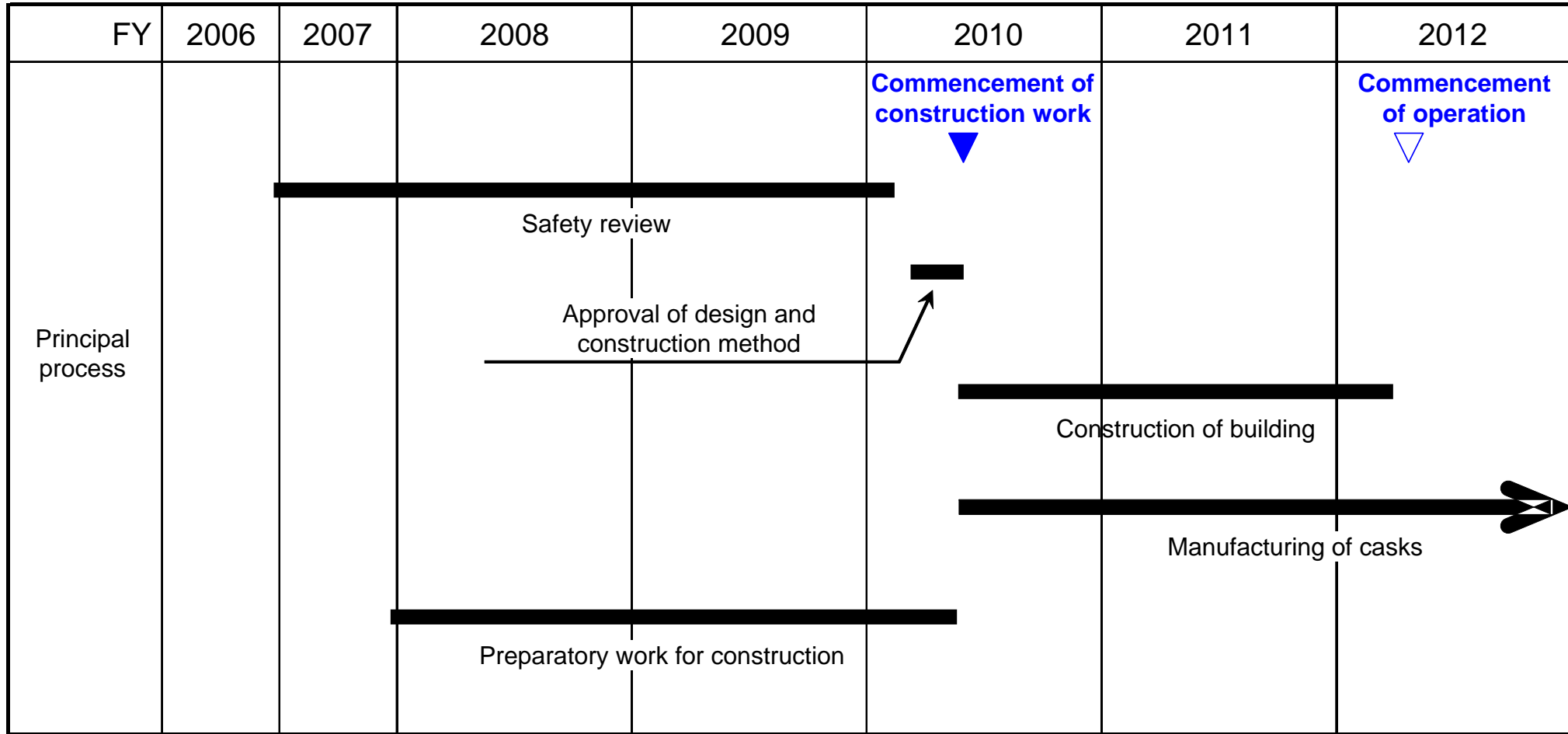
- Spatial radiation dose rate, etc. inside the storage building
- Spatial radiation dose rate, etc. near the boundary of supervised area

(3) Monitoring items for heat removal functions

- Temperature and temperature difference at the building's air inlet/outlet
- Cask surface temperature



# 6. Construction Plan



## 6. Construction Plan

— Status of Construction Work —

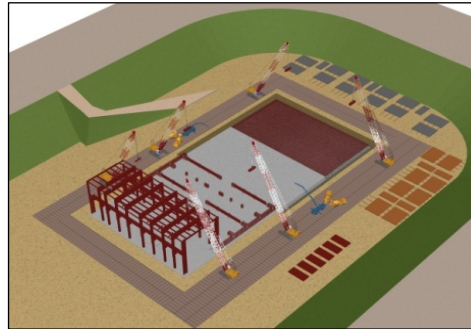


# 6. Construction Plan

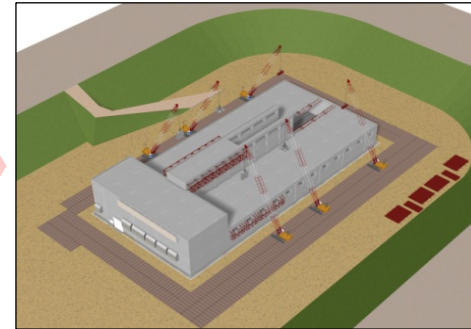
— Schematic Drawing and Processes (Scheduled) —



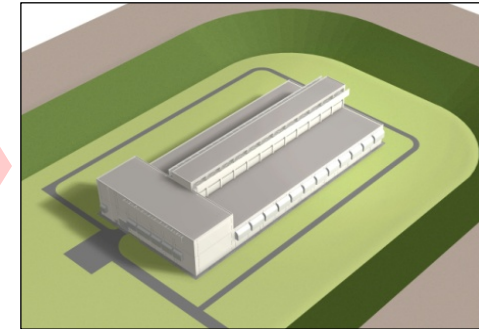
Around the winter of 2010



Around the spring of 2011



Around the summer of 2011



Rendering

	FY2010	FY2011	FY2012
Principal process	▼ Commencement of construction work in August 2010		▼ Commencement of operation in July 2012
Piling work	Approx. 4 months		
Based mat construction		Approx. 6 months	
Shed construction		Approx. 16 months	



## 6. Construction Plan

— Conceptual Rendering of Completed Building —



## 7. Conclusion

- The construction of “Recyclable Fuel Storage Center” started in August 2010.
- The construction is scheduled to complete in July 2012.

