Current Status of Radioactive Waste Management in KOREA and Development of the KOREAN Disposal Facility

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RWM Policy & Framework
Direct control by government

Top priority on safety

Minimization of waste generation

‘Polluters pay’ principle

Transparent siting process
Independent organization for radioactive waste management (the article 10)
- “Korea Radioactive Waste Agency (KORAD) is designated as the dedicated organization for radioactive waste management”

Radioactive waste management fund (the article 28)
- Establishing the Government Fund to improve the transparency and stability of financial resources for RWM

Scope of radioactive waste management (the article 9)
① Transport, storage, treatment & disposal of radioactive waste
② Siting, construction, operation and post-closure management of radioactive waste management facilities
③ Collection, investigation, analysis & management of data on radioactive waste
④ Public Relations
⑤ Other activities such as R&D, international cooperation & training
1. **NSSC** (Nuclear Safety and Security Commission)
2. **AEC** (Atomic Energy Commission)
3. **MSIP** (Ministry of Science, ICT& Future Planning)
4. **MOTIE** (Ministry of Trade, Industry & Energy)
5. **KINAC** (Korea Institute of Nuclear nonproliferation and Control)
6. **KINS** (Korea Institute of Nuclear Safety)
7. **KAERI** (Korea Atomic Energy Research Institute)
8. **KORAD** (Korea Radioactive Waste Agency)
9. **KHNP** (Korea Hydro & Nuclear Power Co., Ltd.)
RWM Practice
Nuclear fuel cycle facilities in Korea

**In Operation**
- 23 Units (20,716MW)

**Under Const.**
- 5 Units (6,600MW)

**Planning**
- 6 Units (8,600MW)

Daejeon Science Town: KAERI, KINS, KEPCO-NF, KORAD Tech. Center

Hanbit 1,2,3,4,5&6

ShinHanul 1&2 (Under Const.)

KORAD HQ

LILW Repository

Hanul 1,2,3,4,5&6

Wolsong 1,2,3&4, ShinWolsong 1

ShinWolsong 2 (Under Const.)

Kori 1,2,3&4, ShinKori 1&2

ShinKori 3&4 (Under Const.)
- Located in the south-east coast of the Korean Peninsula
- Adjacent to Wolsong NPPs
- Area: about 2,000,000 m²
- Disposal capacity: total 800,000 drums, 1st stage – 100,000 drums
- Disposal method: 1st stage – underground silo type (6 silos in 80m below sea level)
WLDC – Surface facility
WLDC – Underground facility

- Operation Tunnel: Transportation of radioactive waste
- Construction Tunnel: Transportation of construction equipment and materials
- Shaft: Entrance for workers
- Silo: Final disposal of radioactive waste

Portal

Shaft Entrance
Overall Progress Rate: 97% (as of Sep. 2013)
- Underground Progress Rate: 96%

Operation Tunnel
- Excavation rate: 100% (1,415 m)

Construction Tunnel
- Excavation rate: 100% (1,950 m)
WLDC – Underground facility (Cont’d)
Silo Construction

- Excavation rate(Silo #1 ~ #6): 100%
Silo #1 ~ #2: Peri form work method
Silo #3 ~ #6 : Climbing tower form work method
LILW transportation ship

- Name: Cheong-Jeong Noori (淸淨世界)
- Design Specifications
  - Applicable Codes & Standards: INF Level II
  - Dead weight tonnage: 950 ton (~ 1,000 Packages of 200 or 320L Drums)
  - Length: ~ 78 m
  - Width: ~ 16 m
  - Double hull, double engines, and other safety features
The 2nd stage disposal facility in WLDC (draft)
SNF generation

- Safely managed in storage facilities at reactor site
- About 750 THM generated annually from 23 reactors

*PWR(19) : about 360 THM, PHWR(4) : about 390 THM

<table>
<thead>
<tr>
<th>Site(no. of reactors)</th>
<th>Storage Capacity</th>
<th>Stored</th>
<th>Saturation year</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>current</td>
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<tr>
<td>PWR</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Kori(6)</td>
<td>2,690</td>
<td>2,030</td>
<td>2016</td>
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<td>Yeonggwang(6)</td>
<td>3,320</td>
<td>2,075</td>
<td>2021</td>
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<td>Uljin(6)</td>
<td>2,327</td>
<td>1,724</td>
<td>2018</td>
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<tr>
<td>Shin-wolsong(1)</td>
<td>219</td>
<td>-</td>
<td>2017</td>
</tr>
<tr>
<td>PHWR</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Wolsong(4)</td>
<td>9,443</td>
<td>6,878</td>
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<tr>
<td>Total</td>
<td>17,999</td>
<td>12,707</td>
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</table>

<as of Dec. ‘12 / unit: THM>
Long-term estimate of SNF generation

- About 33,000 THM from PWR and 12,000 THM from PHWR to be generated by 2083
  - No. of reactors: 34 units
    (based on the 5th basic plan of electricity supply and demand)
SNF management practice in NPPs

Wet Storage

Dry Storage

Transshipment to neighboring NPP
SNF management policy

AEC’s Decision on SNF management

- The 220th AEC (Jul. 1988)
  - Constructing concentrated interim storage away from reactor site by the end of Dec. 1997

- The 253th AEC (Dec. 2004)
  - Storing SNF at reactor sites by 2016 by expanding temporary storage
  - Consent-based national policy should be made with consideration of international trends on policy, R&D, etc.
Stakeholder Engagement
Progress of stakeholder engagement (SE)

- **Apr. 08**: Recommendation on Stakeholder Engagement for SNF management by Stakeholder Engagement TF Team led by Gov.
- **Dec. 09**: Establishment of legal basis upon Stakeholder Engagement by revision of the RWM Act
- **Dec. 09 ~ Aug. 11**: Consideration of technical options for SNF management
- **Aug. 12**: Submission of 14 recommendations on SNF management policy-making by SNF Policy Forum (led by private sector)
- **Nov. 12**: Approval of the implementation plan for SNF management measures by the AEC
Implementation plan for SNF management measures

- Phased implementation after the Stakeholder Engagement Program
- Creation of the Stakeholder Engagement Committee (SEC) in 2013
- Establishment of the Basic Plan for Radioactive Waste Management based on the results of discussion among the SEC

Preparatory Stage (~ Sep. 2013)
- Organizing Support Group (Mar.)
- Setting up detailed implementation plan
- Preparing for launch of SE Committee (Apr.)
- Presentation Meeting to relevant organizations

Implementation Stage (Oct. 2013~2014)
- Launch & operation of SE Committee
- Draft of result of SE program and recommendations

Final Stage (~2nd half of 2014)
- Establishment of the basic plan for RWM
  - including plans for siting & funding, etc.
Framework of SE Program

**Objective**
- Focused on feasible options including interim storage, but not defining certain topics
- Submission of recommendation to MOTIE and AEC

**Use of Results**
- Respect of SE Program result as much as possible
- Establishment of Basic Plan for Radioactive Waste Management (approval of AEC)
Stakeholder Engagement Committee

Members of SE Committee

- 15 committee members
  - experts in human & social science and technical engineering
  - representatives recommended by NGO and residents in NPP area
- A chairperson, elected among committee members
  - reputable but neutral person

Role of SE Committee

- Decision on principles and methods of SE Program
- Initiation of SE Program
- Recommendation to government
Thank you for attention!