

# Review on Regulations and Practices of Periodic Safety Review for LILW Repositories

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## 1. Introduction

Technical review for safety of disposal facilities have to be undertaken prior to construction and prior to operation as done for the LILW disposal facility in Korea. In addition periodic reviews have to be undertaken during the operation of the facility and following closure, up to termination of the facility license. The purpose of this periodic safety review(PSR) is to periodically evaluate and enhance their safety based on the operational experience acquired, recent regulatory requirement and new technological developments in the field of radioactive waste management[1].

According to Article 5(Renewal of Safety Assessment) of NSSC Notice No. 2016-26, on the basis of the experience gained through the process of managing and controlling disposal facilities and the results of safety assessment, the operator shall frequently reexamine the conditions regarding the safety of disposal facilities and supplement them, if necessary[2]. However, unlike the regulations for NPPs, scope and contents of the PSR for LILW disposal facilities are not clearly stipulated in the Nuclear Safety Act(NSA) and its subordinate statute.

This paper presents the investigated information of the PSR in terms of regulations, experiences and practices from some countries with advanced disposal programs in order to suggest scope and contents of the PSR for LILW disposal facilities in Korea based on the international experience and practices.

## 2. Regulations and Practices

### 2.1 Investigation on regulations of PSA

An investigation has been conducted regarding regulatory requirements of the PSR for disposal facilities in terms of its purposes, period, and scope and contents in Finland, Sweden and France as well as WENRA(Western European Nuclear Regulator's Association).

**WENRA:** Working Group on Waste and Decommissioning (WGWD) has worked on safety reference levels for disposal facilities for radioactive waste, and published the report which includes an issue related to the PSR[3]. It concluded that the licensee shall carry out at regular intervals a review of the operational and post-closure safety of the facility to confirm compliance with licensing requirements. The frequency of the review shall be established by the national legal and regulatory framework.

**Finland:** The licensee shall carry out a periodic safety review for the disposal facility at least once in every 15 years, and the PSR shall include assessments of the disposal facility's safety status and the long-term safety of the disposal as well as potential development targets in order to maintain and enhance safety[4]. The PSR document should include the equivalent information needed to be reviewed for a license application or a license amendment, and updated as appropriate.

**Sweden:** At least once every ten years, a new and integrated analysis and assessment of the safety of a facility shall be performed. Since 2010, the requirement regarding the PSR is stated in the Act on Nuclear Activities. The regulations for the PSA stipulated in the Regulatory Code, SSMFS 2008:1, are applicable both nuclear power plants and disposal facilities.

**France:** According to TSN Act(Concerning Transparency and Security in the Nuclear Field) established in 2006, the licensee of a basic nuclear installation including disposal facilities has to carry out PSRs of its installation by taking account of the best international practices (i.e. every 10 years).

### 2.2 Investigation on practices of PSA

An investigation has been conducted regarding practices of the PSR for disposal facilities in Finland, Sweden, France and Spain. Table 1 shows the summary of regulations and practices of the PSR for LILW disposal facilities from different countries.

**Finland:** The Olkiluoto LILW disposal facility was taken into operation in 1992 and consequently its safety assessment was submitted for review in 2007. The first stage of the Loviisa LILW disposal facility, the LLW disposal tunnel, was taken into operation in 1998. The construction of the second stage of the facility, the ILW disposal cavern, was completed in 2007. The operator of the Loviisa LILW disposal facility submitted its PSR of the facility to the regulator in 2013.

**Sweden:** The SFR disposal facility has been in operation since 1988. An updated long term safety assessment of the SFR repository was submitted in 2008. As a result of the review by the regulator, a more detailed assessment of SFR was submitted in 2014, especially addressing the long term performance of the rock vault for intermediate level waste[5].

**France:** The PSR is carried out every ten years. The latest safety assessment of the La Manche repository was carried out by ASN in December 2009. ASN notified its conclusions concerning the files in a letter sent out in 2010.

Table 1. Practices of PSR for LILW repositories

	Operat-ion	Regulation	Practi-ce
SFR (Sweden)	1988	<ul style="list-style-type: none"> <li>● Act on Nuclear Activities(1984:3)</li> <li>● SSMFS 2008:1 - every 10 years</li> </ul>	2009 (Add. info in '10 & '14)
Loviisa (Finland)	1998	<ul style="list-style-type: none"> <li>● YVL A.1 (Reg. control of the use of nuclear energy)</li> </ul>	2013
Olkiluoto (Finland)	1992	<ul style="list-style-type: none"> <li>- every 15 years</li> </ul>	2007
La Manche (France)	1969 ~1994 (closed)	<ul style="list-style-type: none"> <li>● TSN Act - every 10 years</li> </ul>	2009
El Cabril (Spain)	1992	<ul style="list-style-type: none"> <li>● Not identified in law - every 10 years</li> </ul>	2003

### 3. Contents for PSR

After reviewing the regulations and experience from some countries with advanced disposal programs, and current regulation of the PSR for NPPs in Korea, several suggestions are possible to propose regulations of the PSR for LILW disposal facilities.

The PSR in principle can include review of facility design; SSCs important to safety of facility and their

aging; radiological and non-radiological impact due to facility operation and their assessments including normal and abnormal conditions due to accident; use of experience during operation and research findings; operational procedures established; organization, management framework and safety culture; emergency planning; waste acceptance criteria; inventory of radioactive materials disposed; and monitoring results etc.

### 4. Conclusions

The PSR for LILW disposal facilities has been carried out at various periods in countries with advanced disposal programs, and is usually performed every 10 to 15 years. The PSRs are international practices for periodically evaluating and enhancing safety of facilities based on the operational experience gained and new technological developments, but the scope and contents of the PSR are variously defined and implemented in each country by law. In Korea, the scope and contents of the PSR for LILW disposal facilities should be established by taking into account the inherent properties of disposal facilities, e.g. passive safety function, unlike the properties of common NPPs.

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