

Current Status on Decommissioning Plan of Nuclear Facilities in Korea

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Permanent Shutdown of Kori unit 1



고리1호기 영구정지 선포식

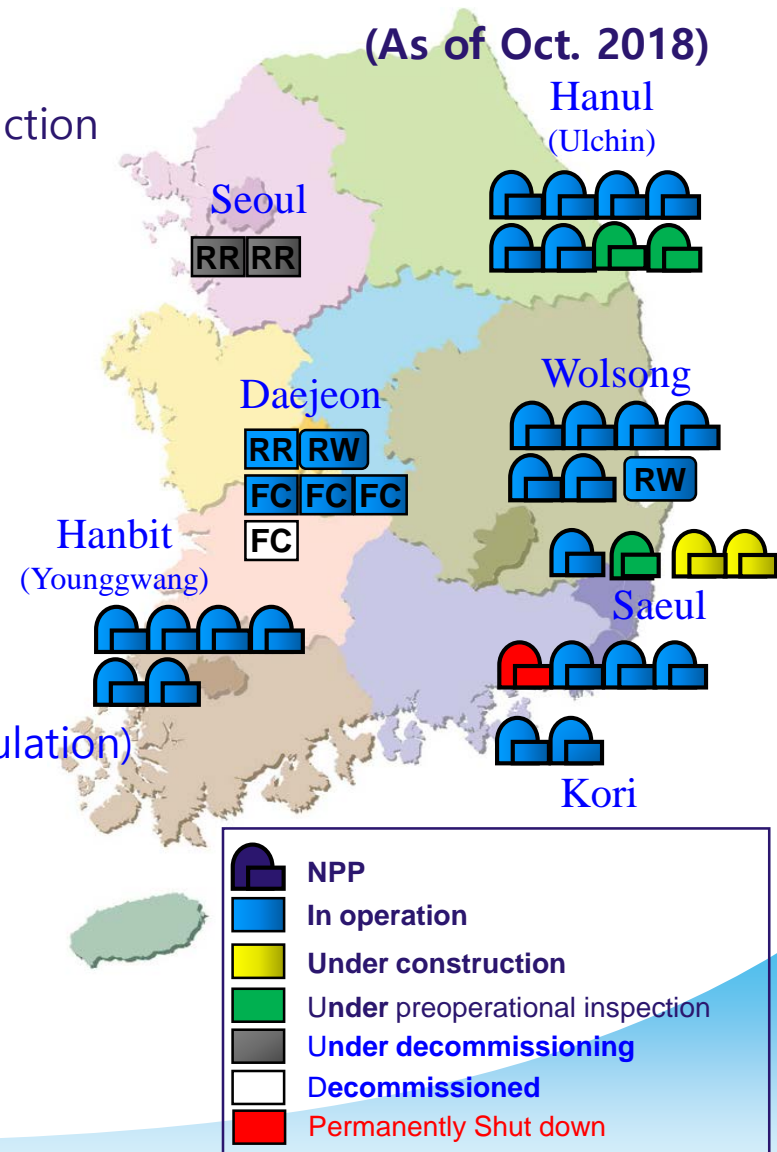
Moon addresses the Kori 1 closure ceremony... 19 June 2017 (image: presidential website)

Nuclear Energy Phase-Out Policy

- ✚ New Government of President Moon declare the Gradual Phase-Out of Nuclear Power in 2017
 - Plans for New NPP will be canceled
 - Shin-Kori 5,6 will be constructed in accordance with the outcome of the public debate
 - Operating Periods of existing units will not be extended
 - Kori unit 1 has been permanently shutdown(June 2017)
 - Early Closure of Wolsung 1
 - Prior to the Expiration of Its Operating Licence in 2022
 - Existing plants close at a 40~60 years end-of-life
 - Last NPP may close at the middle of 2080's

Major Nuclear Facilities in Korea

- ❑ Nuclear Power Plants (NPPs)
 - ◆ 24 units in operation and 2 units under construction
 - ◆ 3 units under preoperational inspection
 - ◆ 1 units in permanently shut down
- ❑ Research Reactors (RRs)
 - ◆ HANARO (RR)
 - ◆ KRR 1 and 2 (RR, under decommissioning)
- ❑ Nuclear Fuel Cycle Facilities (FCs)
 - ◆ Fuel Fabrication Plant for NPP
 - ◆ Fuel Fabrication Facility for RR
 - ◆ Post-Irradiation Examination Facility (PIEF)
 - ◆ Uranium Conversion Facility (released from regulation)
- ❑ Radioactive Waste Management Facilities (RW)
 - ◆ RI Waste Management Facility
 - ◆ Wolsong LILW Disposal Center (WLDC)
→ in operation since 2015











NPPs in Operation

Plant		Reactor Type	Capacity (MWe)	Commercial Operation	NSSS Supplier	Design Life Expiration
Kori (KRN)	1	PWR(WH)	587	1978. 04	Westinghouse	2017.06.18
	2		650	1983. 07	Westinghouse	2023.04.08
	3		950	1985. 09	Westinghouse	2024.09.28
	4		950	1986. 04	Westinghouse	2025.08.06
Shin-Kori (SKRN)	1	(OPR-1000)	1000	2011. 02	KHIC/KOPEC	2050.05.18
	2		1000	2012. 07	KHIC/KOPEC	2051.12.01
	3	(APR-1400)	1400	2016. 12	DHIC/KOPEC	2075.12
Wolsong (WSN)	1	PHWR	679	1983. 04	AECL	2022.11.20
	2	(CANDU)	700	1997. 07	AECL	2026.11.01
	3		700	1998. 07	AECL/KHI	2027.12.29
	4		700	1999. 10	AECL/KHI	2029.02.07
Shin-WSN (SWSN)	1	PWR	1000	2012.07	DHIC/KOPEC	2051.12.01
	2	(OPR-1000)	1000	2015.07	DHIC/KOPEC	2054.11.14
Hanbit (HBN)	1	PWR(WH)	950	1986. 08	Westinghouse	2025.12.22
	2		950	1987. 06	Westinghouse	2026.09.11
	3	PWR(CE)	1000	1995. 03	KHIC/ABB-CE	2034.09.08
	4		1000	1996. 01	KHIC/ABB-CE	2035.06.01
	5	PWR(KSNP)	1000	2002. 05	KHIC/KOPEC	2041.10.23
	6		1000	2002. 12	KHIC/KOPEC	2042.07.30
Hanul (HUN)	1	PWR(FR)	950	1988. 09	Framatome	2027.12.22
	2		950	1989. 09	Framatome	2028.12.28
	3	PWR(KSNP)	1000	1998. 08	KHIC	2037.11.07
	4		1000	1999. 12	KHIC	2038.10.28
	5		1000	2004. 07	DHIC/KOPEC	2043.10.19
	6		1000	2005. 04	DHIC/KOPEC	2044.11.11

NPPs under Construction

We are here



Site & Unit	Type	2000	2005	2010	2015	2020
Shin-Kori 4	APR-1400					
Shin-Hanul 1 Shin-Hanul 2	APR-1400					
Shin-Kori 5 Shin-Kori 6	APR-1400					
Shin-Hanul 3 Shin-Hanul 4	Canceled					



CP Application



Construction

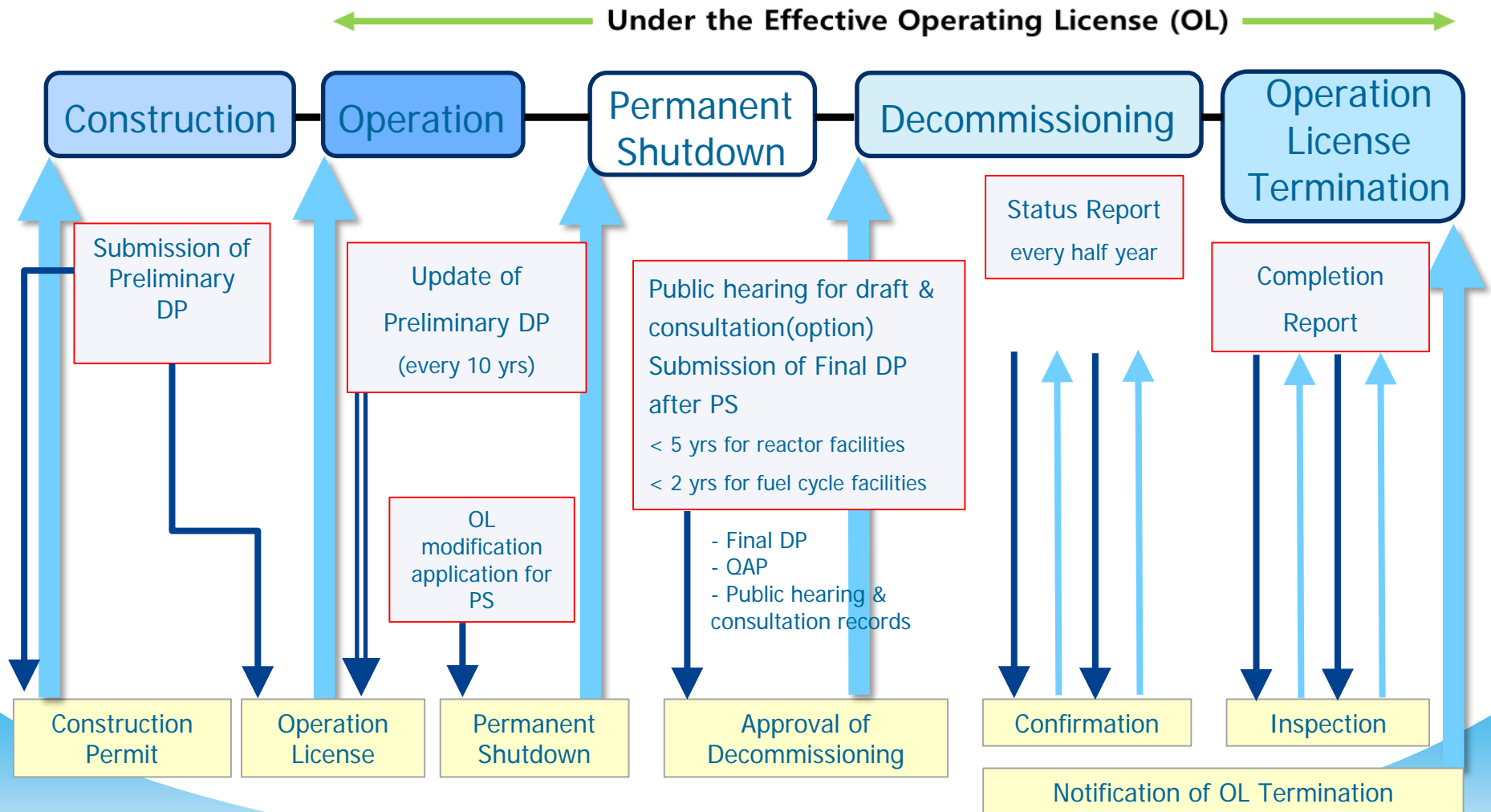


OL Application

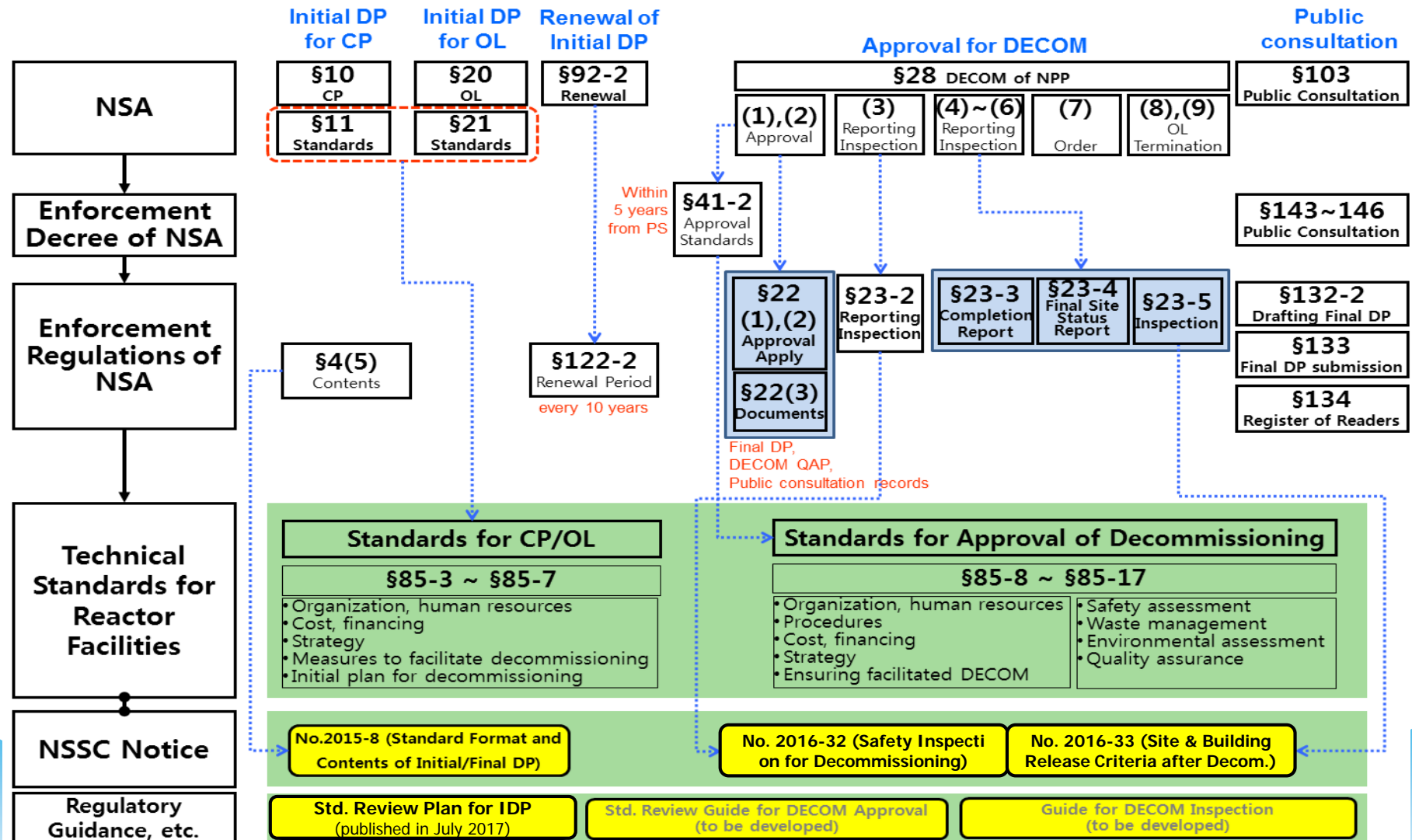
OPR-1000 : Improved KSNP (Korea Standard NPP, 1000MW PWR Type)

APR-1400 : Advanced Pressurized Reactor (1400MW PWR Type)

Regulation Stages & Process



Provisions for Decommissioning Regulation



Decommissioning Regulations



Revision of NSAct

◆ Definition “Decommissioning” : Article 2 (24)

- ☞ The term “decommission” means **all actions or measures** taken to **exclude any facilities** licensed or designated pursuant to this Act **from the scope of application of this Act**, through removal of the facility and the site or through decontamination thereof after **permanent cessation** of the operation of the facilities by those who have been granted permit
- ☞ Target facilities : Article 20 (1) **power reactor**, 30-2 (1) **research & education reactor**, Article 35 (1) or (2) **nuclear fuel cycle business(refining, fabricating, reprocessing)**

Decommissioning Regulations

Initial Decommissioning Plan

◆ Target Facilities for IDP

- Legal based documents at construction permit, operating or designating license:

- ☞ **Power & Research/Education Reactor :**

- (Construction Permit) NSAct article 10(2) & 30(2)

- (Operating License) NSAct article 20(2), 30(2)

- ☞ **Nuclear Fuel Cycle Business :** (Permit) NSAct article 35(3)

◆ Description in IDP

- Enforcement regulation article 4(5) & Notice of NSSC “format & contents on DP”

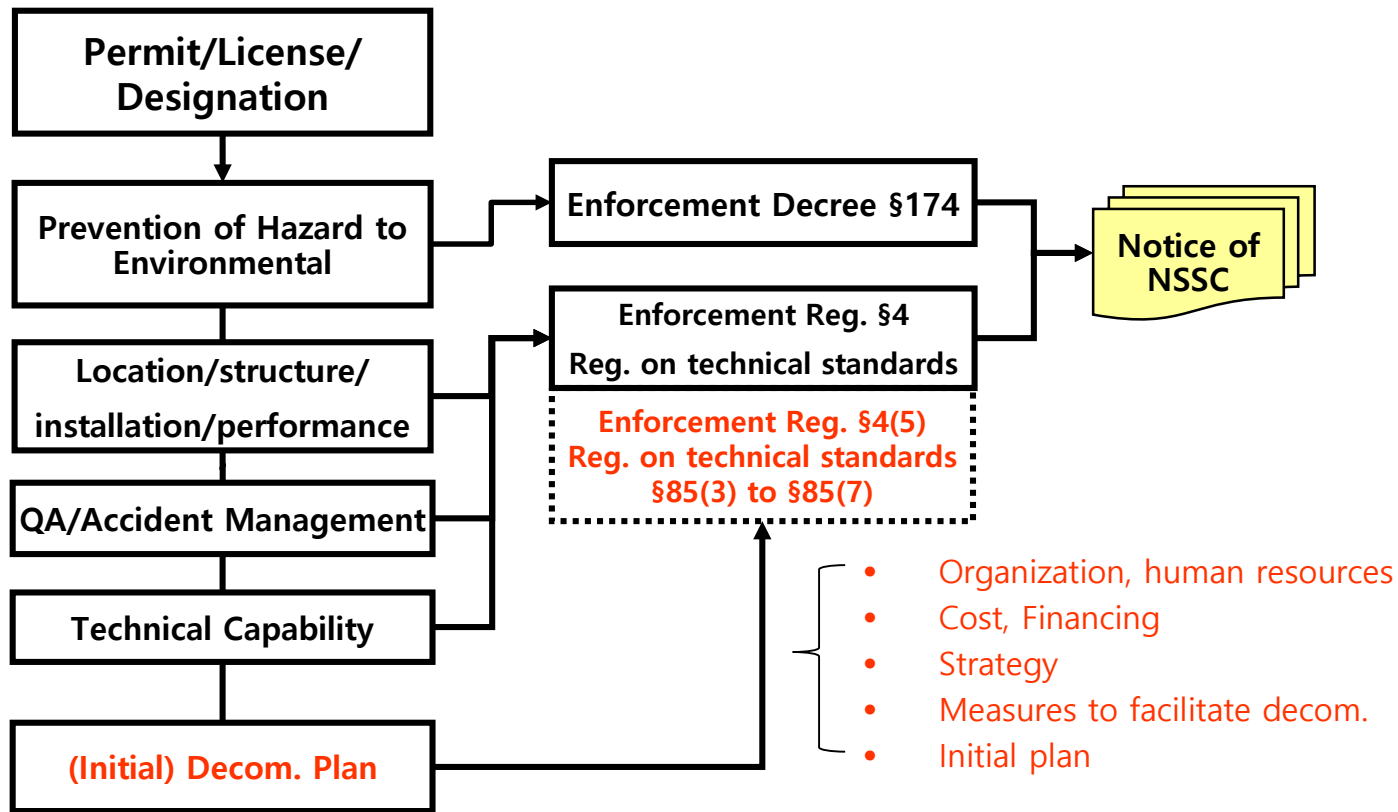
- ☞ Decom. strategy, schedule, measures to protect radiation hazard, decontamination

◆ Periodic revision for IDP

- 10 ys renewal - NSAct 92(2) & enforcement regulation 122(2)

Decommissioning Regulations

Summary for IDP



Decommissioning Regulations

Final Decommissioning Plan

◆ Decommissioning Approval

- **Application(licensee):** as to decommission the utilization facilities, submit the application of decom. approval with FDP + doc.*

* QAM on decom., resident opinion & public hearing results

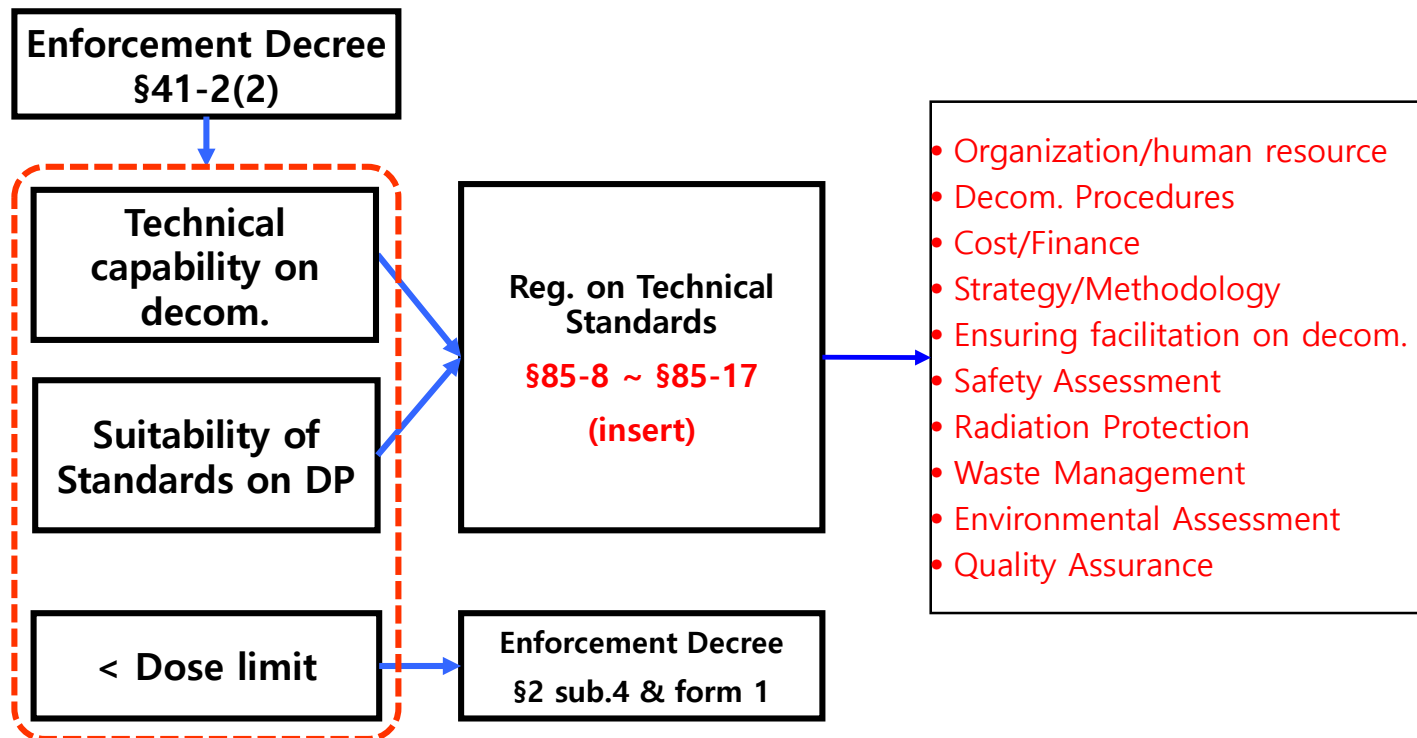
- ☞ should apply the decom. approval within 5 ys after permanently shutdown (enforcement decree §41-2)

- **Decom. Approval :** NSAct §28(1)/28(2)/42(1)/42(2), enforcement decree §22/48-2 (reactor + fuel cycle)
- **Public access/opinion/hearing :** NSAct §103(2), enforcement decree §143 ~ §145 (only for reactor)

Decommissioning Regulations

Summary for FDP

- Requirement for Decom. Approval



Decommissioning Regulations



Report & Inspection on Decom. Status

- **Periodic Report (decom. status)**
 - **Licensee Report (NSAct article 23(3))**
 - ☞ Semi-annual reporting on decom. status : ① facilities status, ② decontamination status, ③ radiation safety management status, ④radio-waste management status (Reg. on technical standards §23(2))
- **Periodic Inspection (Confirmation & Check)**
 - **NSSC Inspection (NSAct article 23(3))**
 - ☞ Notice of NSSC, "Regulation on items and methods on inspection for decom. Status" article 3(3)
7 areas (17 items) : decontamination activity, decom. activity, environmental radiation management, waste management, fire protection, QA activities

Decommissioning Regulations

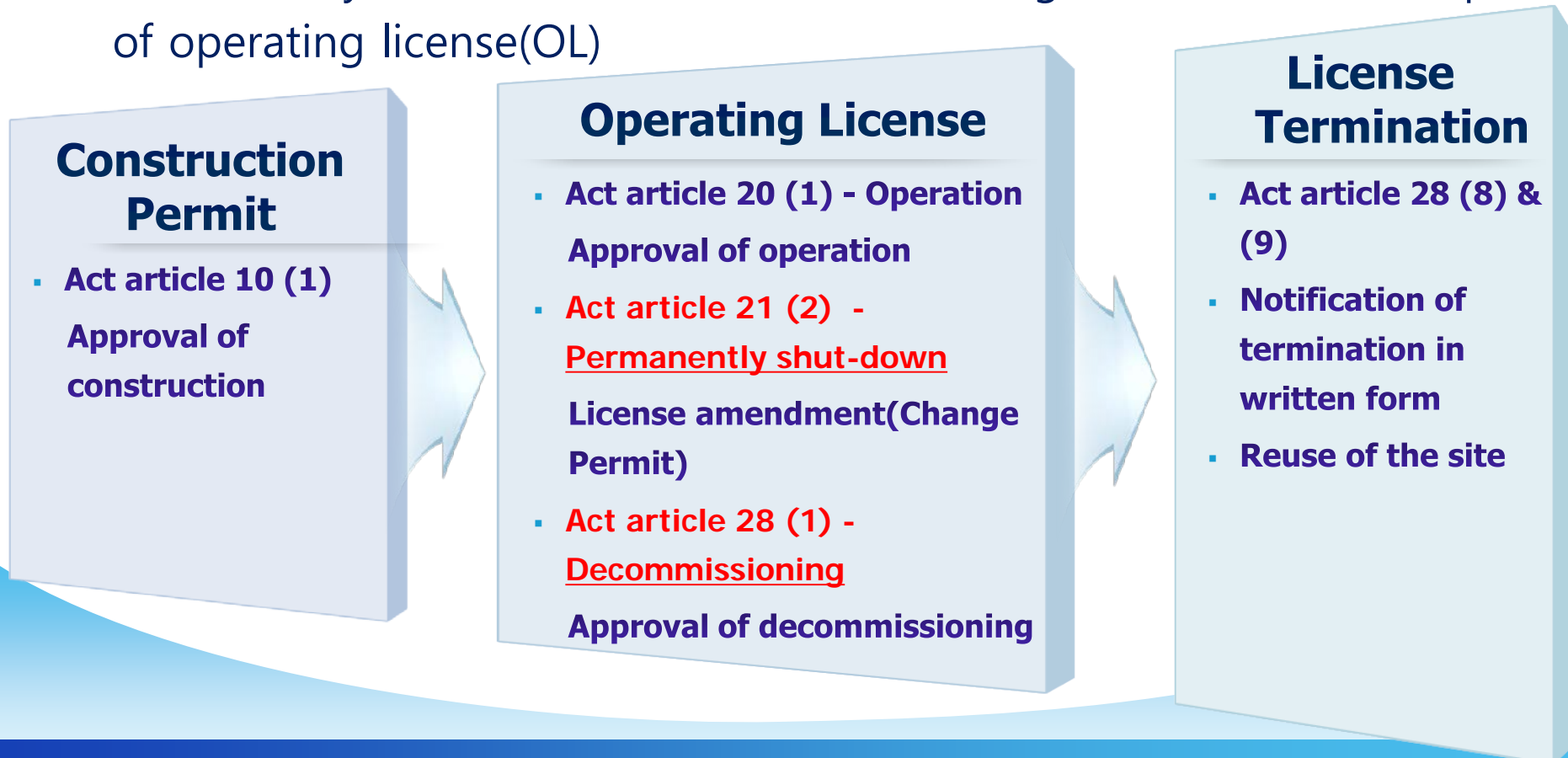


Decommissioning Completion Report & Inspection

- ◆ **Decom. Completion Report & NSSC Review**
 - Licensee Report (NSAct article 28(4)/(5))
 - ☞ **Completion Report & Final Status Survey Report**(Enforcement Reg. 23-3/4)
 - DCR : Strategy, progress, (before/after) site & facilities status, final radiation/activity status, waste management status, occupational dose status, abnormal event/accident on decom.
 - FSSR: Investigation plan/method/results for final radiation/activity on site, site reuse plan
- ◆ **Inspection for Decom. Completion**
 - NSSC Inspection (NSAct article 28(8), Enforcement Reg. article 23-5)
 - ☞ **Compliance with DP, DCR, FSSR and criteria on site reuse**
 - Notice of NSSC “Regulation on standards on site & building reuse

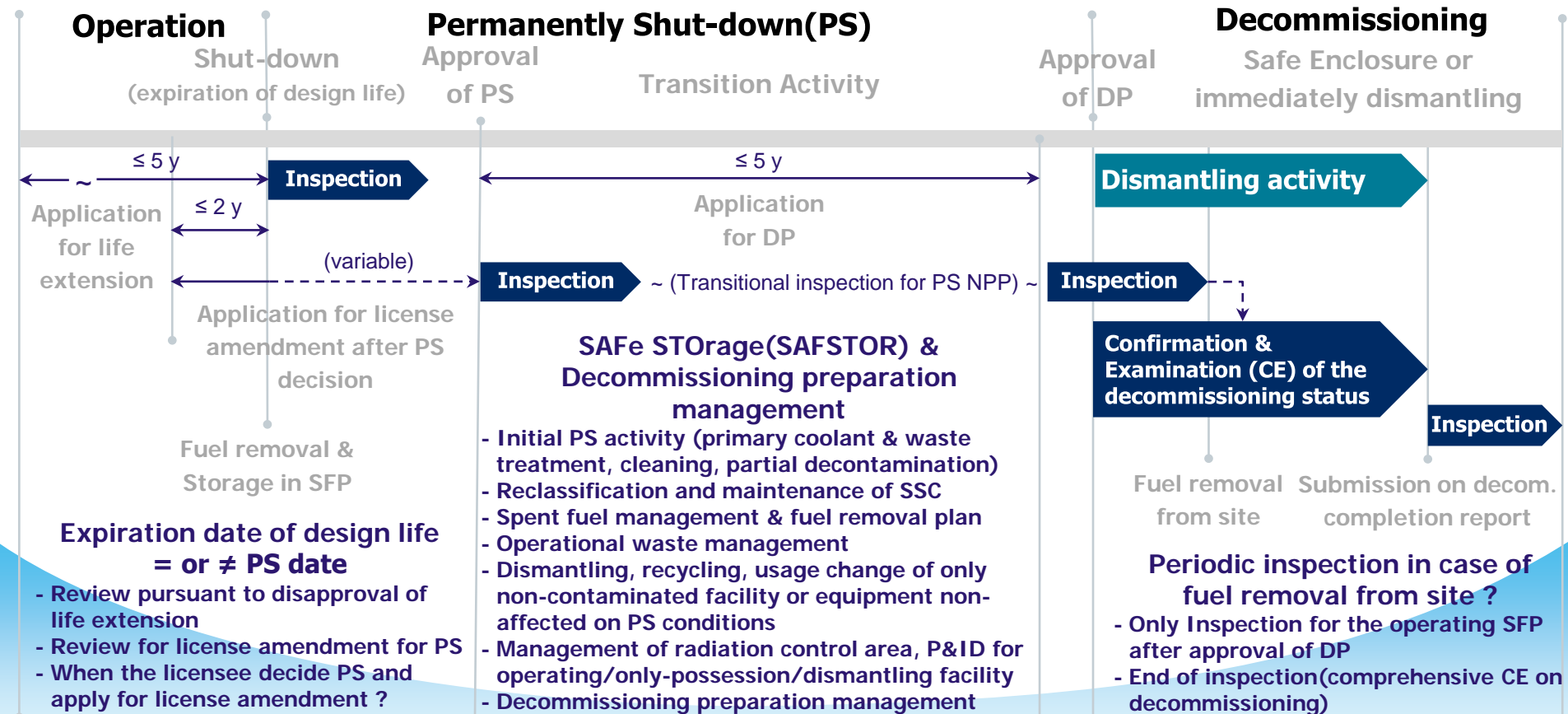
Transitional Phase of NPP in Korea(1)

- ✚ According to Nuclear Safety Act(NSAct), the phase of NPP could be categorized with construction permit(CP), operating license(OL), license termination(LT)
- ✚ Permanently shut-down and decommissioning was considered as parts of operating license(OL)

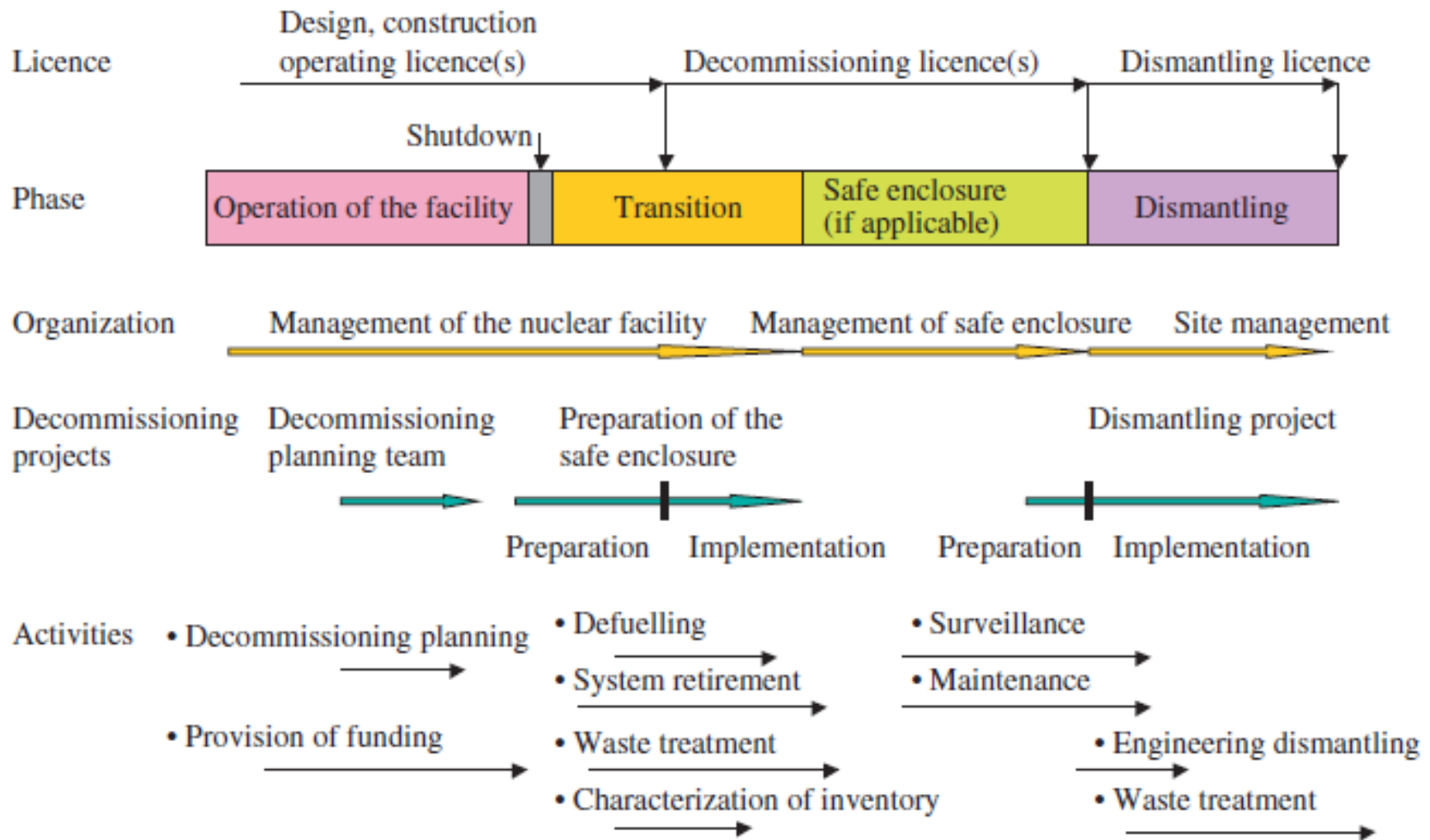


Transitional Phase of NPP in Korea(2)

- If the operator intends to permanently shut-down & decommission, the operator apply a license amendment & submit a decommissioning plan(DP) to regulatory body before the start of their activities under operating license



IAEA's Safety Standards for Transitional Phase(2)

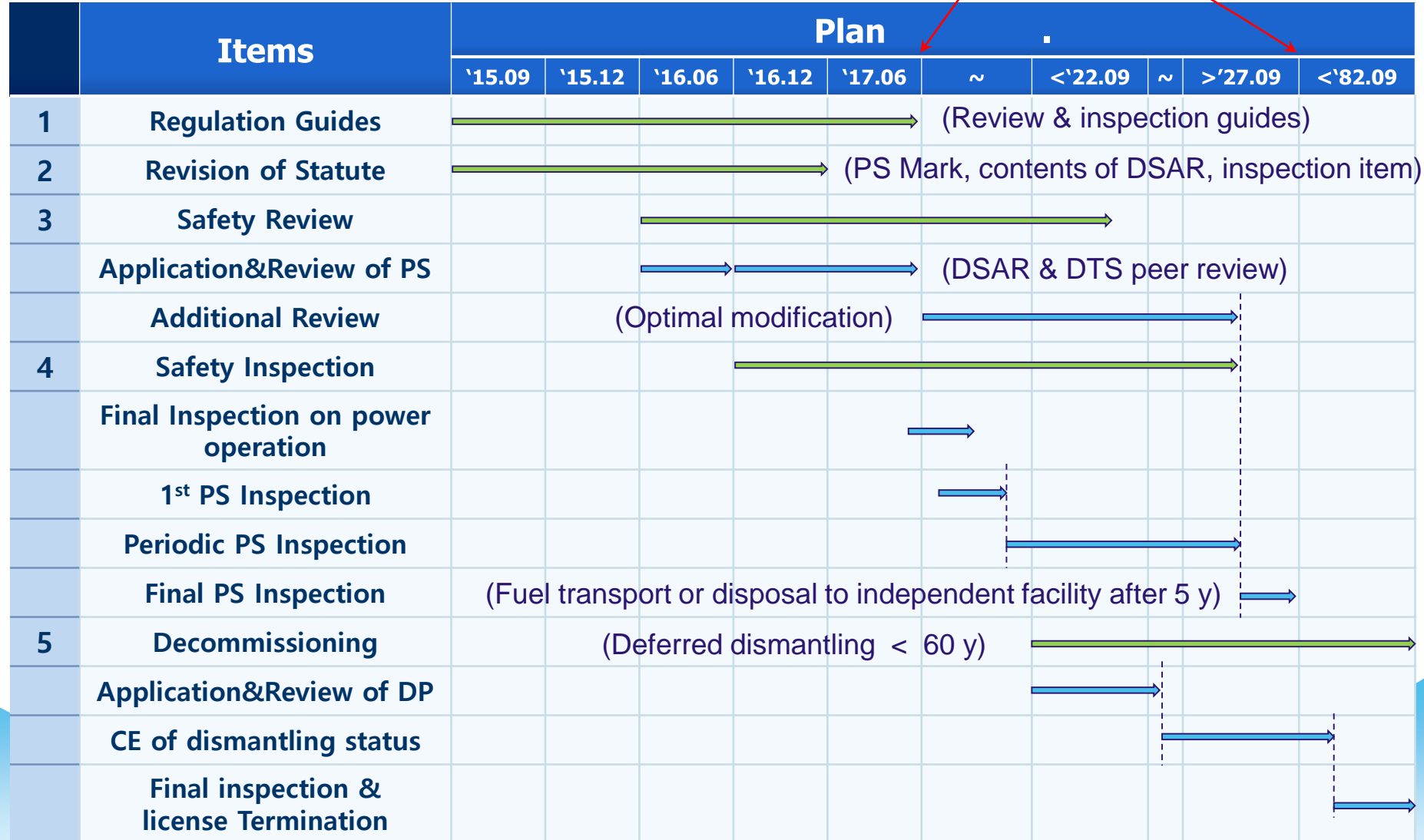


IAEA TRS No.420 Fig.1 Decommissioning related activities during the life cycle of an NPP

Further Plan



Regulation Plan on Kori unit 1 NPP



Safety Together, Better Tomorrow!

***Thank you so much for your
attention!***

