

Zoom Conference
19th June 2024, Prague

The Risk of APR 1000 in Czech

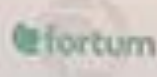


원자력 안전과 미래
원자력 안전에 우리의 미래가 있습니다

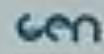
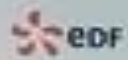
Jeong Yoon Lee RPE

EUR Certificate for APR1000

2 March 2023, Brussel Belgium



TRACTEBEL



tvo



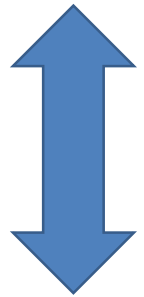
OPR 1000 design is based on down sizing CE SYS 80 (1300MW) by **CE Engineers** together with KAERI staffs thru TT contract

APR 1400 design is based on ABB-CE SYS 80+(1400MW) to EPRI URD requirements Thru TA contract between KHNP and **ABB-CE**

NRC design certified SYS 80+(1400MW) in 1997, and APR-1400 in August 2019

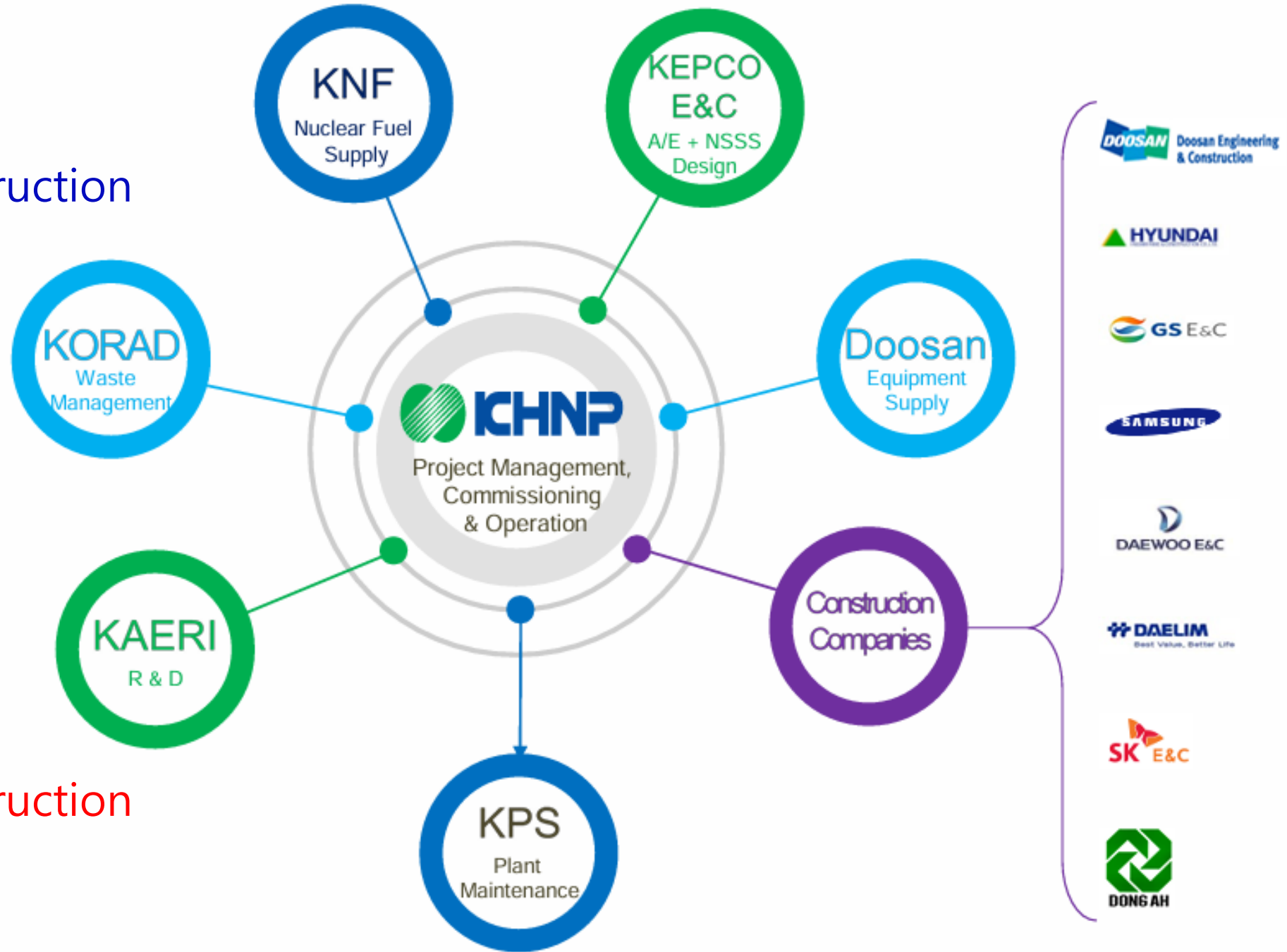
APR1000 = OPR1000+APR1400+EUR

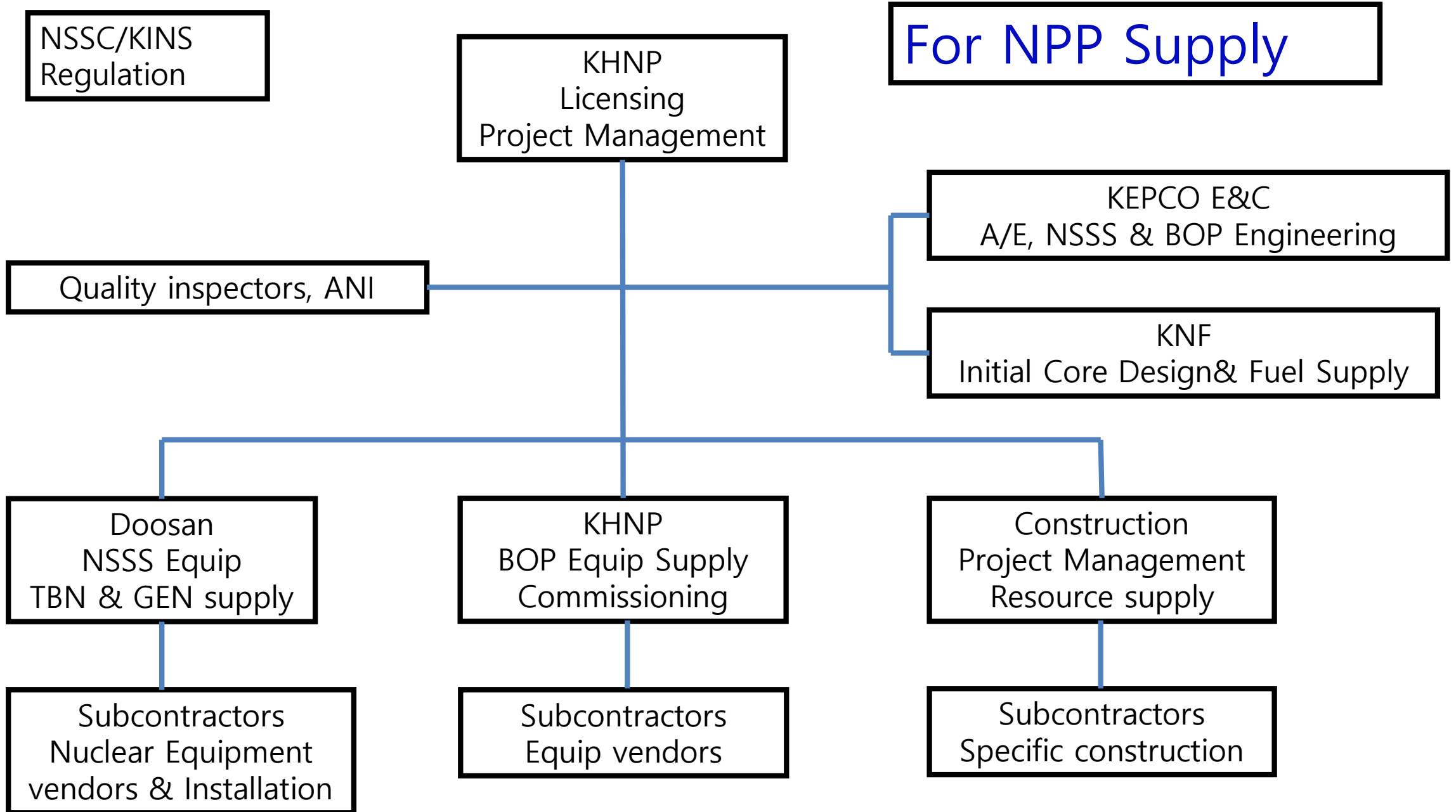
EPC,
Procurement & Construction
by Engineering



No Third Party
Reviewer!!!

MPC,
Procurement & Construction
by Money(Contract)





NSSC/KINS
Regulation

KHNP
Licensing
Project Management

For NPP Supply

Quality inspectors, ANI

KEPCO E&C
A/E, NSSS & BOP Engineering

KNF
Initial Core Design& Fuel Supply

Doosan
NSSS Equip
TBN & GEN supply

KHNP
BOP Equip Supply
Commissioning

Construction
Project Management
Resource supply

Subcontractors
Nuclear Equipment
vendors & Installation

Subcontractors
Equip vendors

Subcontractors
Specific construction



Oct 17, 2013

by Sonal Patel

- KHNP intervenes in all fields of Nuclear Supply
- KHNP's hegemony together with corrupted politicians is a big source of corruption.
- KHNP's annual R&D order 500bwon by which control of high level human resource group secured.
- It builds strong nuclear engineering profit cartel (Academy, Research, Engineering..)

Nuclear

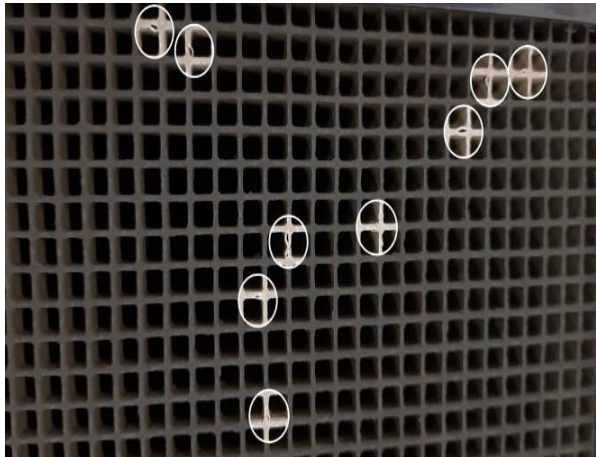
S. Korea Indicts 100 in Nuclear Graft Scandal, Considers Drastic Cut in Future Nuclear Power Share

South Korea in the past week indicted 100 people—including officials from the state-run nuclear power plant operator—of corruption in a scandal over forged nuclear safety certifications. It is now also considering freezing ambitions to maintain nuclear's 29% share in its total power mix—which means scrapping a previous goal to increase it to 41% by 2035.

The scandal broke last November after the country's energy ministry (formerly the Ministry of Knowledge Economy and now, the Ministry of Trade, Industry, and Energy [MOTIE]) ordered the shutdown of two nuclear reactors at the Yeonggwang nuclear complex owned by state company Korea Hydro & Nuclear Power Co. (KHNP), which operates the nation's 23 nuclear reactors. The measure followed the Korea Electric Power Co. (KEPCO) subsidiary's admission that eight unnamed firms that supplied parts had faked certificates covering thousands of nuclear power components over a period of nearly 10 years, from 2003 to 2012—affecting at least five reactors. Then in May, KHNP found safety-related control cabling with forged documentation in four other reactors, prompting the country's nuclear regulator to force shutdown of Shin-Kori No. 2 and Shin-Wolsong No. 1 reactors—both commissioned in July 2012—for about four months for replacements.

The source of corruption has not been changed!

PAR(Passive Autocatalytic Recombiner)



		시험이상보고서 (NOA) Project No. : <u>PAR</u>
발주서 번호	,	고객
품목 번호	,	공급자
품목명	PAR	
시험이상 내역 <input type="checkbox"/> 시편 <input type="checkbox"/> Profile 입력오류 <input type="checkbox"/> 시험원 편 <input type="checkbox"/> 구매품목 <input checked="" type="checkbox"/> 기타 (<u>수소 공급량 미작동</u>)		
시험이상 사항 <ul style="list-style-type: none"> 시험시작 2시간 30분 후(수소주입 2시간 25분 후, ...) 공기 공급이 불안정 해짐. <u>공기 공급이 불안정 해짐에 따라 수소 농도가 ...</u> 		
조치사항 <ul style="list-style-type: none"> <u>수소 농도가 높아 폭발의 위험성이 ...</u> <u>약 8,000초 동안 시편의 수소 제거 능력은 ...</u> 		

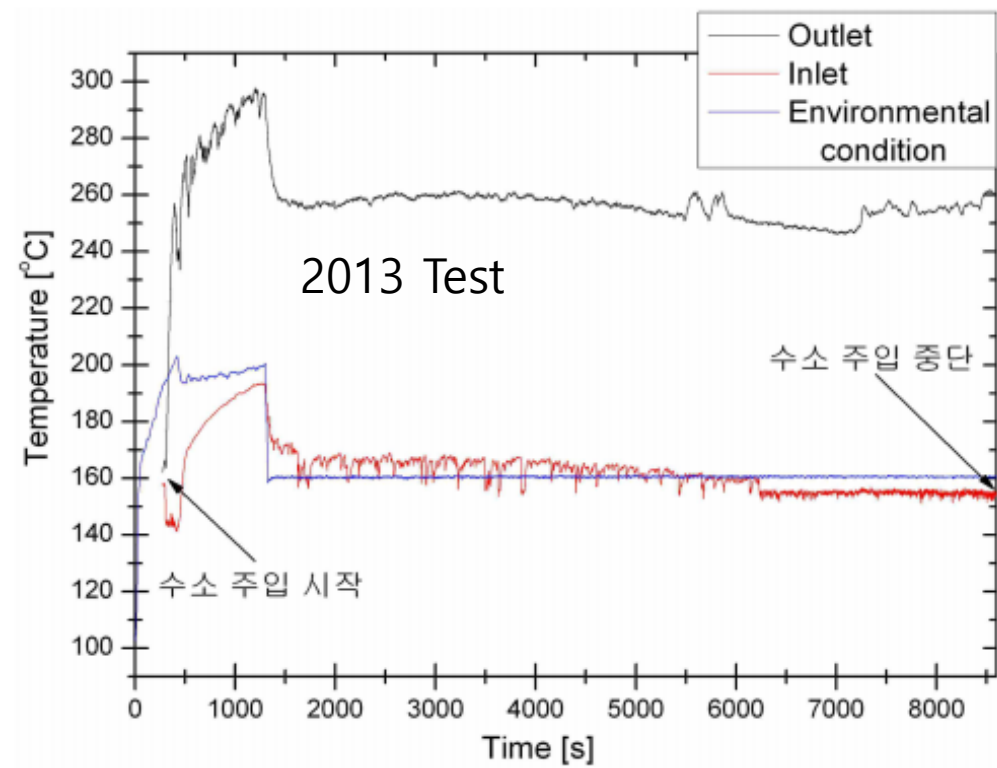


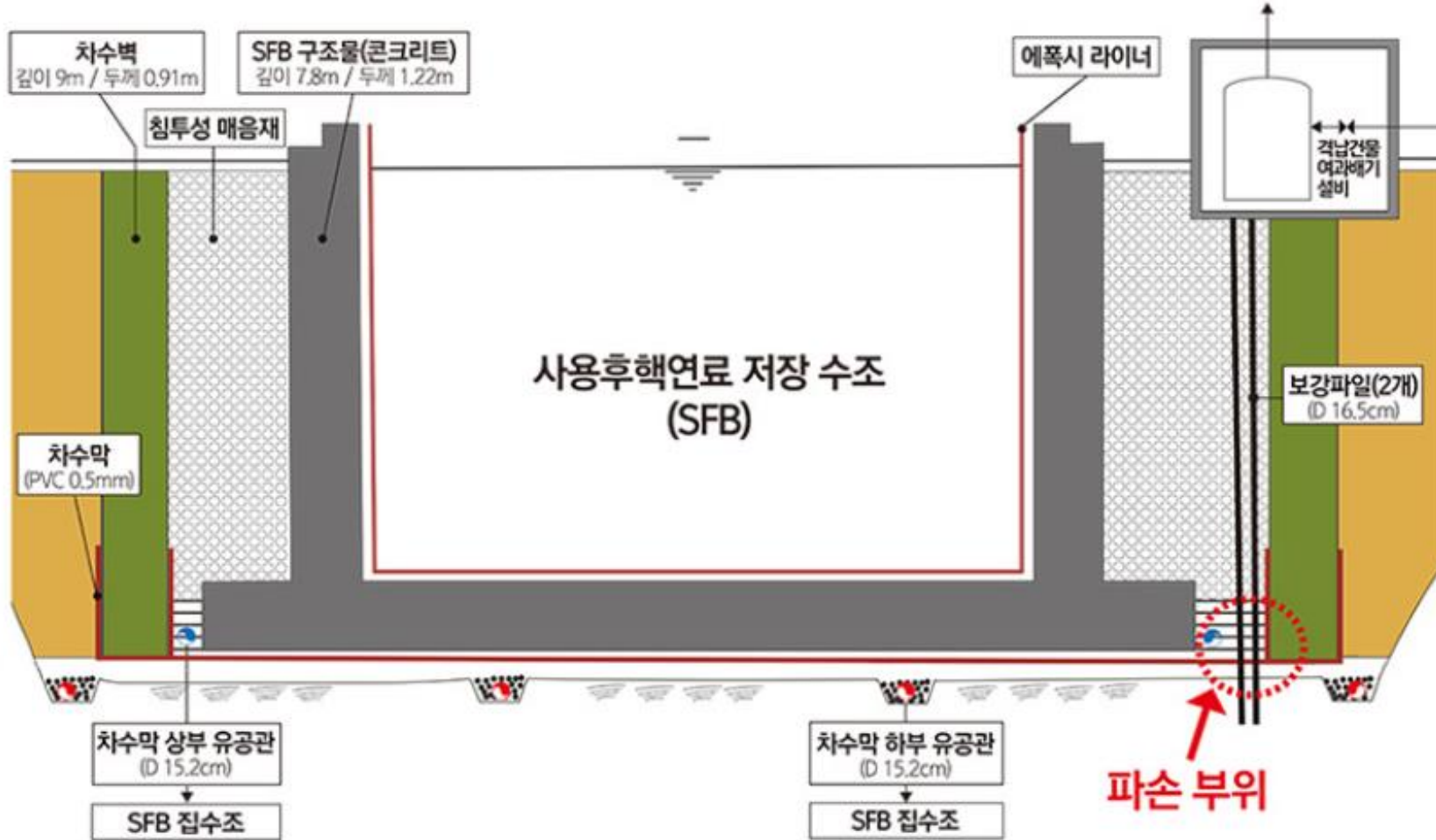
그림 3-7. 촉매 상단·하단 온도

May 2024 NSSC, PARs supplied are insufficient in H2 removal performance but accept flame during H2 removal process

CFVS(Containment Filtered Vent System)

사용후핵연료 저장 수조 아래에 있는 차수막 시설 단면도

제작 탈핵신문 그래픽 정수희



△ 자료 제공: 경주환경운동연합

- MMIS system developed for localization in 2010 and Installed at Shinhanul 1,2, APR1400 at first.
- It causes lots of complex problems during Shinhanul 1,2 construction
- Construction delay for 5 years and finally start commercial operation in 2022, 2023.
- However, Sinhanul #1 shutdown for MMIS error in January 2024.

이데일리 [+ subscribe](#)

Succeeded in localizing 'MMIS', one of the three core nuclear power plant technologies... 4th in the world

Entered 2010.09.16. 11:00 AM - Modified 2010.09.16. 2:59 PM [Original text of article](#)

- Nuclear power plant's brain and neural network... 14 trillion won worth of import substitution effect by 30 years
- Fruit of 9 years of research and development led by Doosan Heavy Industries and Nuclear Power Co.
- POSCO ICT, Woori Technology, Woojin, and KEPCO Technology also participated in the development



Pilot Operated Safety Relief Valve



SEMPELL



SEBIM

Safety: Shared POSRV Nightmares for KHNP and EneC

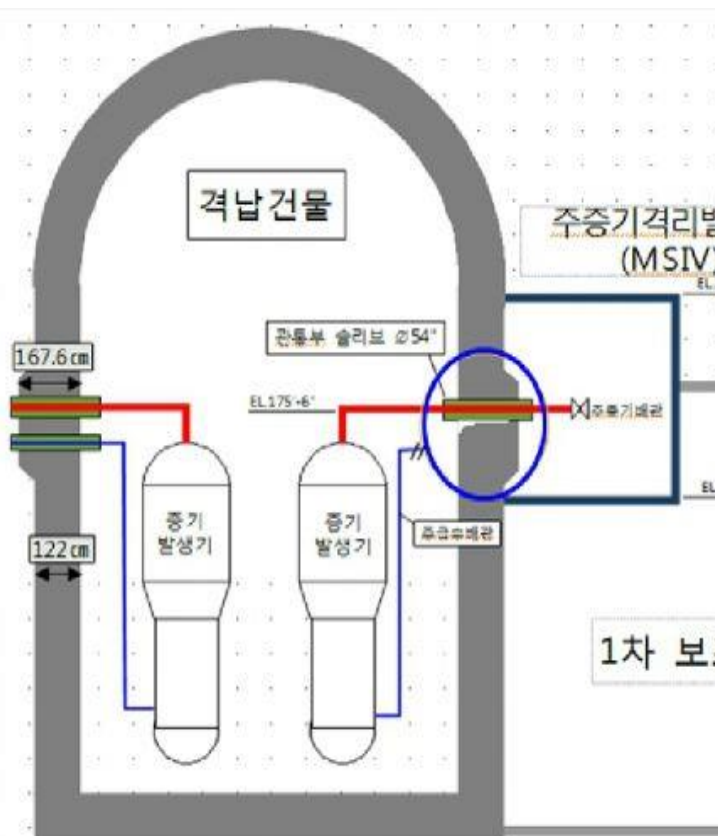
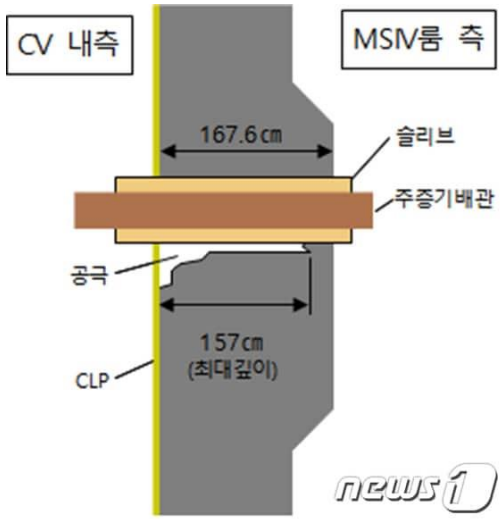
Copyright © 2024 [Energy Intelligence Group](#)

A faulty piece of key equipment in the world's first operating APR1400, and in seven other APR1400s under construction in both South Korea and the United Arab Emirates, continues to be a major headache for the APR1400 owners and casts a spotlight on national regulators in both countries. The reactor's pilot-operated safety relief valve (POSRV) is designed to protect the pressurizer against overpressure

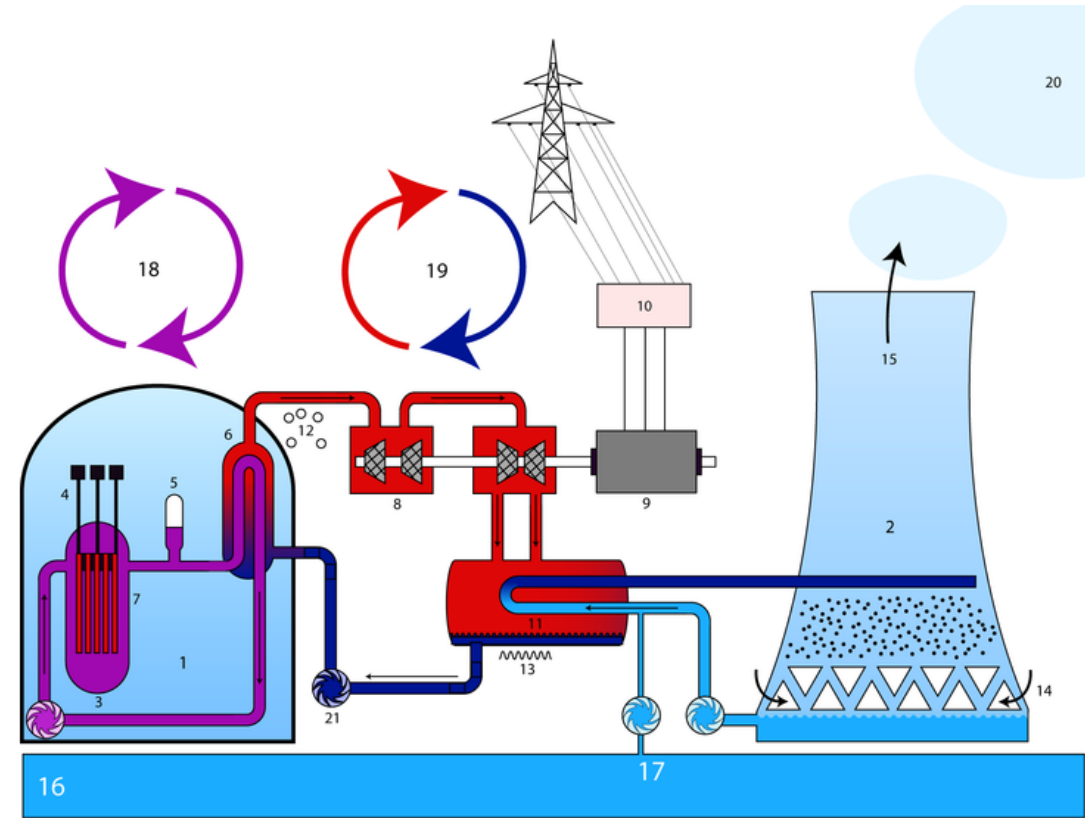
Nightmare!

It causes construction delay for 4 years in Barakah

Same problem was in Shinhanul 1,2



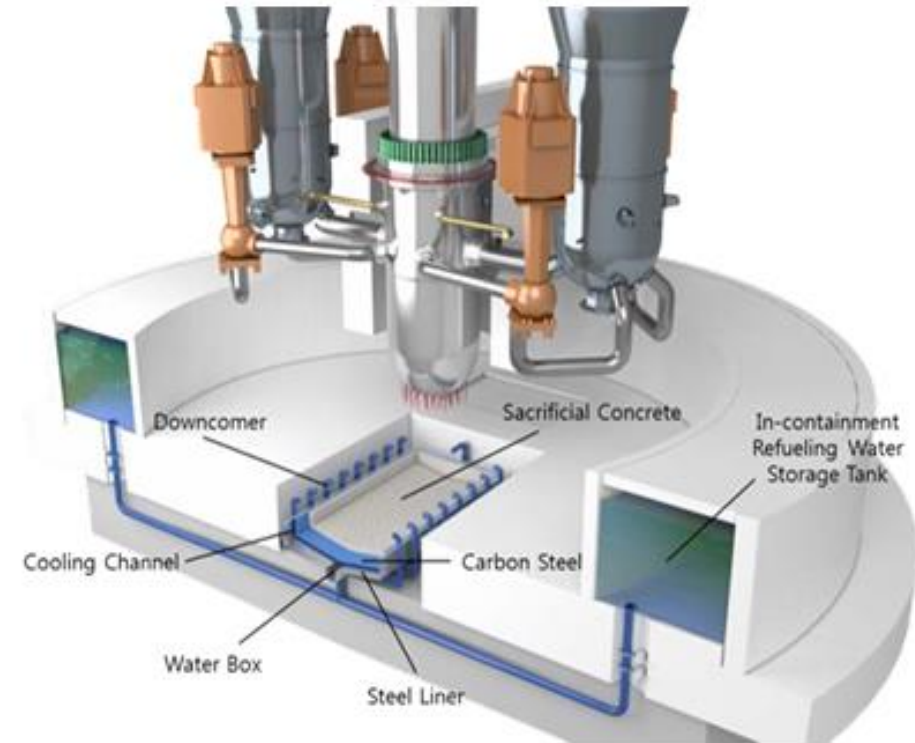
New Design - Big Cooling Towers



PECS, Passive Ex-vessel corium retaining and Cooling System

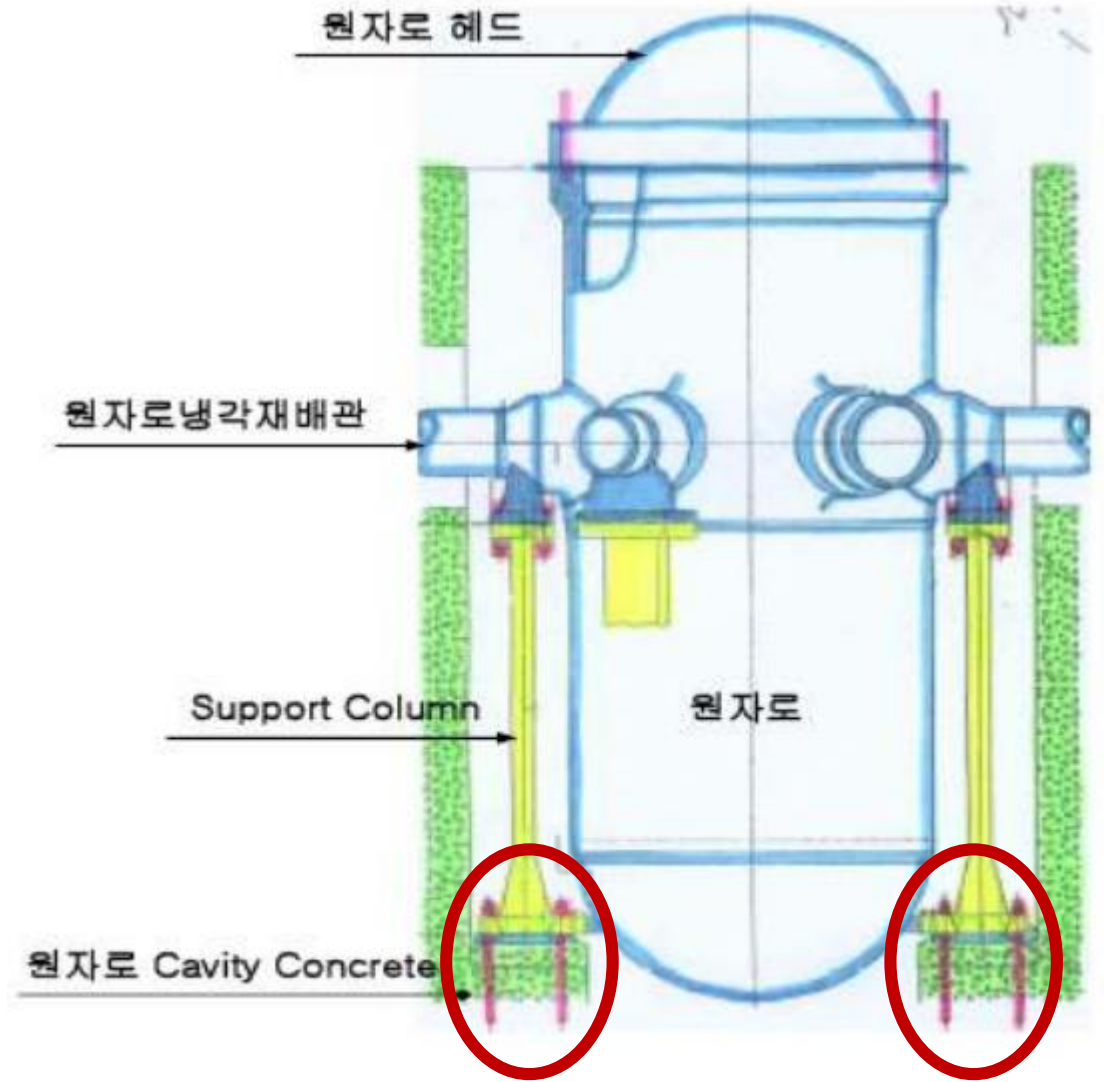
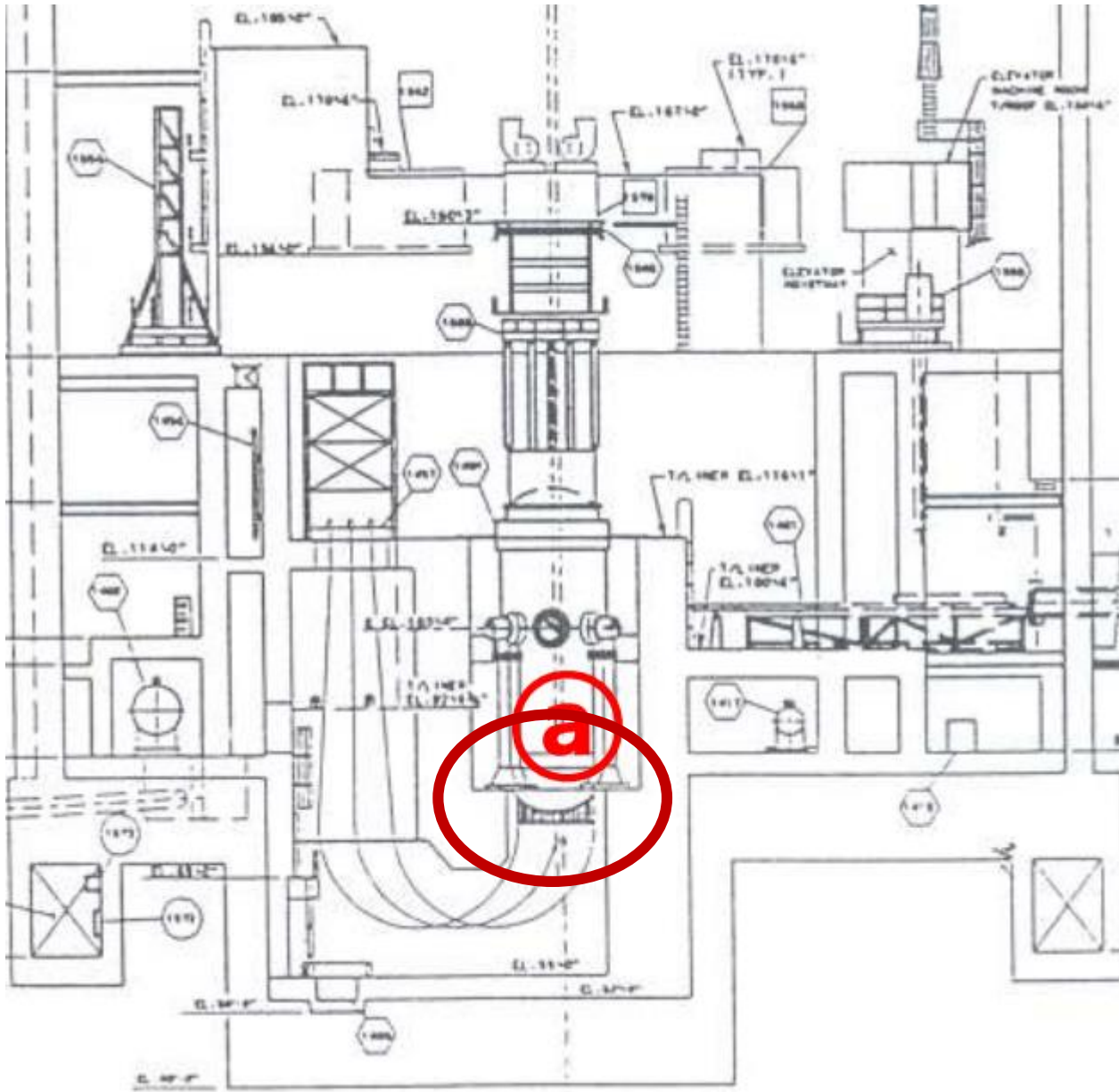
System	Function
Passive Corium Cooling System	Preventing interaction between molten core and pressure-bearing materials of the containment
Emergency Reactor Depressurization System	Preventing high pressure molten ejection
Containment Spray System	Preventing containment over-pressurization
Passive Hydrogen Control System	Maintaining hydrogen concentration in containment below 10 v/o
Instrument System	Monitoring status of plant condition
Electrical System	Supplying power to SAs dedicated systems by using battery and AACs

Core-Catcher



Advanced Power Reactors in Korea, May 17, 2017, Yong Soo Kim, Prague

https://www.energeticketrebitsko.cz/data_4/soubory/6.pdf



“비구조요소를 고려한 APR-1400 원전격납구조물의 응답 이력 해석을 위한 집중질량 모델 개발”, ScienceON, 2012.11.
<https://scienceon.kisti.re.kr/commons/util/originalView.do?cn=TRKO201300025116&dbt=TRKO&rn=>

	W AP1000	EDF EPR1200	KHNP APR1000
Project Financing	O	O	Δ
Construction delay	Δ	Δ	O(?)
Latest Standards	O	O	Δ
Technical Maturity	O	O	Δ
Design Capability	O	O	X
Vendor Localization	O	O	Δ
Language Communication	O	O	X
Fuel Cycle	O	O	X
Diplomatic	O	O	Δ
Price	Δ	Δ	O

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF COLUMBIA

WESTINGHOUSE ELECTRIC COMPANY
LLC,

1000 Westinghouse Drive
Cranberry Twp., PA 16066

Plaintiff,

vs.

KOREA ELECTRIC POWER CORP.

#55 Jeollyeok-ro
Naju-si, Jeollanam-do
Korea 58322

Serve: 400 Kelby Street
Suite 704
Fort Lee, NJ 07024

AND

KOREA HYDRO & NUCLEAR POWER
CO. LTD.,

1655 Bulguk-ro,
Munmudaewang-myeon, Gyeongju-si
Gyeongsangbuk-do
Korea 38120

Serve: 400 Kelby Street
Suite 704
Fort Lee, NJ 07024

Defendants.

Case No.

- Westinghouse filed a lawsuit against KEPCO/KHNP that Korean Reactor design is based on Westinghouse owned License
- 10CFR Part 810 Violation
- Korean NPP technology are not allowed to Third Party without permission under PART 810
- Korea admit APR 1400 design is based on the Westinghouse owned license so, Korean should have permission from US DOE

COMPLAINT

Plaintiff Westinghouse Electric Company LLC (“Plaintiff” or “Westinghouse”), by and

through its undersigned counsel, files this complaint seeking a declaratory judgment and injunctive

This content is from the eCFR and is authoritative but unofficial.

Title 10 - Energy
Chapter III - Department of Energy

Part 810 Assistance to Foreign Atomic Energy Activities

- § 810.1 Purpose.
- § 810.2 Scope.
- § 810.3 Definitions.
- § 810.4 Communications.
- § 810.5 Interpretations.
- § 810.6 Generally authorized activities.
- § 810.7 Activities requiring specific authorization.
- § 810.8 Restrictions on general and specific authorization.
- § 810.9 Grant of specific authorization.
- § 810.10 Revocation, suspension, or modification.
- § 810.11 Information required in an application for specific authorization.
- § 810.12 Reports.
- § 810.13 Additional information.
- § 810.14 Special provisions regarding Ukraine.
- § 810.15 Violations.
- § 810.16 Effective date and savings clause.



- § 810.6 Generally authorized activities.
- § 810.7 Activities requiring specific authorization.
- § 810.8 Restrictions on general and specific authorization.
- § 810.9 Grant of specific authorization.

810.2(a)(2)

(2) The transfer of technology that involves any of the activities listed in paragraph (b) of this section either in the United States or abroad by such persons or by licensees, contractors or subsidiaries under their direction, supervision, responsibility, or control.

810.2(b)(5)

(5) Nuclear reactor development, production or use of the components within or attached directly to the reactor vessel, the equipment that controls the level of power in the core, and the equipment or components that normally contain or come in direct contact with or control the primary coolant of the reactor core;

Appendix A to Part 810
Generally Authorized Destinations

S. Korea urges U.S. to resolve legal issue on nuclear reactor export to Czech Republic



Oh Seok-min

All News · 10:26 April 28, 2023



Earlier this year, the U.S. Department of Energy (DOE) rejected a filing by KHNP regarding its bid for a nuclear reactor construction project in the Czech Republic, according to officials.

In a response to the KHNP's letter, the DOE said that any such letters "must be submitted by U.S. persons" under its regulations, indicating that its cooperation with Westinghouse is a must, which sparked concerns that the potential exports of nuclear reactors could fall apart due to the ongoing litigation.

The joint statement, issued after the summit between Yoon and U.S. President Joe Biden, said that the two nations mutually respect "each other's export control regulations and intellectual property rights" regarding nuclear energy issues.

Project Deficit?

- Long Project schedule & deadline
- No proved design exists currently for APR1000
- It depends Conditions of Project Financing
- Who is responsible for the project deficit?
 - Project run by Public Company
 - Profits go to company, Deficits go to nation
 - It could be become Diplomatic issues depending agenda arised

Too Big, Too Long and Too Risky
Low Possibility of successful construction