



IAEA

Regional Workshop on Safety Benefits and Challenges in the Development of the Adoption of
Small Modular Reactors (EVT2404165)

Development of SMART100

02. April. 2025

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ENERGY
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INSTITUTE



한국원자력연구원
Korea Atomic Energy Research Institute



IAEA Regional Workshop

Development of SMART100

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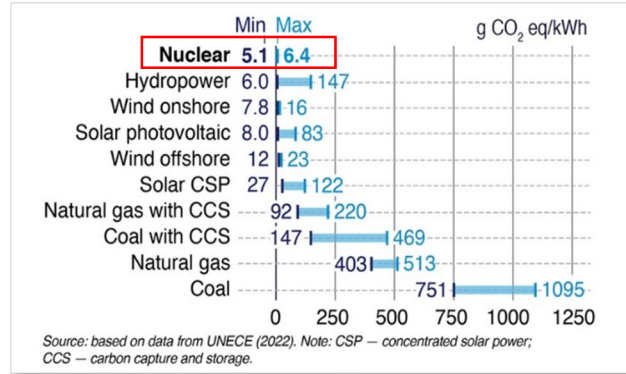
- 01** Introduction
- 02** Design Philosophy
- 03** Technical Development
- 04** Standard Design Approval
- 05** Closure

Carbon Neutrality and SMR

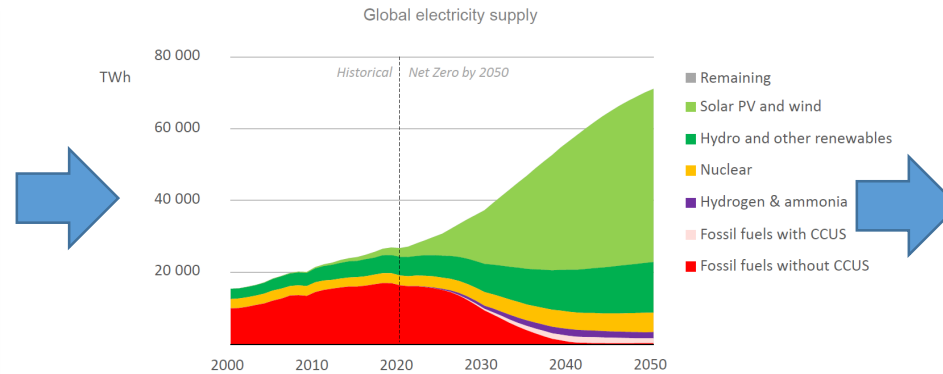


(Electrification) Energy transition to renewable electricity for achieving carbon neutrality

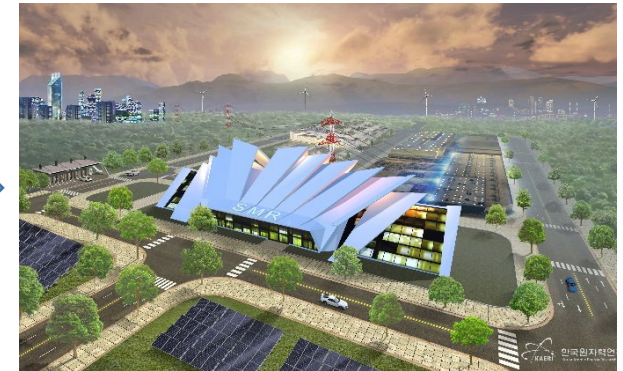
- The share of nuclear energy rises along with the growth of renewable energy.
- SMRs can supplement the intermittency of VRE and geographical transmission limitation.



Climate Change and Nuclear Power 2022, IAEA (2022)



Brent Wanner, Korea Atomic Power Annual Conference, 27 April, 2022

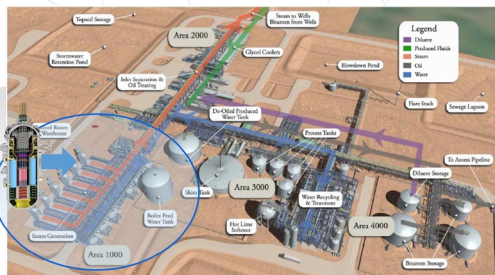


< SMR Net Zero City >

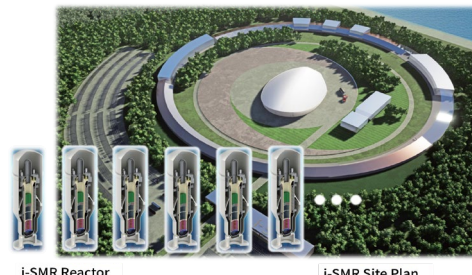


(SMR) Roles of SMR in Net Zero Emissions

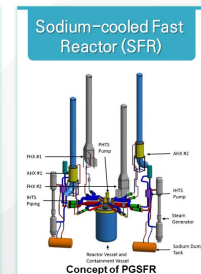
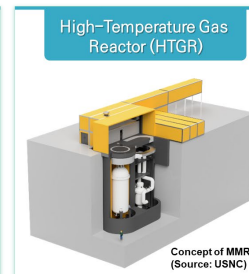
- Replacement of coal plants to supply on-grid power
- Replacement of fossil fuels in heavy industry, off-grid mining and district heating
- Hydrogen production, desalination and merchant shipping



< SMART for Heat Supply >

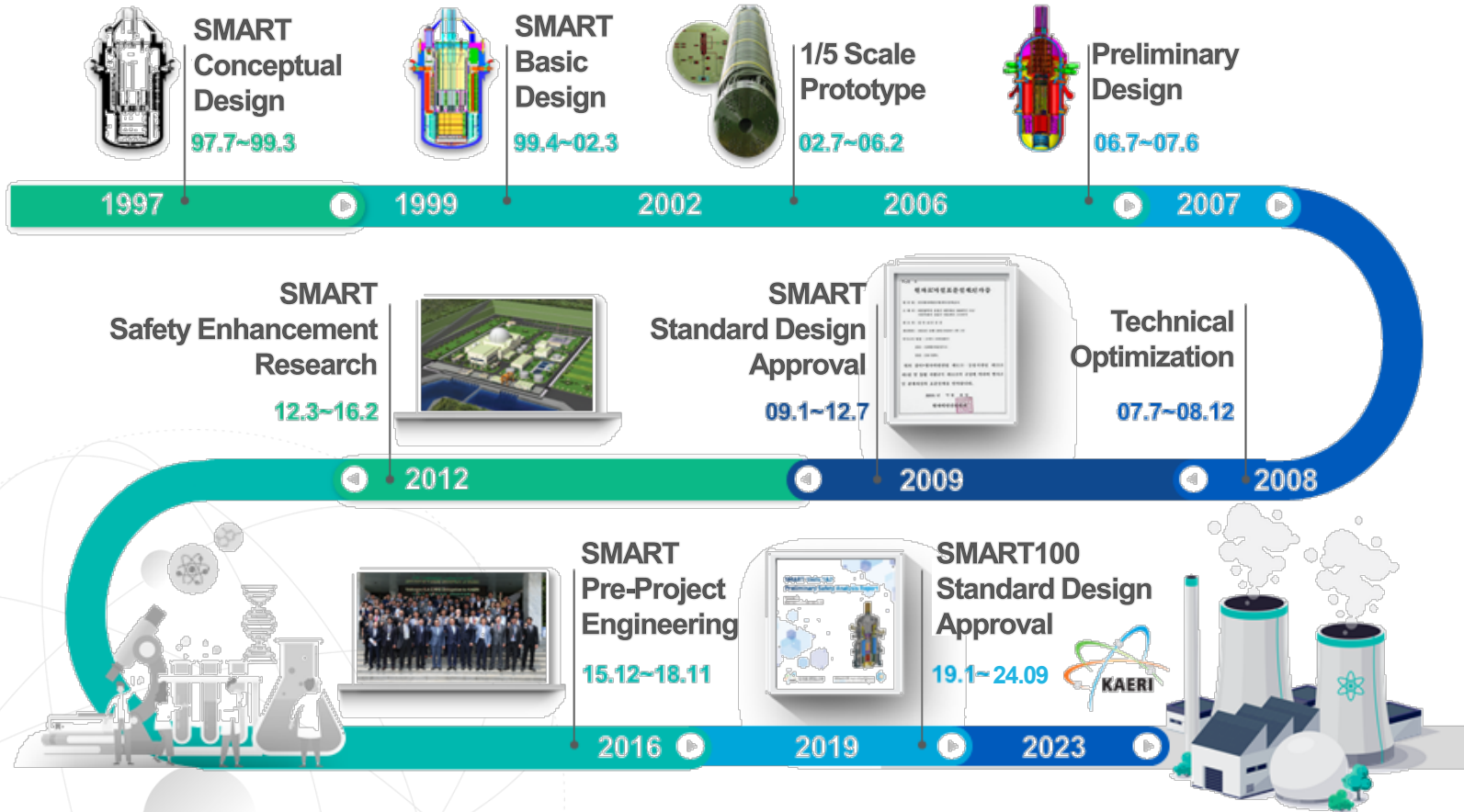


< Innovative SMR >



< Generation IV SMR >

Development History



No. 4

Certificate of Standard Design Approval for Nuclear Facility

1. Name of Company: Korea Hydro and Nuclear Power Co., Ltd.(KHNP),
Korea Atomic Energy Research Institute(KAERI),
King Abdullah City for Atomic and Renewable Energy(K.A.CARE) of Saudi Arabia

2. Address

- KHNP : 1655, Bulguk-ro, Munmudaewang-myeon, Gyeongju-si, Gyeongsangbuk-do, Republic of Korea
- KAERI : 111, Daedeok-daero 989beon-gil, Yuseong-gu, Daejeon, Republic of Korea
- K.A.CARE : PM5H+4JX 12244 Al Olaya, Riyadh, Kingdom of Saudi Arabia

3. Representative

- KHNP : JOO HO HWANG
- KAERI : HAN GYU JOO
- K.A.CARE : H. H. Dr. MAMDOOH AL SAUD

4. Name of Reactor : SMART100

5. Type : Integral type Pressurized Water Reactor

6. Capacity : 365 MWt

As above, pursuant to Article 12 of the 「Nuclear Safety Act」, Article 22 (1) of the Enforcement Decree of the same Act, and Article 9 of its Enforcement Rules of the same Act, the standard design of the reactor and related facilities is hereby approved.

September 26, 2024

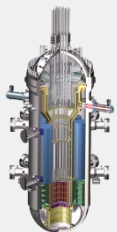
Nuclear Safety and Security Commission

Official
Seal
Affixed

September. 26. 2024

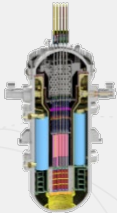
SMART Design Upgrade and Licensing

■ Design Development



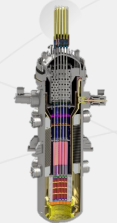
[SMART]

- SMART development started ('97, initial technology development)
- Development of the integral reactor concept had been conducted. ('99~'02)
- SMART Technology Validation and Standard Design Approval(SDA) project was conducted ('09~'12)
- SMART SDA was officially issued on July 4th, 2012. (330MWth, 100MWe, partially passive safety system)



[SMART100]

- The safety enhancement of SMART was conducted after Fukushima Accident ('12~'16, fully passive safety system)
- SMART Pre-Project Engineering(PPE) had been conducted for construction in Saudi Arabia ('15~'19)
- The project of SMART100 SDA has been conducted ('19~now), issuance of SDA is expected on Sep. 2024.



[SMART-C]

- For improving economic characteristics of SMART, Reactor vessel diameter is decreased and optimization of safety system is conducted.
- SMART-C project for deploying in Canada is on-going



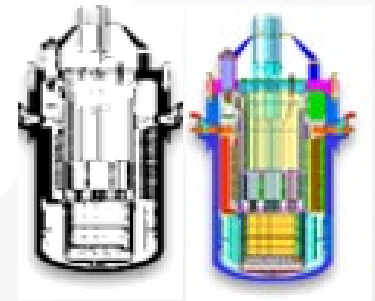
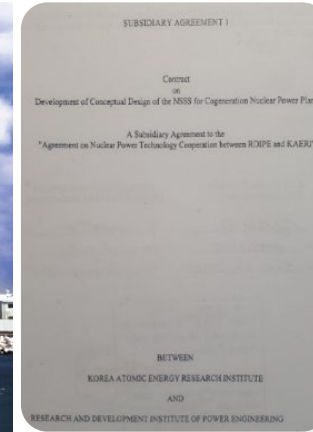
Background

- The national R&D project “**Next Reactor for Global Markets**” was launched to enhance export competitiveness based on the Korean NPP design technologies and operating experiences (1997)



Major R&D Projects for SMART

- (1997-1999) Conceptual Design Project
- (1999-2002) Basic Design Project for SMART Reactor System
- (2002-2006) Proto-type (1/5 Scale) Development Project for SMART Technology Demonstration



SMART



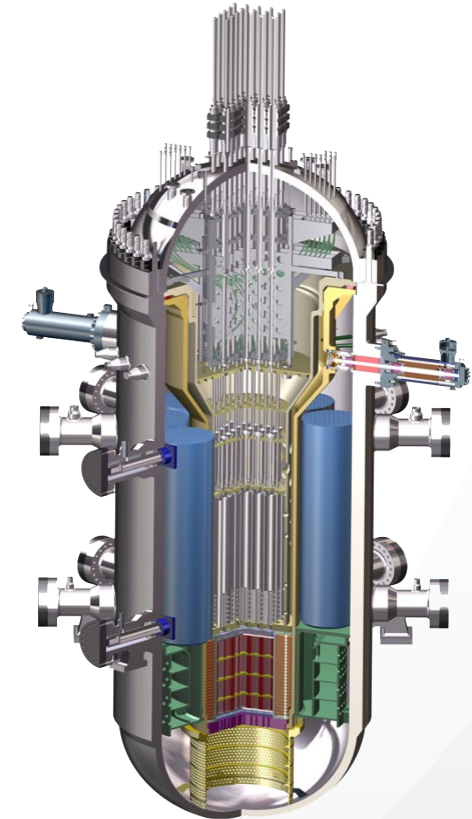
Target Markets

- The reactor was designed as integral reactor targeting the small or medium scale power generation and seawater desalination markets.



Key Milestones & Achievements

- (Feb. 2008) Selected the national nuclear power project
- (Dec. 2008) Launched SMART development by Korean government and established industrial consortium
- (Jul. 2012) Achieved the world's **first “Standard Design Approval (SDA)”** among the integral reactors

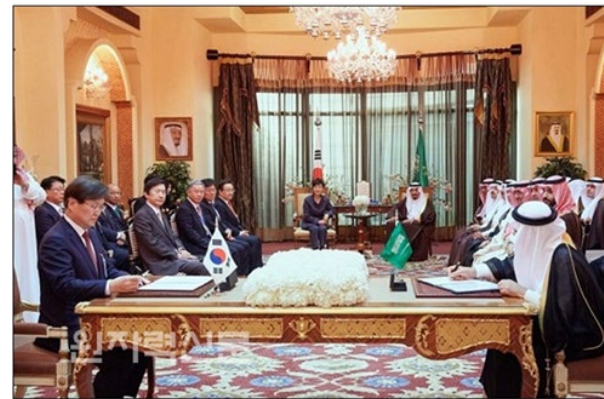
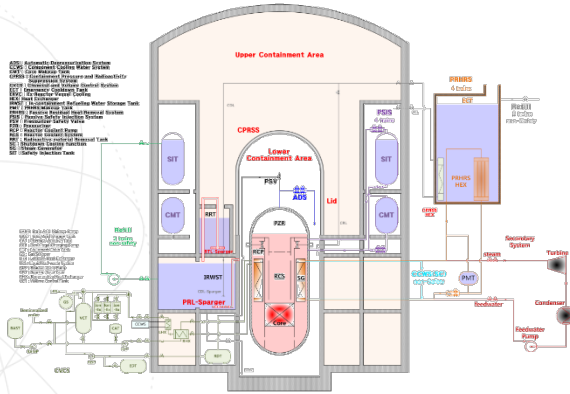
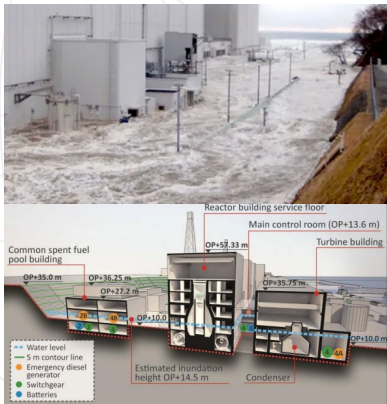


SMART100



Background

- The needs to incorporate the **post-Fukushima Action** increased to ensure the safe conditions even in the situations like the Fukushima accident in 2011. The national R&D projection by Korean government was launched to substitute the active safe systems with **passive safety systems** in 2012.
- SMART Partnership** was established for **FOAK construction** in Saudi Arabia and global commercialization. The detailed design works were completed to enhance the safety and economy in SMART PPE project (2015-2018).



SMART100



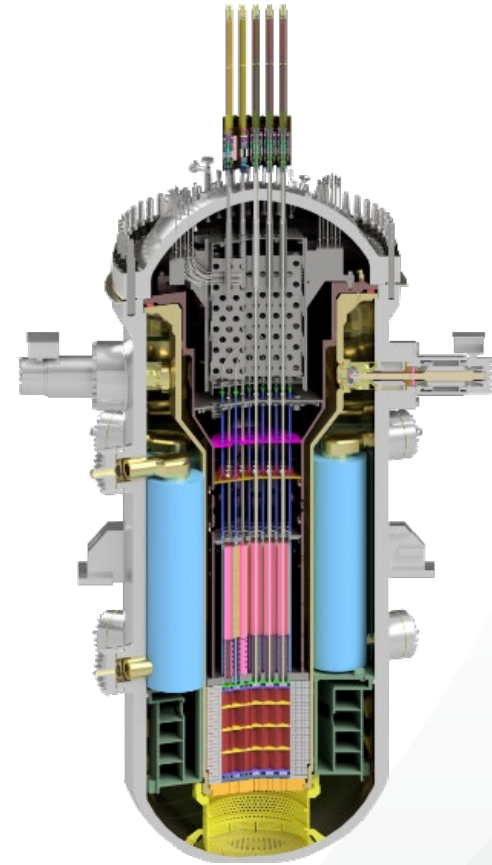
Major Projects for SMART100

- (2012-2016) Safety Enhancement Research (SER) project
- (2015-2018) Pre-Project Engineering for (PPE) project
- (2019-2024) Standard Design Approval (SDA) project



Key Milestones & Achievements

- (SER) Study on passive safety systems
- (PPE) Detailed design deliverables for FOAK construction and licensing documents
- (SDA) Named as “**SMART100**”
Standard design to minimize licensing risks





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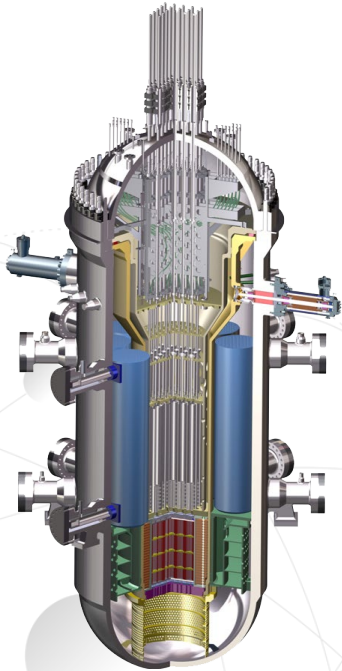
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SMART vs SMART100

SMART



330 MWt

100 MWe

PWR

Integral type

36 months

Helical, once-through

Active + Passive ¹⁾

EDG

AC + Natural Forces

30 minutes

$< 1.0 \times 10^{-6}/\text{RY}$

Dome / Cylinder



Thermal Power

Electric Power

Reactor Type

Configuration

Refueling Period

Steam Generator

Safety Systems

Emergency Power

Driving Force for Safety

Operator Action Time

CDF
(Internal / Full Power)

Containment

365 MWt

110 MWe

PWR

Integral type

30 months

Helical, once-through

All Passive ²⁾

Battery

DC + Natural Forces

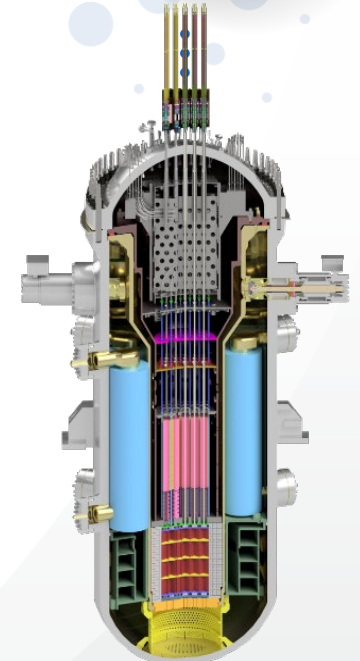
72 hours

$< 1.0 \times 10^{-7}/\text{RY}$

Arch / Rectangular



SMART100



¹⁾ Active : Safety Injection, RCS Depressurization, Containment System / Passive : Residual Heat Removal

²⁾ Passive : Safety Injection, RCS Depressurization, Containment System, Residual Heat Removal

Pioneering Strategic Pathways



Vision

01 Next Global Model

Proven Tech.

License

SMR

- To maximize the utilization of proven PWR Technology
- To minimize construction, operation, and licensing risks by SDA
- To ready for SMR global energy market deployment in the 2020s



Mission

02 Integral Reactor and Passive Safety System

Long-term

No AC Power

Passive System

- To ensure long-term safety without external resources
- To achieve constructability and operability even in limited off-site power supply
- To adopt passive safety systems operated by natural forces without relying on AC Power



Strategy

03 Harmonizing “Proven” and “Innovative” Technologies

Safety

Economic

Application

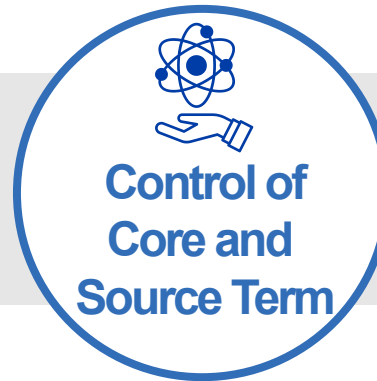
- To eliminate LBLOCA (integral reactor) / No AC power, No Operator action (passive system)
- Economic competitiveness compared to fossil energy and non-electric application
- Versatile applications near urban areas or industries (desalination, district heating, process heat supply, etc.)

Safety Goals

Protecting “Humans” and “Environment” from Radiation Hazards



+



+



Safety Goal 1

- ✓ CDF < 1.0E-7/Ry
- ✓ LERF < 1.0E-8/Ry
- ✓ TED < 250 mSv
- ✓ Total Frequency Cs-137 Exceeding 100 TBq < 1.0E-7/Ry

Safety Goal 2

- ✓ To cool-down to safe shutdown condition within 36 hours without any operator action
- ✓ To maintain the safe shutdown condition for 72 hours without core damages.

Safety Goal 3

- ✓ To meet the “Safety Goal 2” even in the loss of on-site or off-site AC power
- ✓ Capability loss of offsite power (LOOP) or station black-out (SBO)

Safety Goal 4

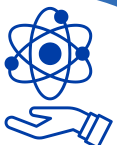
- ✓ To maintain core integrity in the event of double-ended guillotine break of largest pipe penetration the reactor vessel

Safety Design Philosophy

01 To prevent the release of radioactive materials and protect the public and environment

 Multiple Barriers	Barriers	Representative Structures	Large PWR	SMART100
	1 st barrier	• Fuel Pellet	• Pellet	• Pellet
	2 nd barrier	• Fuel Cladding	• Zirlo	• HANA-6
	3 rd barrier	• Reactor Coolant Pressure Boundary	• Loop	• Integral
	4 th barrier	• Containment (Liner plate)	• Applied	• Applied
	5 th barrier	• Containment (steel-concrete)	• Applied	• Applied

02 To Maintain the structural integrity of multiple barriers and control the plant status

 Defense in Depth	Level of defense	Objective	SMART100
	Level 1	• Prevention of abnormal operation and failure	• Robust design, QA, Maintenance
	Level 2	• Control of abnormal operation and detecting failure	• Protection system, surveillance feature
	Level 3	3a • Control of DBA 3b • Control of DEC to prevent core melting	• Passive Safety System , EOP
	Level 4	• Control of DEC to mitigate the consequences of SA	• Containment, SAMG
	Level 5	• Mitigation of radiological consequences of significant releases of radioactive substances	• On-site and off-site emergency facilities, plans, and procedure

Safety Design Philosophy

03 To apply nuclear safety concepts on major structure, system and components (SSCs)



Safety Concept

Redundancy

Diversity

Independence

Fail-safe

Inherent Safety

Design Features

- Single failure criteria
- Different operating principles
- Electrical and physical Separation
- Operation in safe position
- Inherent behaviors in safe condition

SMART100

- Multiple trains in systems
- Valve operators (MOV, AOV...)
- Separation in each train
- Fail Open, Fail Close, Fail as is)
- Reactivity feedback effects

Remark

Essential minimum requirements

Optional Design feature

04 To eliminate accident risk factors and prevent progression to severe conditions



SMART100

- Integral reactor
- Low heat flux in fuels
- Abundant reactor coolant inventory
- Canned motor reactor coolant pump

Design Principles

- To eliminate the intrinsic causes of LBLOCA
- Advantageous for ensuring nuclear fuel integrity
- Advantageous for preventing core uncover
- To eliminate the main leakage path

Design Characteristics

Safety
Goal

Safety
Strategy

Critical
Safety
Function

Passive
Safety
System



Prevention of Release of Radioactive Materials



Protect Fuel and Cladding



Protect Primary System



Protect Containment

Core Sub-critical

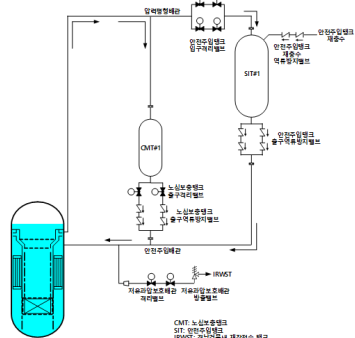
Core Cooling &
Heat Removal

Reactor Coolant
Injection

Maintain
RCPB Integrity

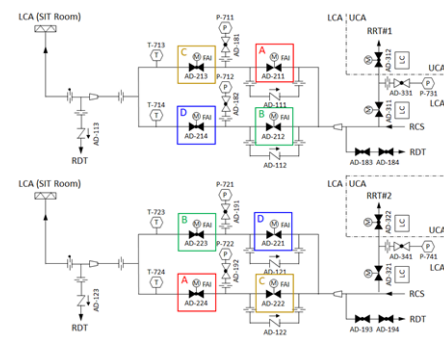
Containment
Integrity

Passive Safety Injection System



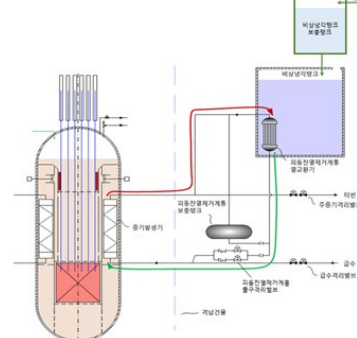
✓ Coolant Injection by Gravity

Auto Depressurization System



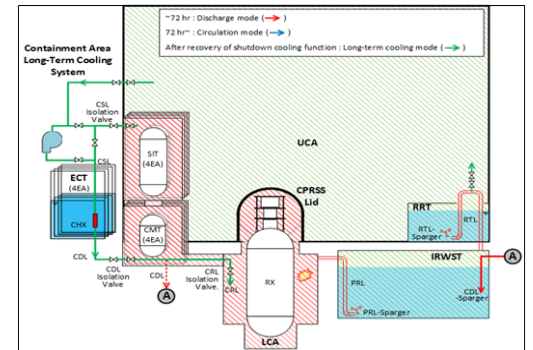
✓ Discharge by Pressure Difference

Passive Residual
Heat Removal System



✓ Natural Circulation

Containment Pressure and
Radioactivity Suppression System



✓ Discharge by Pressure Difference
✓ Natural Circulation



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Design Characteristics

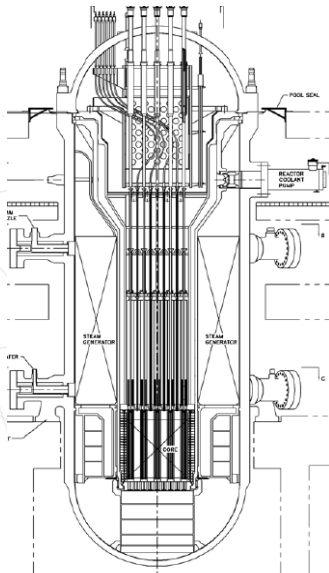
01 Reactor Vessel

Physical Barrier

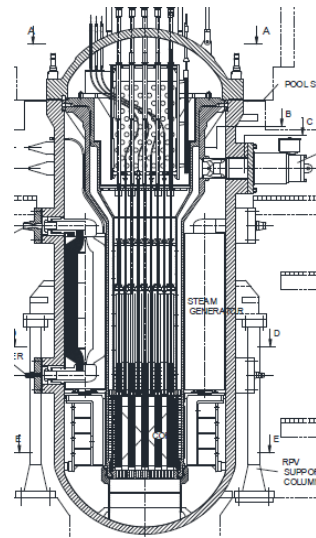
- Reactor vessel designed as one of the major physical barriers that prevent the release of radioactive materials while **maintain its integrity over a design life of 60 years**

Code & Standard

- Mechanical compartments that maintain the reactor coolant pressure boundary are designed to withstand the design pressure of reactor coolant system in accordance with **KEPIC MNB (or ASME Sec. III MB)**.



SMART



SMART100

Parameter	SMART	SMART100	Modification Status
Outer Diameter	about 6 m	about 6 m	None
Inner Diameter	about 5 m	about 5 m	None
Height	about 18 m	about 16 m	Reduced (-2m)

Design Characteristics

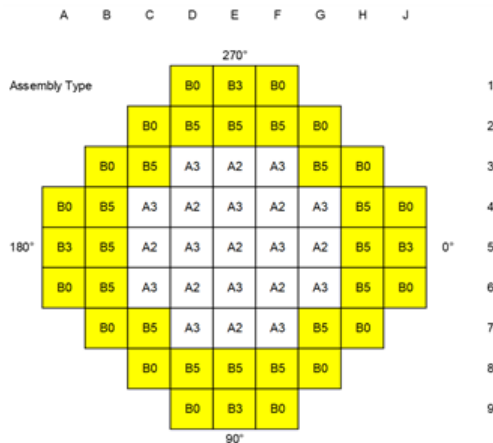
02 Core Design

Thermal Power

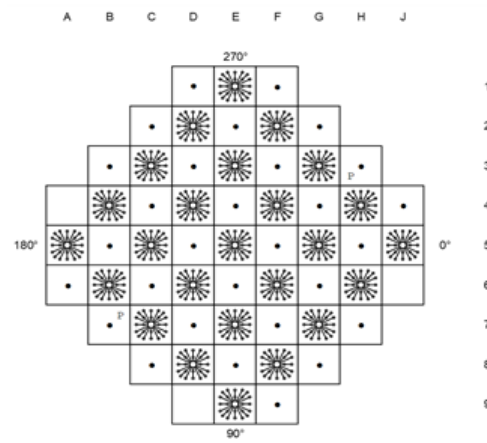
- Thermal power of SMART100 is designed to be 365 MWt which is 10% higher than SMART (330 MWt), the core design for SMART100 has been conducted by using the **DeCART2D/MASTER** developed in KAERI. (* SMART SDA : CASMO-3/MASTER)

Characteristics

- Physically smaller than commercial PWRs and different in fuel enrichment and management strategies; however, the **major characteristics are similar** to the operating PWRs. (i.e. fuel burnup, control method, other phenomena)



Fuel Loading Pattern of Initial Cycle



Control Rod Assembly and In-Core Instrumentation

Fuel Rod Parameter	Large PWR	SMART	SMART100
Enrichment* (wt% U-235)	4.50	4.88	4.72
Avg. Linear Power Density(W/cm)	~179	~107	~119

* Based on highest enrichment among the fuel rods in the equilibrium cycle

Design Characteristics

03 Reactor Coolant System

Integral Reactor

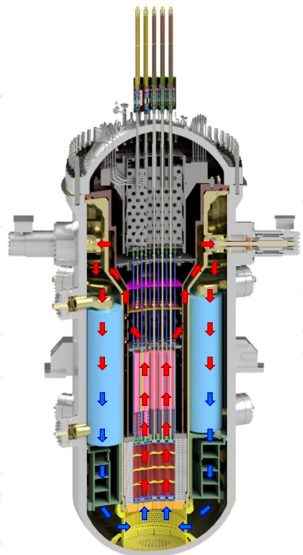
- The major components (i.e. steam generator, reactor coolant pump, pressurizer, and reactor internals) are installed in a single reactor vessel; thus, it inherently **eliminates the possibility of LBLOCA**.

Reactor Coolant Pump

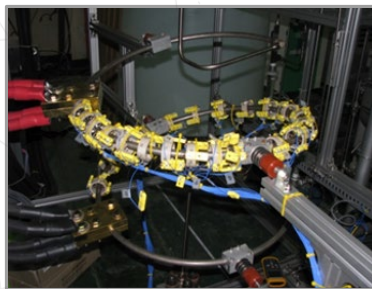
- The canned motor type reactor coolant pump results in **eliminating the mechanical seals** to prevent shaft leakage.

Steam Generator

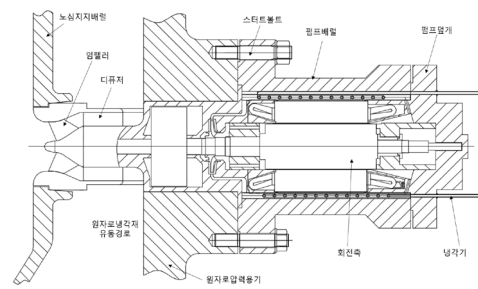
- The **once-through helical coiled type** has advantages for thermal power density and arrangement. The design have capacity to produce sufficiently superheated steam; thus, it supplies the steam to secondary system directly without moisture separator.



Reactor Coolant System



Once-through Helical Coiled Steam Generator

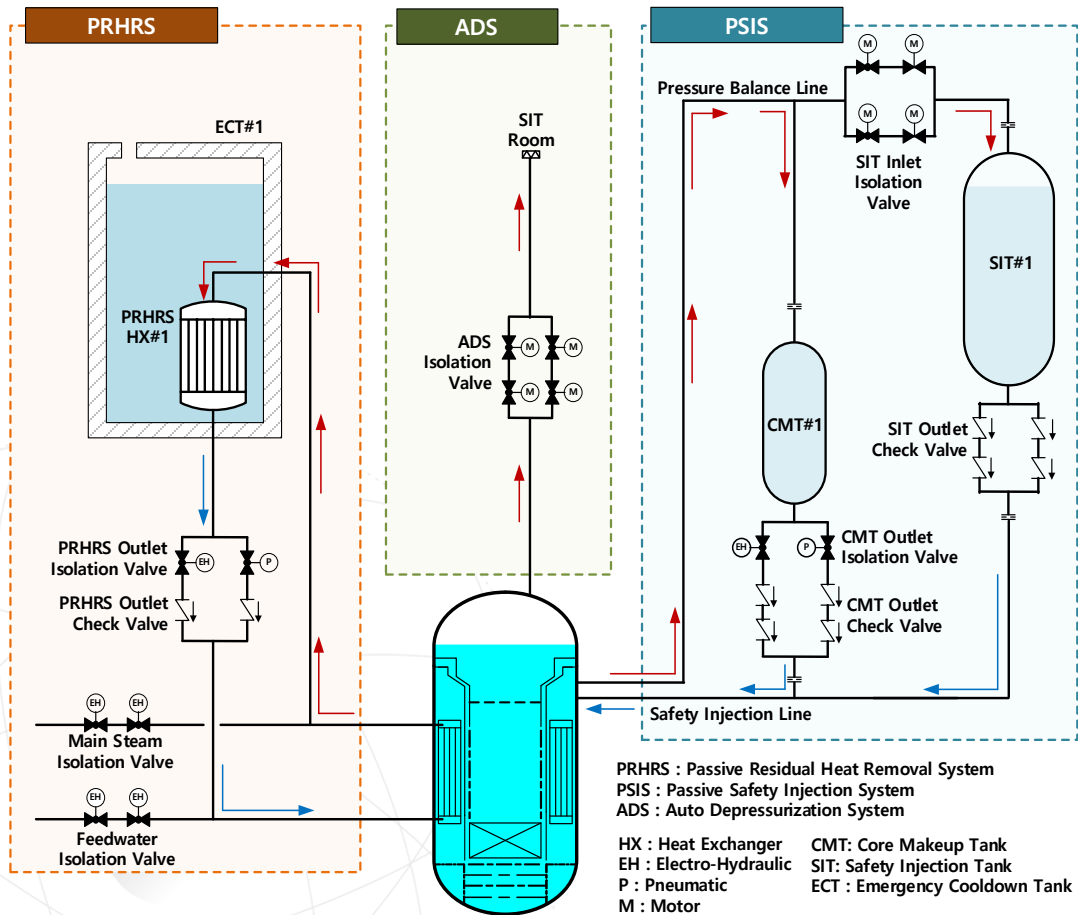


Canned Motor Reactor Coolant Pump

Parameter	Large PWR	SMART100
Design Pressure	17.2 MPa	17.0 MPa
Operating Pressure	15.5 MPa	15.0 MPa
Core Inlet Temp.	291 °C	295.5 °C
Core Outlet Temp.	324 °C	322.0 °C
Coolant Flow Rate	75.6×10^6 kg/hr	9.025×10^6 kg/hr

Design Characteristics

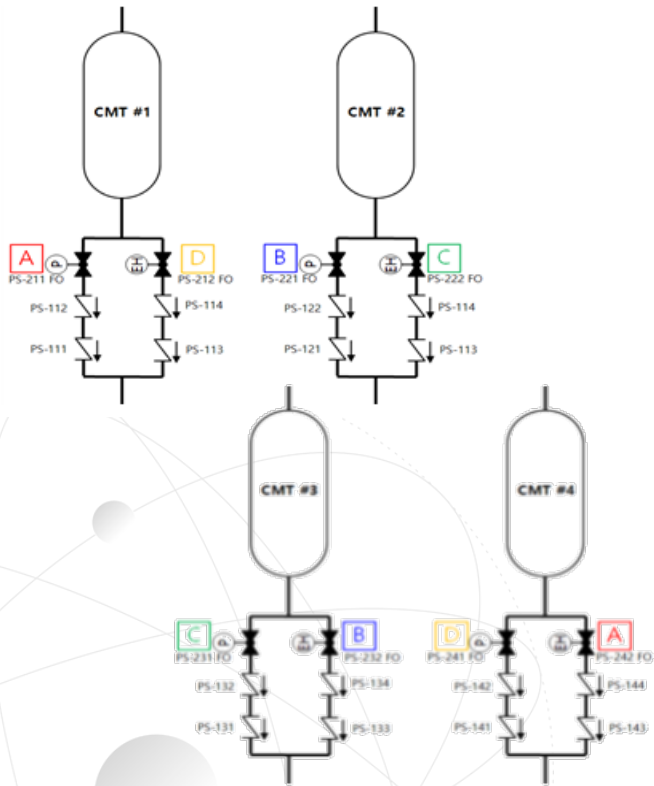
04 Engineered Safety Feature (ESF) – System Design



System	PRHRS	ADS	PSIS
Safety Functions	Core Cooling & Heat Removal	Core Cooling & Heat Removal	Core Cooling & Heat Removal
	Maintain RCPB Integrity	Maintain RCPB Integrity	Coolant Injection
			Core Sub-critical
Driving Force	Natural Circulation	Discharge by Pressure Difference	Gravity
Redundancy	4 trains	2 trains	4 trains
Diversity	Different types of valves (Motor, Pneumatic, Electro-Hydraulic)		
Independence	Physical and electrical separation between trains		
Remarks	All passive safety systems are designed with parallel lines are designed for the single failure criteria		

Design Characteristics

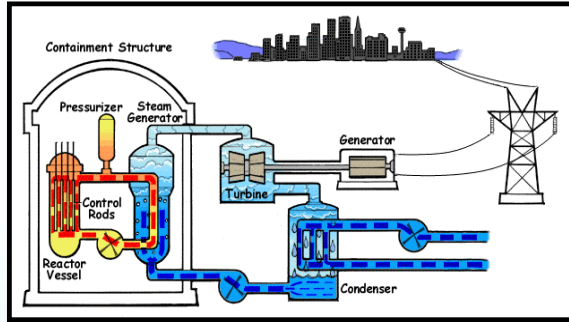
04 Engineered Safety Feature (ESF) – Valves Design



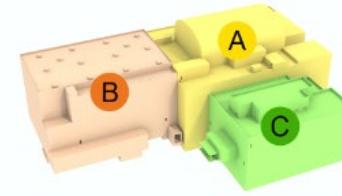
System	Valve	Redundancy	Diversity	Independence	Fail-safe	Backup
PSIS	CMT Outlet Isolation Valve	4 Train	Electro-Hydraulic	Physically separated 2 parallel lines	Fail Open	ADG, SDG
			Pneumatic	Electrically separated 4 Trains of 1E DC System (Ch. A, B, C, D)	Fail Open	ADG, SDG
	SIT Outlet Isolation Valve	4 Train	Motor		Fail As Is	ADG, SDG
PRHRS	PRHRS Outlet Isolation Valve	4 Train	Electro-Hydraulic	Physically separated 2 parallel lines	Fail Open	ADG, SDG
			Pneumatic	Electrically separated 4 Trains of 1E DC System (Ch. A, B, C, D)	Fail Open	ADG, SDG

ADG: Ancillary Diesel Generator, SDG: Standby Diesel Generator

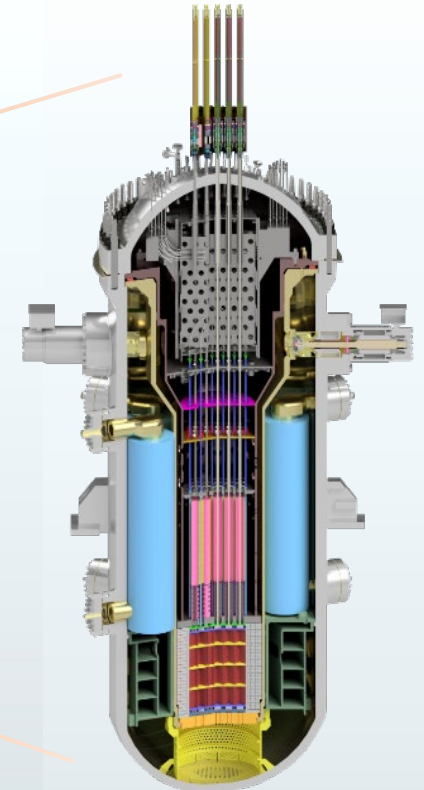
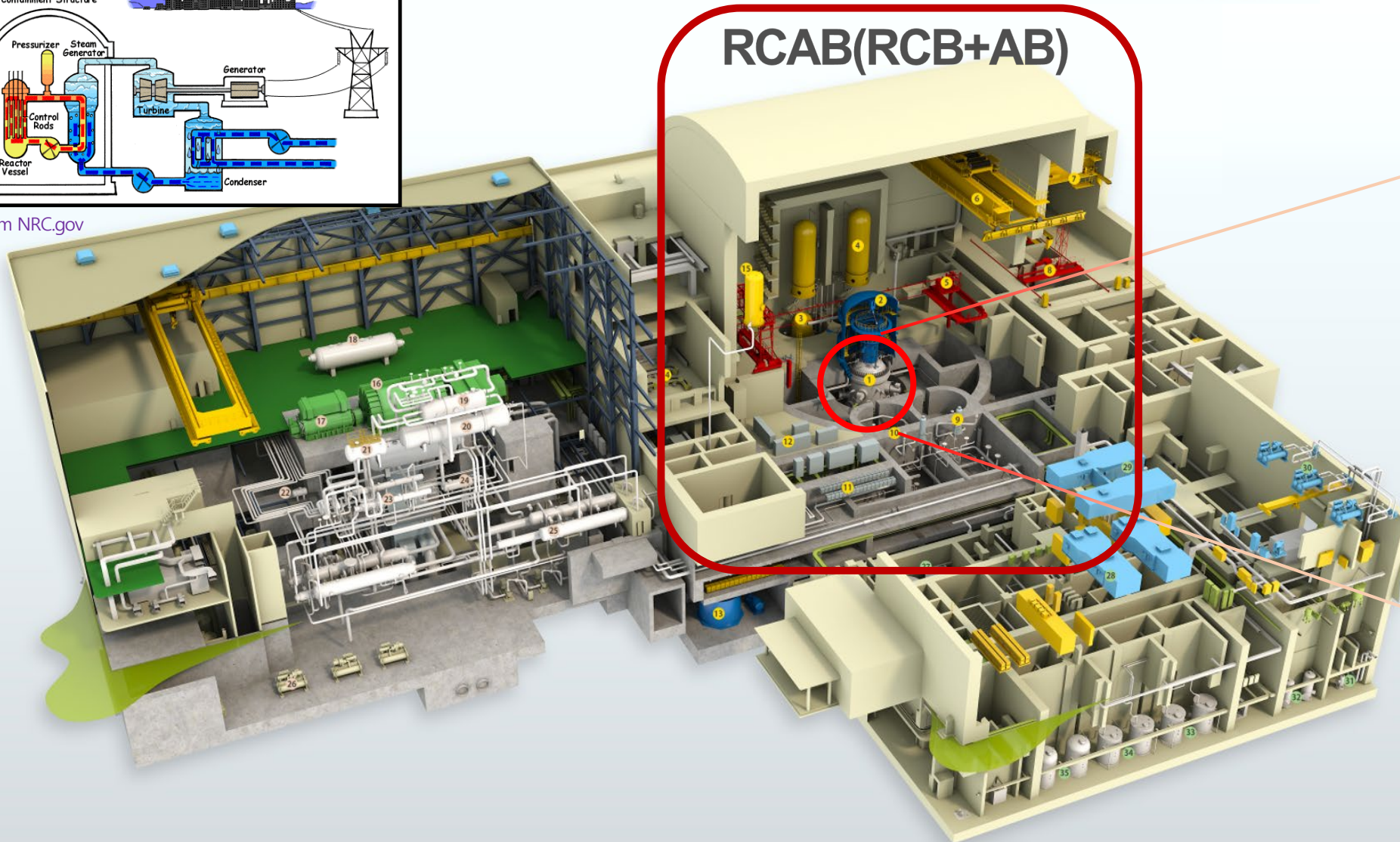
Design Characteristics



from NRC.gov



- (A) Reactor Containment and Auxiliary Building
- (B) Turbine Building
- (C) Compound Building

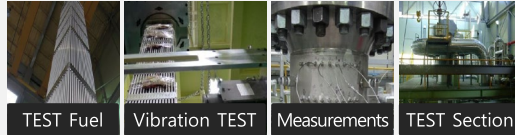


SMART100

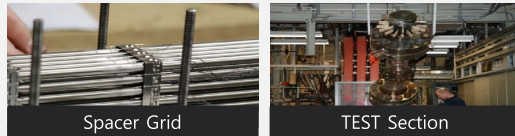
Comprehensive SMART Technology Validation Program

Fuel TH Tests

Fuel Performance Tests

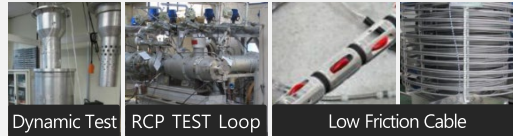


CHF Measurement Test

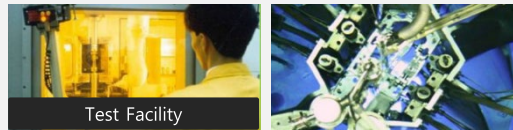


Mechanics and Components

RPV Dynamics Test, RCP Mockup Test and Helical ISI Test



SG Tube Material (A690) Irradiation Test



Thermal - Hydraulics Experiment



SMART – ITL ¹⁾

World's Unique and Largest Full Scope Accident Simulation 1:1 Height, 1/49 Volume



SMART - MCR ²⁾ Simulator





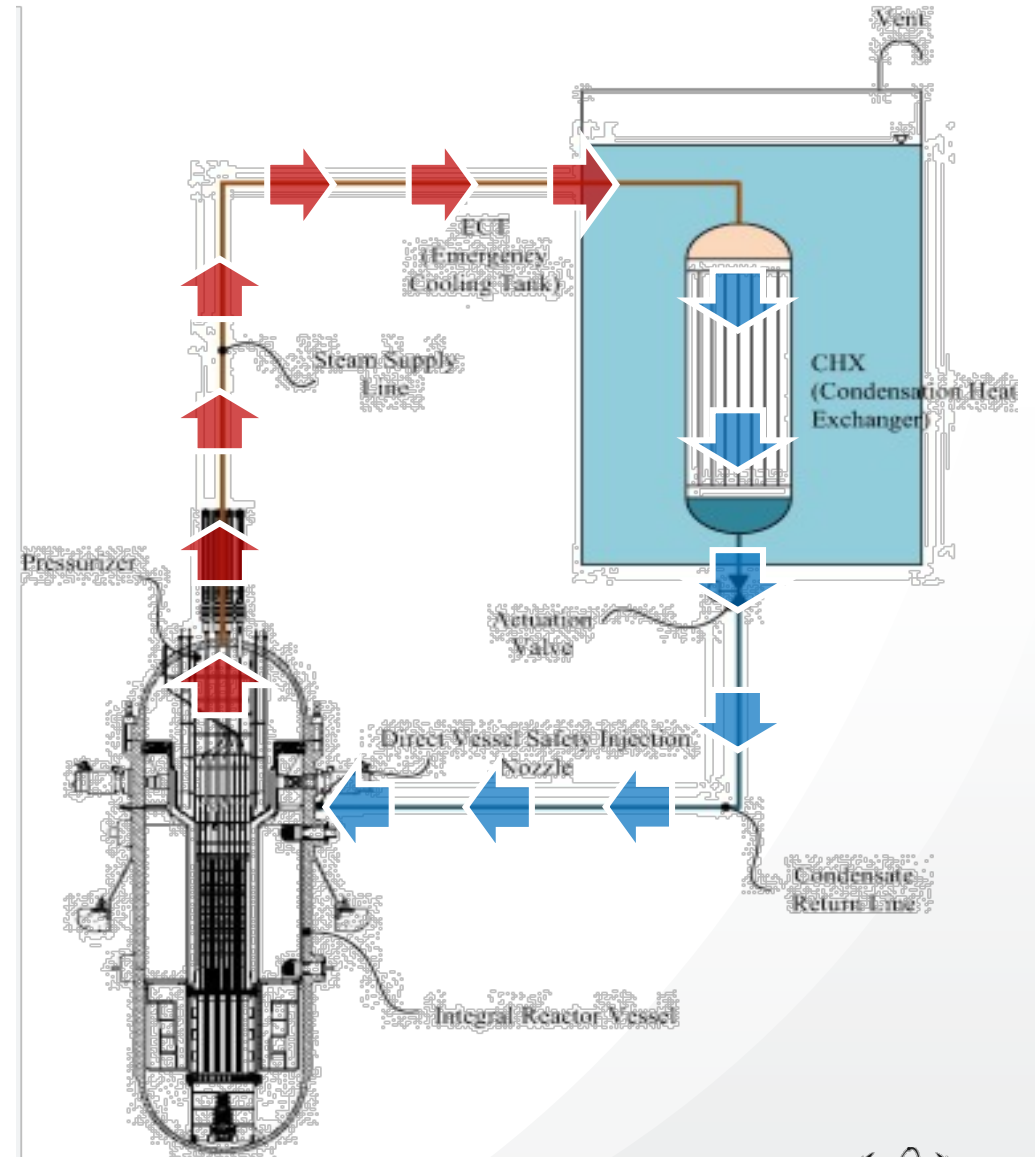
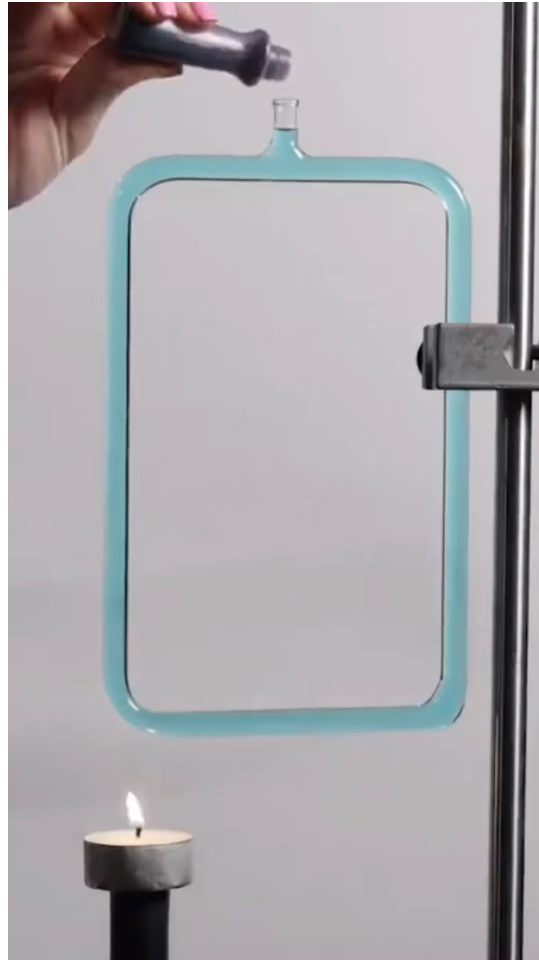
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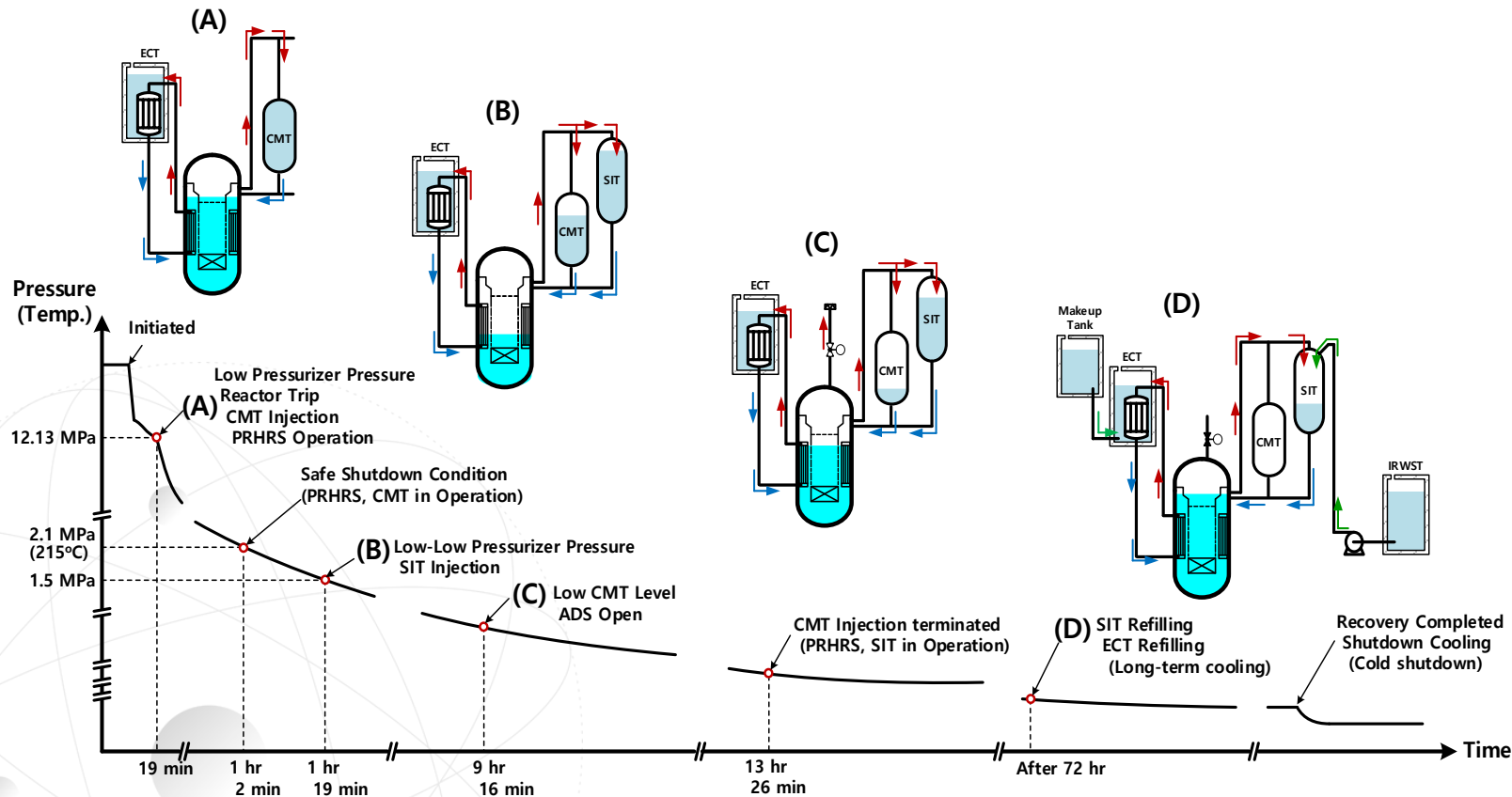
- 01 Introduction
- 02 Design Philosophy
- 03 Technical Development
- 04 Standard Design Approval
- 05 Closure

Passive Safety System



Passive Safety System

01 SBLOCA Scenario



Scenario

Accident initiated *

- ① RCS pressure rapidly decreases
- ② Low pressurizer pressure ► RX/TB trip, CMT injection (maintain core cooling and sub-critical by borated water)
- ③ Loss of AC power ► Feedwater pump stop
- ④ Low feedwater flow ► PRHRS operation
- ⑤ Cooldown to safe shutdown (215°C) within 36 hours

After safe shutdown condition

- ⑥ Low-Low pressurizer pressure ► SIT injection (maintain core cooling and sub-critical by borated water)
- ⑦ Low CMT level ► ADS valve open
- ⑧ CMT injection terminated
- ⑨ Maintain safe shutdown condition for 72 hours

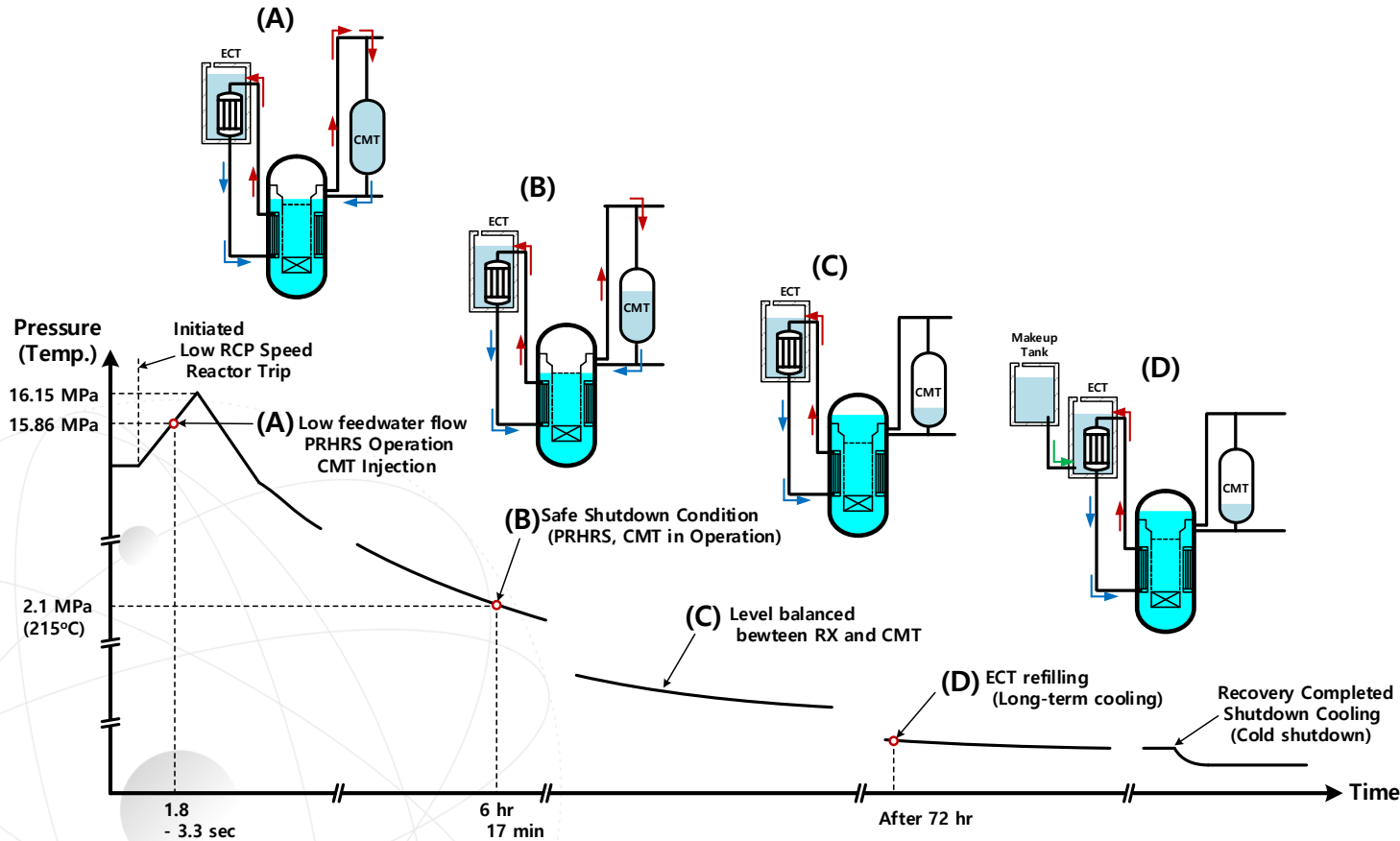
Long-term cooling & Recovery

- ⑩ Refill SIT and ECT after 72 hours
- ⑪ Recovery completed ► shutdown cooling
- ⑫ Cold shutdown (completed)

* Safety injection line (50 mm) double-ended break

Passive Safety System

02 Non-LOCA Scenario



Scenario

Accident initiated *

- ① RCP flowrate rapidly decreases
- ② Low RCP pump speed ► RX trip
- ③ Loss of heat removal ► RCS pressure & temp. increases
- ④ Low feedwater flow ► PRHRS operation ► CMT injection (maintain core cooling and sub-critical by borated water)
- ⑤ Cooldown to safe shutdown (215°C) within 36 hours

After safe shutdown condition

- ⑥ PRHRS, CMT in operation (maintain core cooling and sub-critical by borated water)
- ⑦ Maintain safe shutdown condition for 72 hours

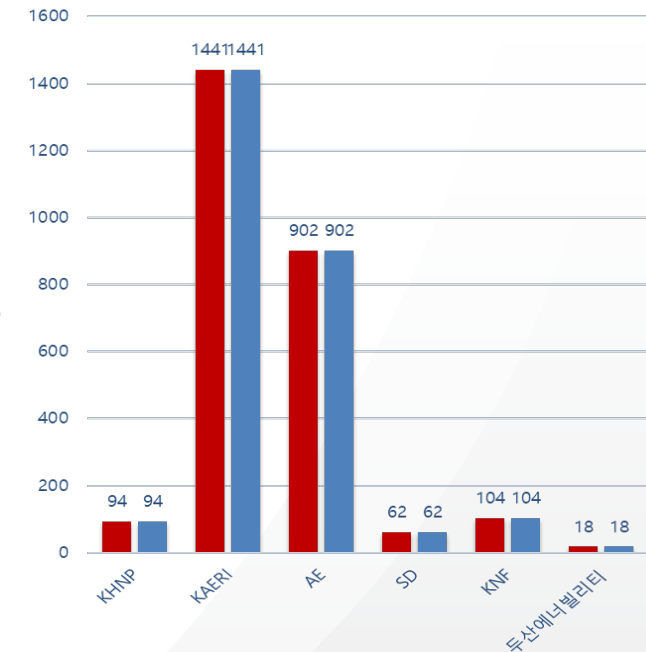
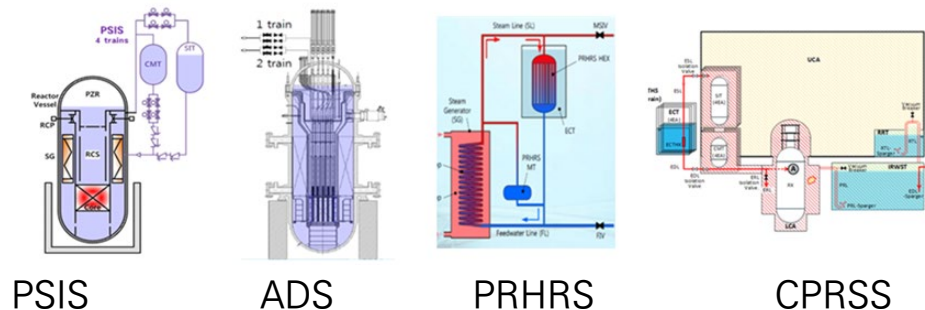
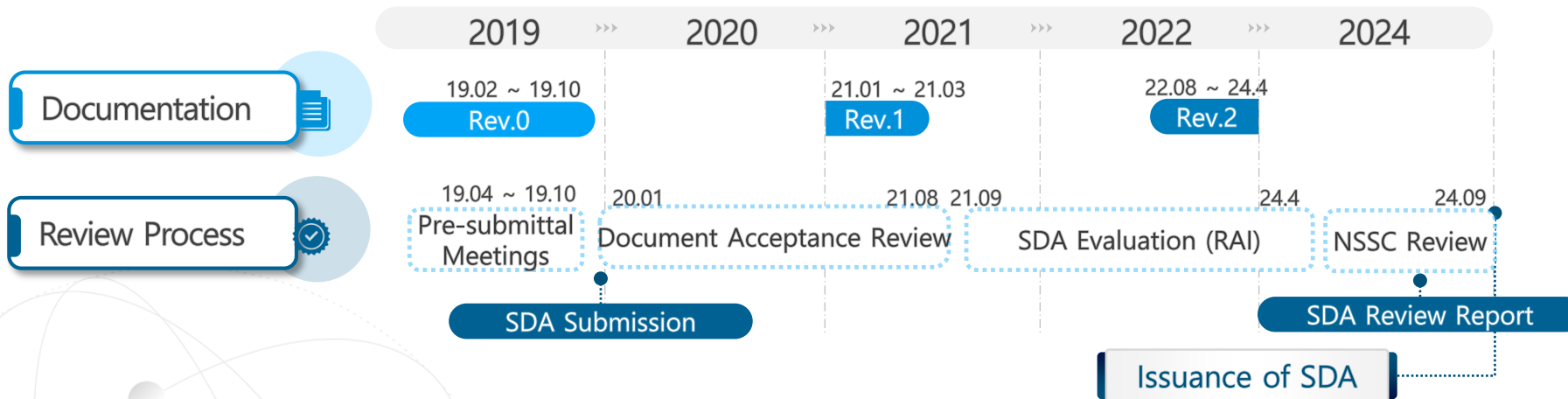
Long-term cooling & Recovery

- ⑧ Refill ECT after 72 hours
- ⑨ Recovery completed ► shutdown cooling
- ⑩ Cold shutdown (completed)

* Loss of Off-site Power (LOOP)

SMART100 Standard Design Approval (SDA)

- KAERI-KHNP SMART SDCA Agreement (Dec. 2018)
- KAERI-K.A.CARE SMART PPE Subsidiary Agreement(Dec. 2019)
- SMART100 SDA Application (Dec. 2019)



SMART100 Standard Design Approval (Sep. 2024)

■ 원자력안전법 시행규칙 [별지 제7호서식] <개정 2015.7.21.>

제 4 호

원자로시설표준설계인

■ Enforcement Rules of the Nuclear Safety Act [Attached form No.7] <Amended on 2015.7.21.>

(front)

- 법인명: 한국수력원자력(주), 한국원자력연구원, 사우디
- 주소
 - 한국수력원자력: 경상북도 경주시 문무대왕면 불국로
 - 한국원자력연구원: 대전광역시 유성구 대덕대로 989번길
 - 사우디 왕립원자력신재생에너지원: PM5H+4JX 12244 Al Olaya,
- 대표자
 - 한국수력원자력: 황주호 (생년월일: 1956.3.22.)
 - 한국원자력연구원: 주한규 (생년월일: 1962.11.12.)
 - 사우디 왕립원자력신재생에너지원: H.H. Dr. MAMDOOH AL SAUD
- 원자로의 명칭: 스마트100 (SMART100)
- 종류: 일체형가압경수로
- 용량: 365 MWt
 - 위와 같이 「원자력안전법」 제12조, 같은 법 시행령 제22조제11항 따라 원자로 및 관계시설의 표준설계를 인가합니다.

2024

원자력안전위원회



No. 4

Certificate of Standard Design Approval for Nuclear Facility

- Name of Company: Korea Hydro and Nuclear Power Co., Ltd.(KHNP), Korea Atomic Energy Research Institute(KAERI), King Abdullah City for Atomic and Renewable Energy(K.A.CARE) of Saudi Arabia
- Address
 - KHNP: 1655, Bulguk-ro, Munsudaewon
 - KAERI: 111, Daedeok-daero 989beon-
 - K.A.CARE: PM5H+4JX 12244 Al Olaya
- Representative
 - KHNP: JOO HO HWANG (Date of Birth:)
 - KAERI: HAN GYU JOO (Date of Birth:)
 - K.A.CARE: H. H. Dr. MAMDOOH AL SAUD
- Name of Reactor: SMART100
- Type: Integral type Pressurized Water Reactor
- Capacity: 365 MWt

As above, pursuant to Article 12 of the Nuclear Safety Act, and Enforcement Decree of the same Act, and the standard design of the reactor and related facilities is approved.

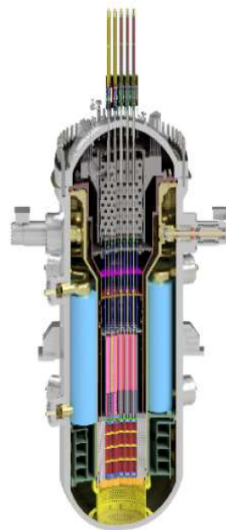
Nuclear Safety and Security Commission



SMART (KAERI, Republic of Korea and K.A.CARE, Kingdom of Saudi Arabia)



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MAJOR TECHNICAL PARAMETERS	
Parameter	Value
Technology developer, country of origin	KAERI, Republic of Korea and K.A.CARE, Kingdom of Saudi Arabia
Reactor type	Integral PWR
Coolant/moderator	Light water / light water
Thermal/electrical capacity, MW(t)/MW(e)	365 / 107
Primary circulation	Forced circulation
NSSS operating pressure (primary/secondary), MPa	15 / 5.8
Core inlet/outlet coolant temperature (°C)	296 / 322
Fuel type/assembly array	UO ₂ pellet / 17x17 square
Number of fuel assemblies in the core	57
Fuel enrichment (%)	<5
Refueling cycle (months)	30
Core discharge burnup (GWd/ton)	<54
Reactivity control mechanism	Control rod drive mechanisms and soluble boron
Approach to safety	Passive
Design life (years)	60
Plant footprint (m ²)	90 000
RPV height/diameter (m)	18.5 / 6.5
RPV weight (metric ton)	1070 (including coolant)
Seismic design (SSE)	> 0.3g with 0.18g of automatic shutdown
Fuel cycle requirements/approach	Conventional LWR requirements applied (spent fuel storage capacity: 30 years)
Distinguishing features	Coupling with desalination and process heat application, integrated primary system
Design status	Detailed design

연습뉴스

원안위, 한국형 소형 모듈원자로 '스마트100' 표준설계 인가

송고시간 | 2024-09-26 18:01

| 외부 전원 없이도 안전조치 가능...원자력 "중동·캐나다 등 수출 기대"

원회 회의
자판기 및 DB 금지]

확정 기자 = 한국이 사우디 아라비아 등에 수출을 타진 중이 하소형 수
라) '스마트100'(SMART100)의 표

중구 위원회 회의실에서 제2013
력원자력, 사우디 왕립원자력신재
사 - 의결했다.

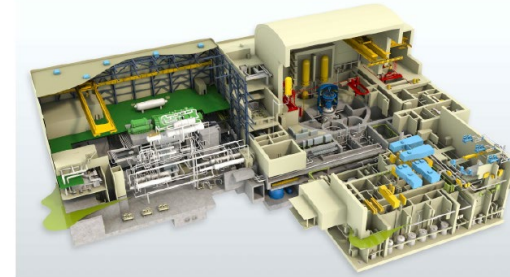
wnn
world nuclear news

HOME / NEW NUCLEAR / SOUTH KOREAN SMR DESIGN APPROVED BY
REGULATOR

South Korean SMR design approved by regulator

Thursday, 26 September 2024

The SMART100 small modular reactor design has been granted standard design approval by South Korea's Nuclear Safety and Security Commission.



The layout of a SMART100 power plant (Image: KHNP/KAERI-K.A.CARE)



IAEA Regional Workshop

Development of SMART100

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- 01** Introduction
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SMART Summary

1

Nuclear Safety



2

Modularity and Economics



3

Flexibility and Supply



Safe Nuclear Power Plant

- > ~100 times Safer than Current Nuclear Power Plant
- > Safe against Natural Hazards and Terror
 - Earthquake and Tsunami
 - Aircraft Crash



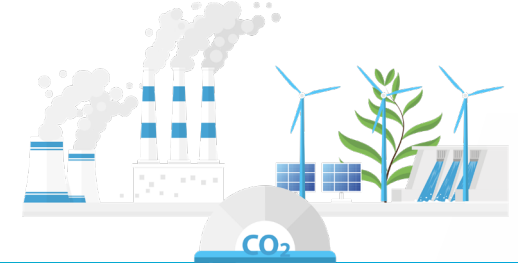
Licensed and Validated Technology

- > Standard Design Approval in 2012
- > Meet the Most Country's Licensing Requirements



Competitive Economics

- > Competing with Renewable Energy with ESS or Gas Power Plant with Carbon Capture



Minimize the Unexpected Operating and Maintenance Issues

- > Similar Operating Condition of Current Nuclear Power Plant



Reliable Equipment Suppliers

- > Ready to Deploy in Anywhere



SMART Summary

- **(Proven Design Excellence)** SMART can supply carbon-free hot steam necessary for the thermal process right now. SMART has achieved design certification from Korea's regulatory authority, underscoring its readiness for immediate deployment. SMART leverages well-established pressurized water reactor (PWR) technologies with a track record of thousands of operational reactor years.
- **(Compact and Safe Footprint)** With a minimal exclusion area boundary, SMART eliminates the need for resident evacuation plans, enhancing safety and reducing land use requirements—an ideal fit for hyperscale data centers.
- **(Customizability and Rapid Adaptation)** KAERI's expertise enables swift customization of SMART to align with specific user needs, ensuring seamless integration with user's operational frameworks.

Thank you for your attention

더 나은 세상을 위한 원자력기술
국민과 세계가 지지하는 한국원자력연구원



Korea Atomic Energy
Research Institute