

Shin-Kori unit 3&4

Development of IDIS
(Integrated Drain Information System)
for reducing radiation exposure

JUNE, 2016

Shin-Kori nuclear plant #2, KHNP

Dong-ug Kim



INTRODUCTION

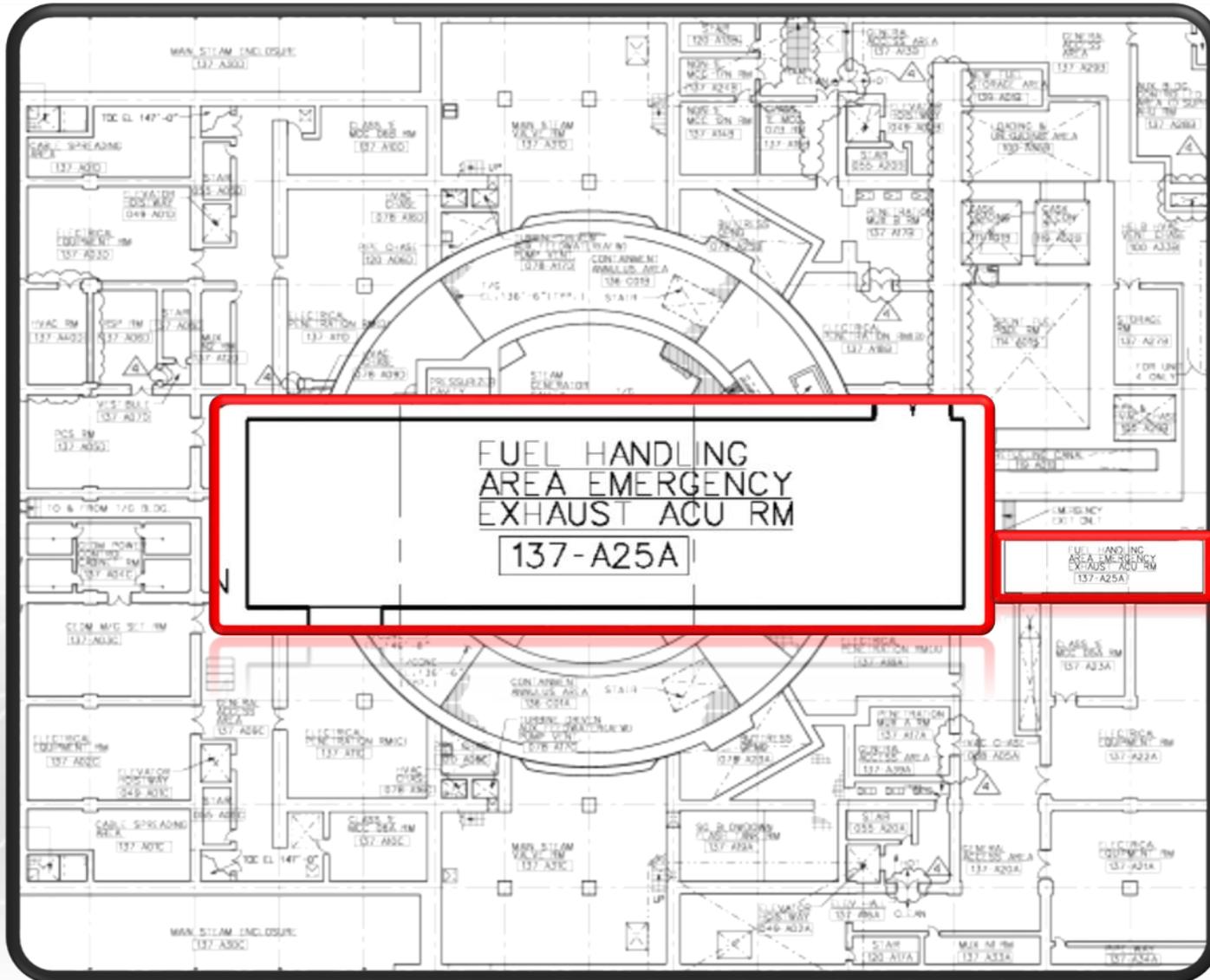


▷ PURPOSE

- - To reduce radiation exposure of workers by finding drain pipes faster and by setting the limits when abnormal event occur like leaking liquid waste.



IDIS(2)



Plumbing Overview [Controlled Area : Aux Building]

순번	유입원	유입원 높이	유입원 위치	도면 (Link)	관리구역	Sump 1	BLDC	Sump 위치	Sump 2	BLDC	Sump 위치	LRS Tank	BLDC	Tank 위치	드레인 수	드레인 규격	드레인 형태	Plumbing Drawing	P & I Diagram	Line 구분
	AUX. BLDG. Controlled Area (II) Normal Exhaust ACU RM	AB 120	120-A29B	120-A29B	0				Floor Drain Sump & Pumps (B)						6"(1)	6"-Open(1) : ○ 4"-Open(4) : ○				DE-A12-E6
142	General Access Area	AB 120		120-A31B	0															DE-A12-D6
143	Elevator Hall	AB 137	137-A1A	137-A16A	0															DE-A14-B6
144	SG Blowdown Flash Tank RM	AB 137	137-A19A	137-A19A	0				Floor Drain Sump & Pumps (A)	AB	055-A34A	LRS Floor Drain Tank	CPB	063-P28.29	2	4"(1) 2"(1)	4"-Open(1) : ○ 2"-Open(1) : ○	9-325-P194-070	9-481-N105-012	DE-A14-C6
145	Fuel Handling Area Emergency Exhaust ACU RM	AB 137	137-A25A	137-A25A	0				Equipment Drain Sump & Pumps (A)	AB	055-A33A	Equipment Waste Tank	CPB	063-P23.24	3	4"(1) 2"(2)	4"-Open(1) : ○ 2"-Open(2) : ○	9-325-P194-080	9-481-N105-017	DE-A14-G6
145	Fuel Handling Area Emergency Exhaust ACU RM	AB 137	137-A25A	137-A25A	0				Floor Drain Sump & Pumps (Radioactive)	AB	055-A34A	LRS Floor Drain Tank	CPB	063-P28.29	5	4"(4) 2"(1)	4"-Open(3) : ● 2"-Open(1) : ○	9-325-P194-080	9-481-N105-012	DE-A14-D6
146	Storage RM				0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	1	4"(1)	4"-Open(1) : ○	9-325-P194-040	9-481-N105-014	DE-A12-D6
147	AUX. BLDG. Controlled Area (I) Supply Area RM				0				Equipment Drain Sump & Pumps (B)	AB	055-A33B	Equipment Waste Tank	CPB	063-P23.24	1	6"(1)	6"-Close(1) : ●	9-325-P194-040	9-481-N105-017	DE-A12-F6
147	AUX. BLDG. Controlled Area (I) Supply Area RM	AB 137	137-A25B	137-A25B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	2	4"(2)	4"-Open(2) : ○	9-325-P194-040	9-481-N105-014	DE-A12-D6
148	General Access Area	AB 137	137-A29B	137-A29B	0				Floor Drain Sump & Pumps (A)	AB	055-A34A	LRS Floor Drain Tank	CPB	063-P28.29	3	4"(3)	4"-Open(3) : ○	9-325-P194-080 9-325-P194-070	9-481-N105-012	DE-A14-D6
148	General Access Area	AB 137	137-A29B	137-A29B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	11	6"(1) 4"(9) 2"(1)	6"-Close(1) : ● 4"-Open(8) : ○ 4"-Close(1) : ● 2"-Open(1) : ○	9-325-P194-040 9-325-P194-030	9-481-N105-014	DE-A12-D6
149	Pipe Chase RM	AB 137	137-A32B	137-A32B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	1	4"(1)	4"-Open(1) : ○	9-325-P194-030	9-481-N105-013	DE-A12-C6
150	New Fuel Storage Area	AB 139	139-A01B	139-A01B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	1	4"(1)	4"-Open(1) : ○	9-325-P194-040	9-481-N105-014	DE-A12-D6
151	SST RM	AB 156	156-A01B	156-A01B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	5	4"(4) 2"(1)	4"-Open(3) : ○ 4"-Close(1) : ● 2"-Open(1) : ○	9-326-P194-030	9-481-N105-014	DE-A12-E6
152	Hot Tool Crib	AB 156	156-A02B	156-A02B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	1	4"(1)	4"-Open(1) : ○	9-326-P194-030	9-481-N105-014	DE-A12-E6
153	Containment Entrance Area	AB 156	156-A04B	156-A04B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	3	4"(3)	4"-Open(3) : ○	9-326-P194-030	9-481-N105-014	DE-A12-D6
154	General Access Area	AB 156	156-A05B	156-A05B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	2	4"(2)	4"-Open(2) : ○	9-326-P194-030	9-481-N105-014	DE-A12-D6
155	New Fuel Container Laydown & Inspection Area	AB 156	156-A08B	156-A08B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	8	4"(6) 2"(2)	4"-Open(6) : ○ 2"-Open(2) : ○	9-326-P194-040	9-481-N105-014	DE-A12-D6
156	Pipe Chase RM	AB 156	156-A11B	156-A11B	0				Floor Drain Sump & Pumps (B)	AB	055-A34B	LRS Floor Drain Tank	CPB	063-P28.29	1	4"(1)	4"-Open(1) : ○	9-326-P194-030	9-481-N105-013	DE-A12-C6

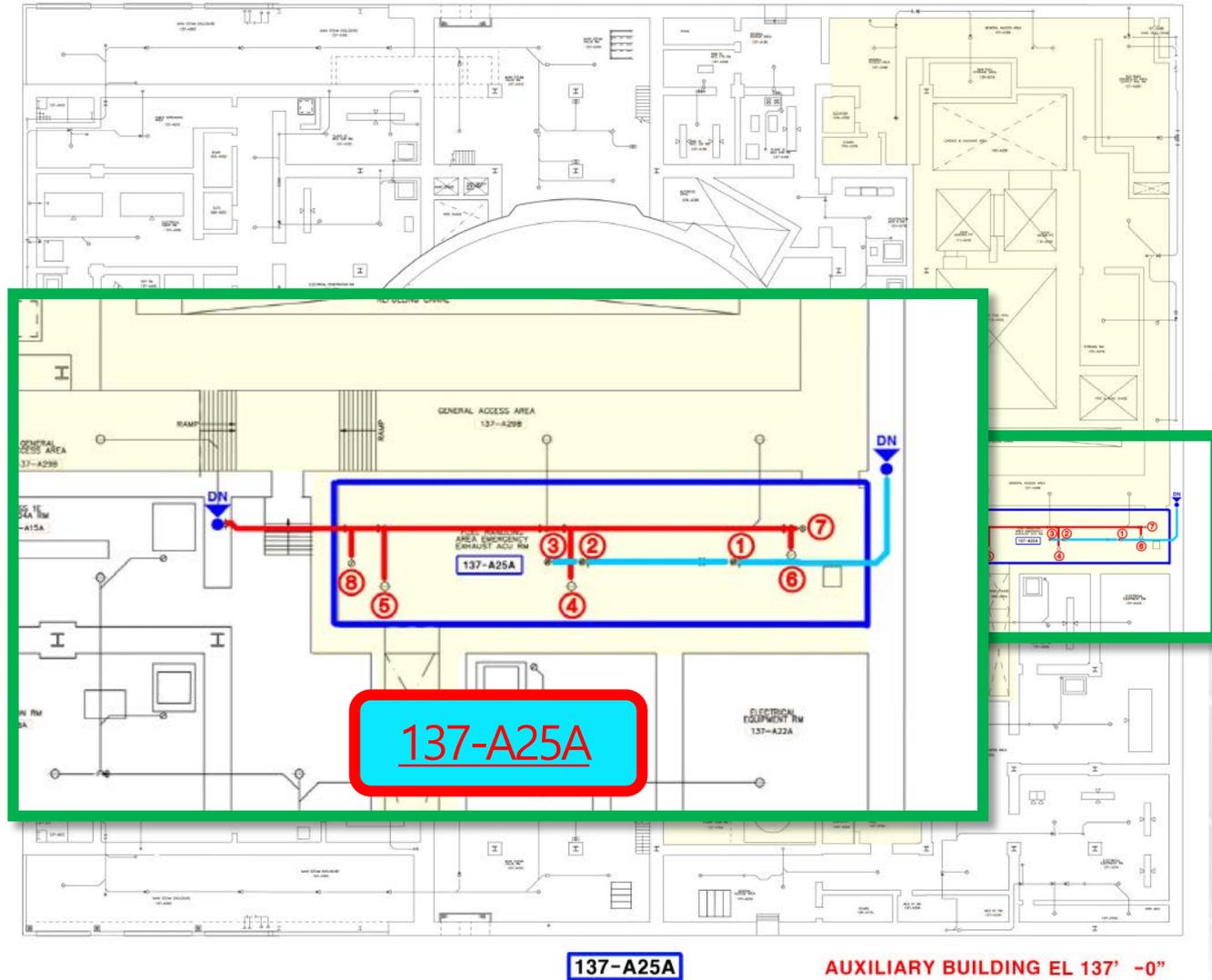
Equipment Drain sump & pumps (A)

137-A25A

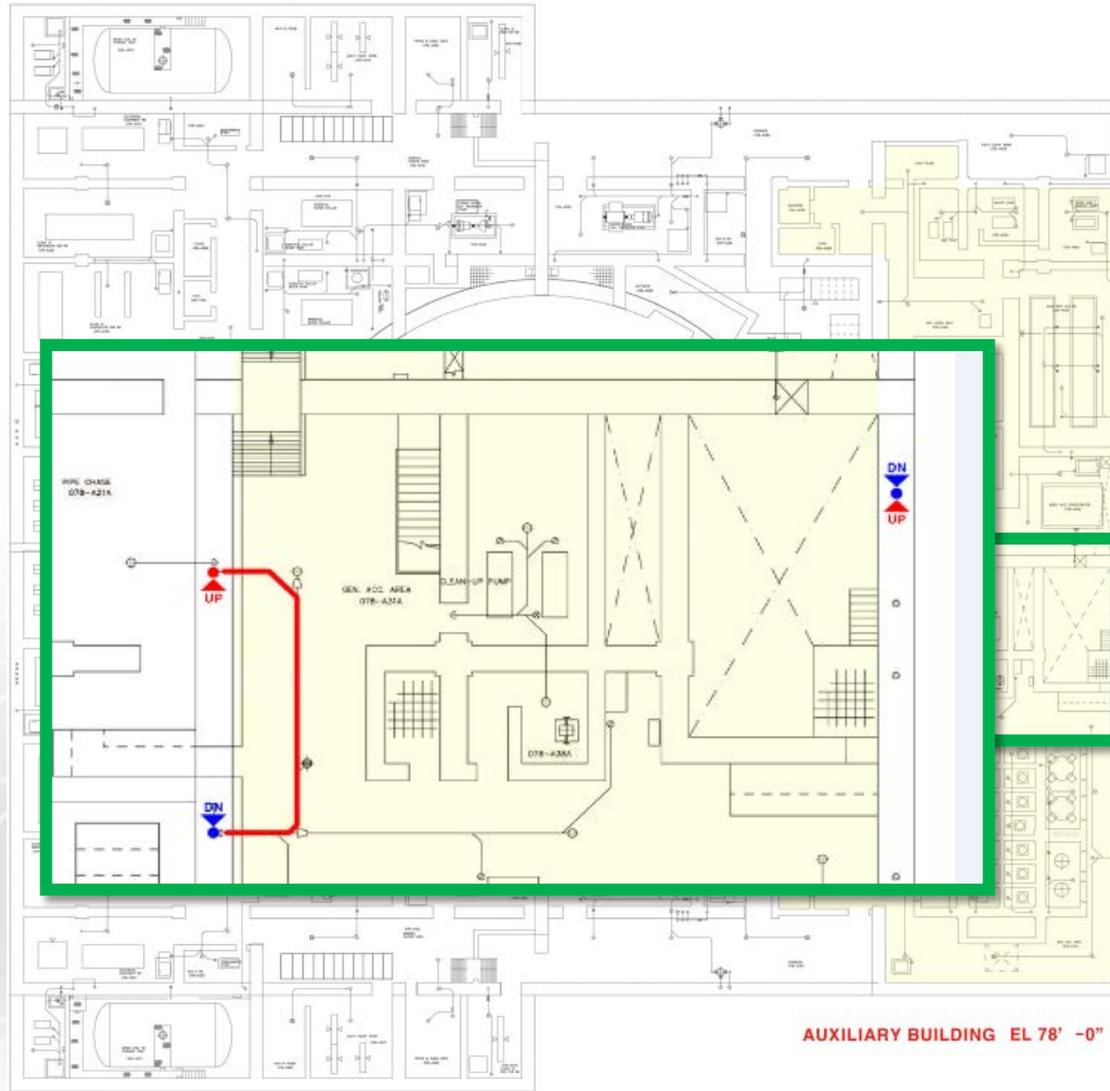
9월 17일



IDIS(4)



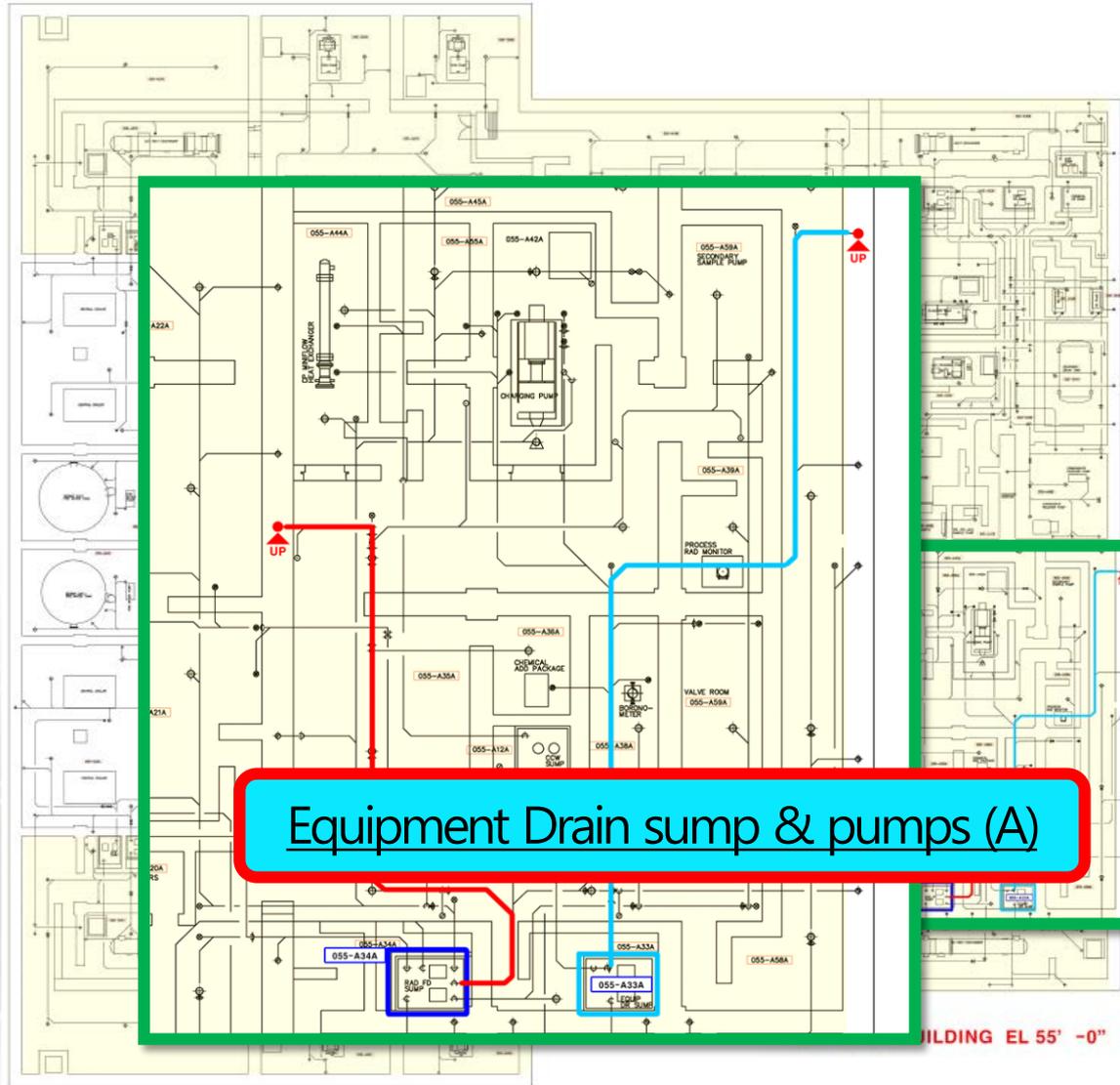
IDIS(5)



AUXILIARY BUILDING EL 78' -0"



IDIS(6)



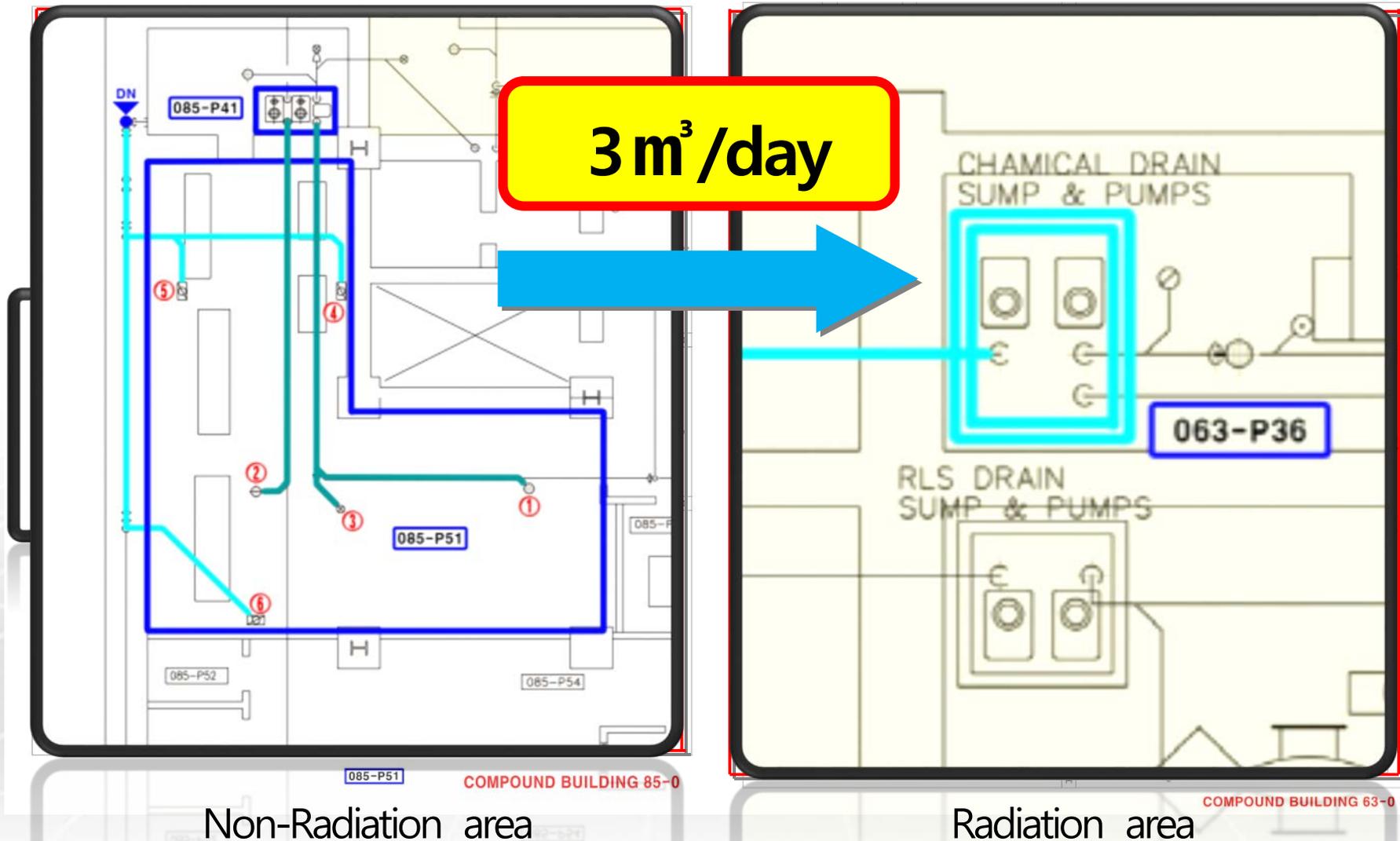


Floor Drain Hole

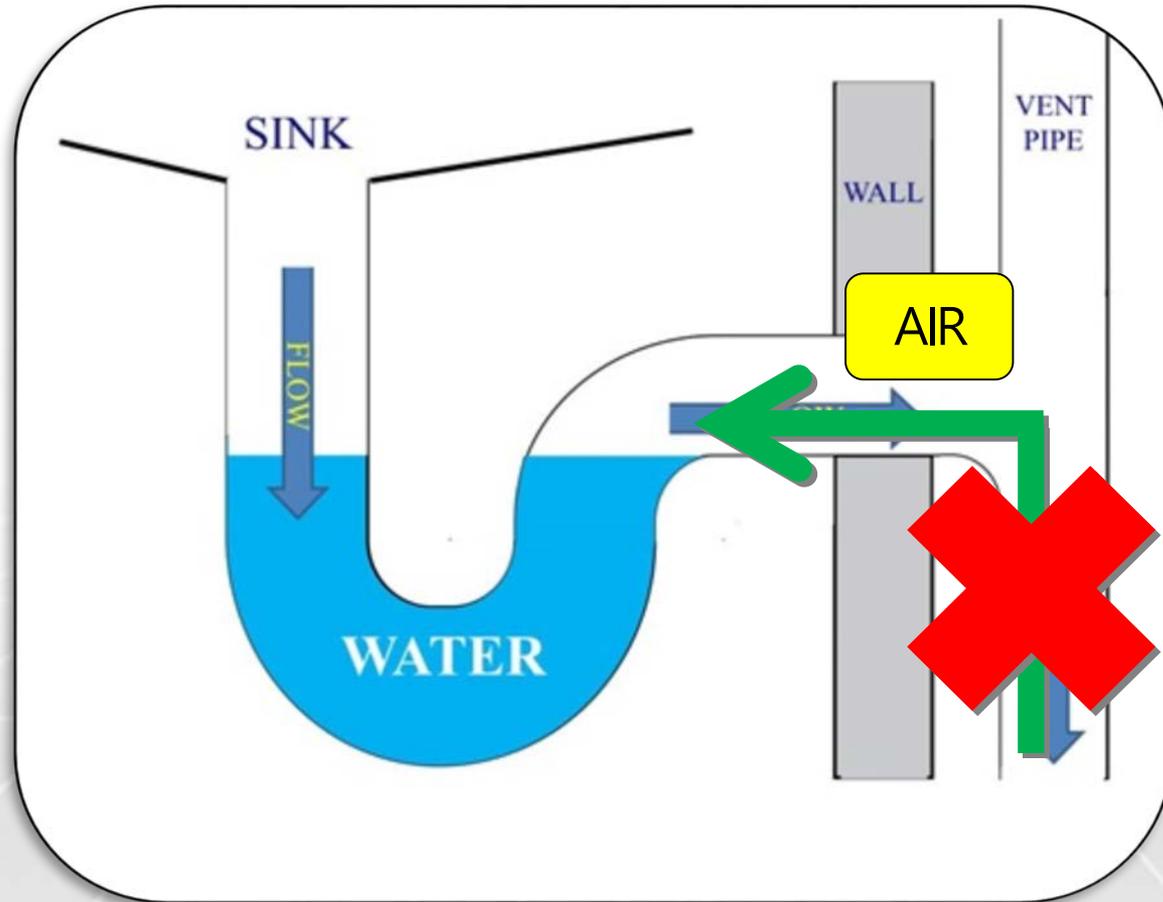


Equipment Drain Hole

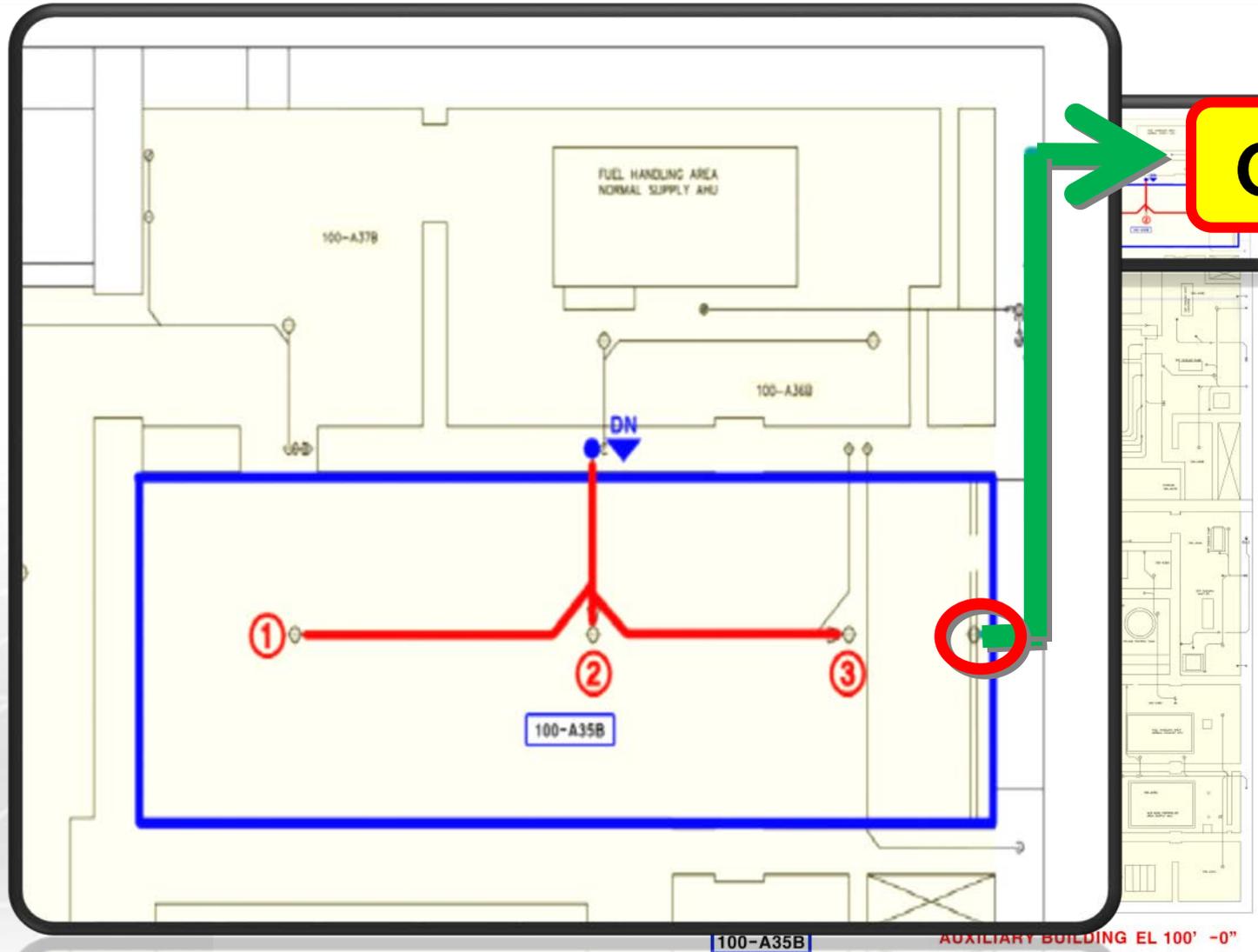
Problem : Pollution 1-1



Problem : Pollution 1-2



Problem : Pollution 2-1

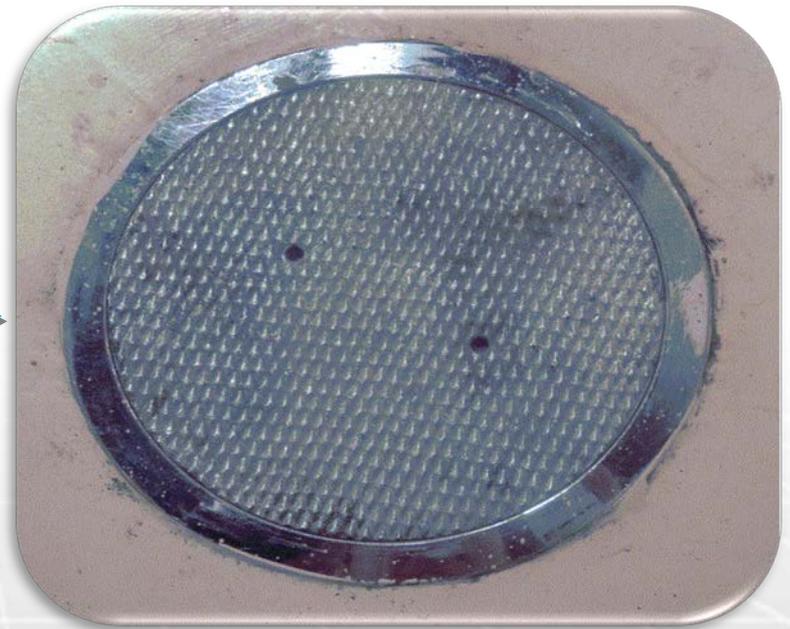
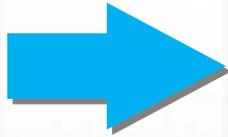


OUTSIDE

Problem : Pollution 2-2



Before



After



EXPECTED EFFECT

- ▷ **Leakage accident(KHNP) : 62/year**
- ▷ **Use to find the cause about sump's and water tank's level increase/decrease in abnormal accident**
- ▷ **Reduction of worker's radiation exposure**





Thank you

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APR 1400(IMPROVEMENT)



IMPROVEMENT OF DESIGN

Contents	OPR 1000	APR 1400
Design lifetime	40 years	60 years
Capacity of generating plant	1000MW	1400MW
Refueling period	12~18 months	18 months
Instrument & control system	ANALOGUE	DIGITAL
Seismic design	0.2g	0.3g

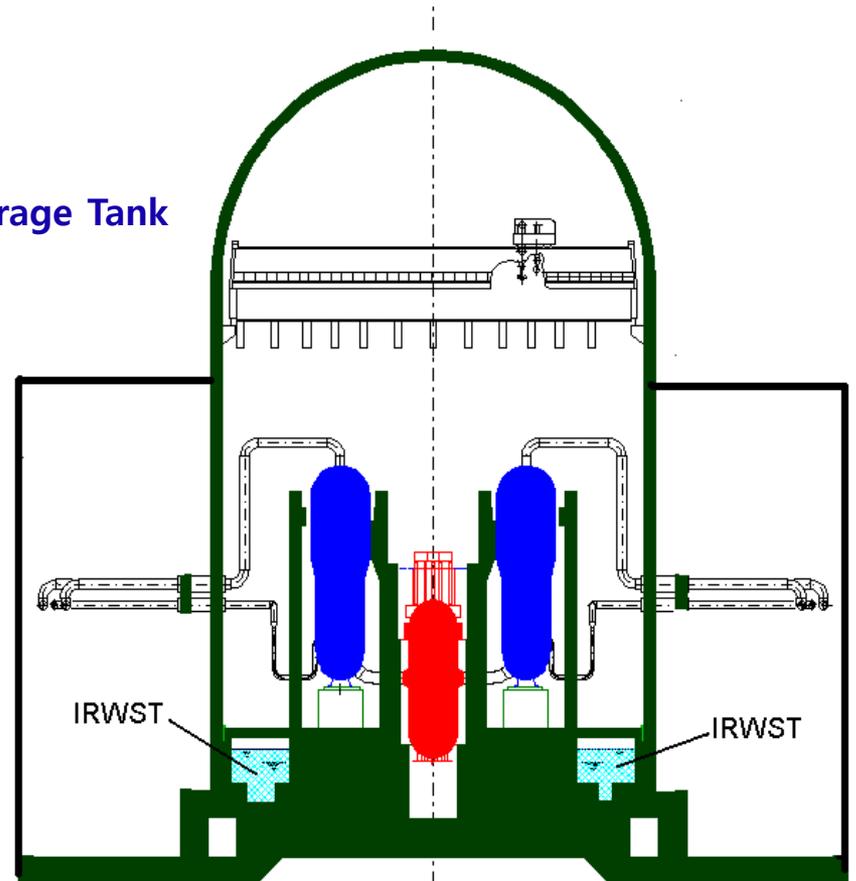


APR 1400(IMPROVEMENT)

IMPROVEMENT OF EQUIPMENT

IRWST

- IRWST : In-Containment Refueling Water Storage Tank
- Unnecessariness of changing the safety injection pump's suction
- Continuous supply of cooling water in accident

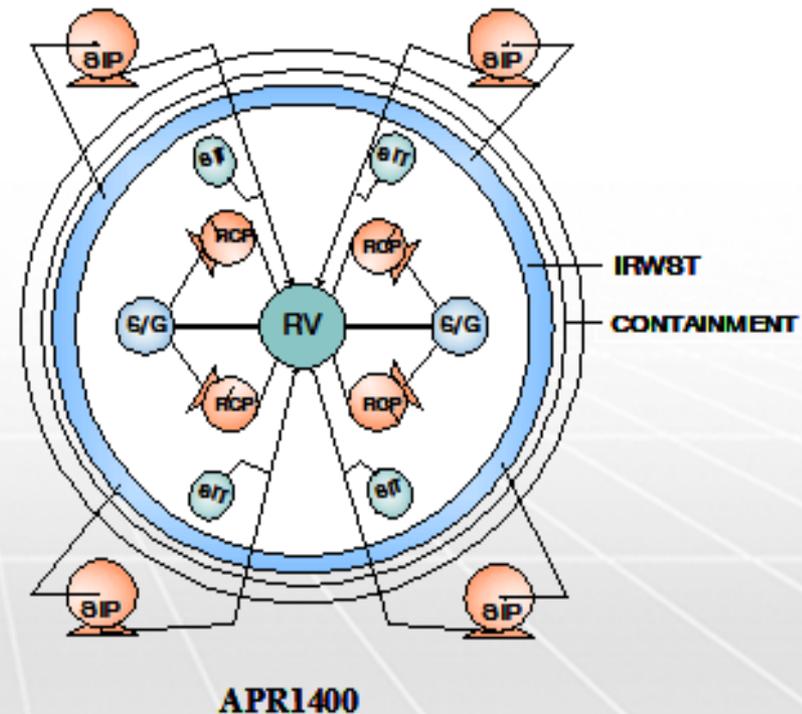


APR 1400(IMPROVEMENT)

IMPROVEMENT OF EQUIPMENT

DVI

- DVI : Direct Vessel Injection
- 2 division cold-leg injection
→ 4 division reactor injection
- Loss protection of safety injection suction in accident

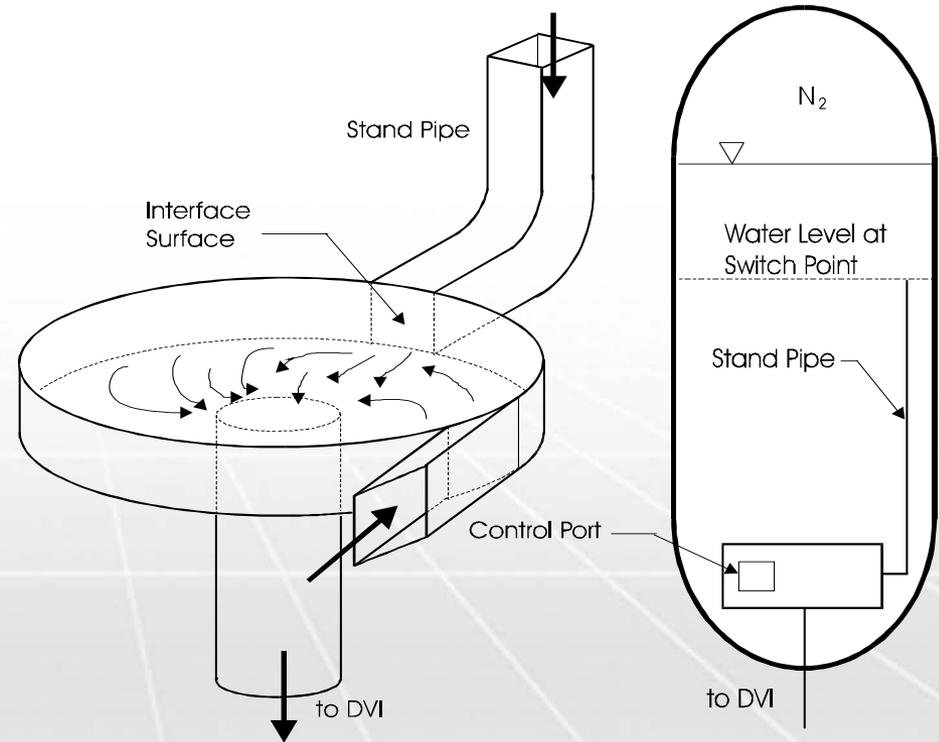


APR 1400(IMPROVEMENT)

IMPROVEMENT OF EQUIPMENT

SIT Fluidic Device

- Installment of SIT Bottom
* SIT : Safety Injection Tank
- Safety enhancement
by extending
the safety injection time

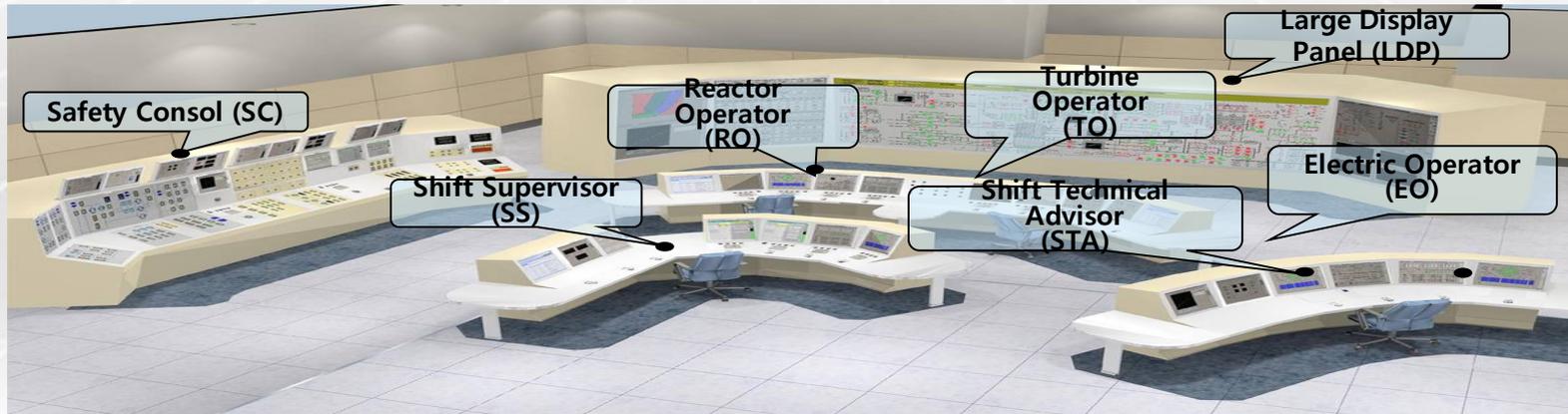


APR 1400(IMPROVEMENT)

IMPROVEMENT OF EQUIPMENT

MMIS

- MMIS : Man-Machine Interface System
- Application of MMI human engineering design basis
- Computerization of procedure
 - CPS : Computerize Procedure System



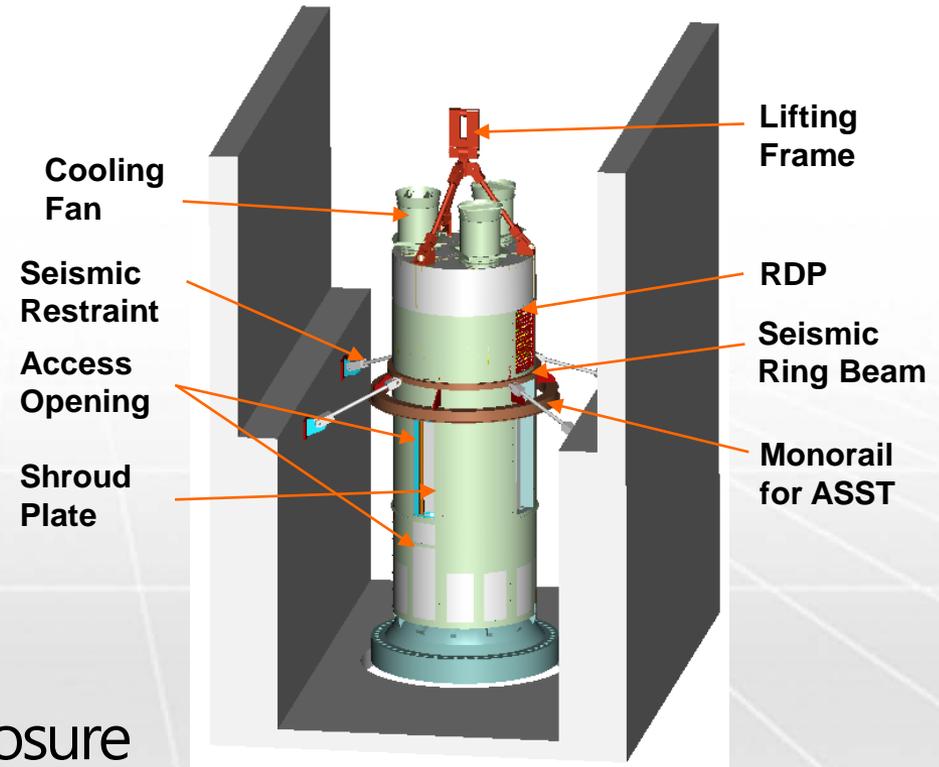
APR 1400(IMPROVEMENT)

IMPROVEMENT OF EQUIPMENT

IHA

- IHA : Integrated Head Assembly

- The simplification of upper structure design
- Improvement of equipment maintenance and constructability
- Reduction of radiation exposure



APR 1400(IMPROVEMENT)

IMPROVEMENT OF EQUIPMENT

Submerged intake system

- Environment friendly

