

# Improvement of the Existing Respirators Capability in of Abnormal Situation.

---



KORASOL CO.,LTD  
<http://www.korasol.co.kr>



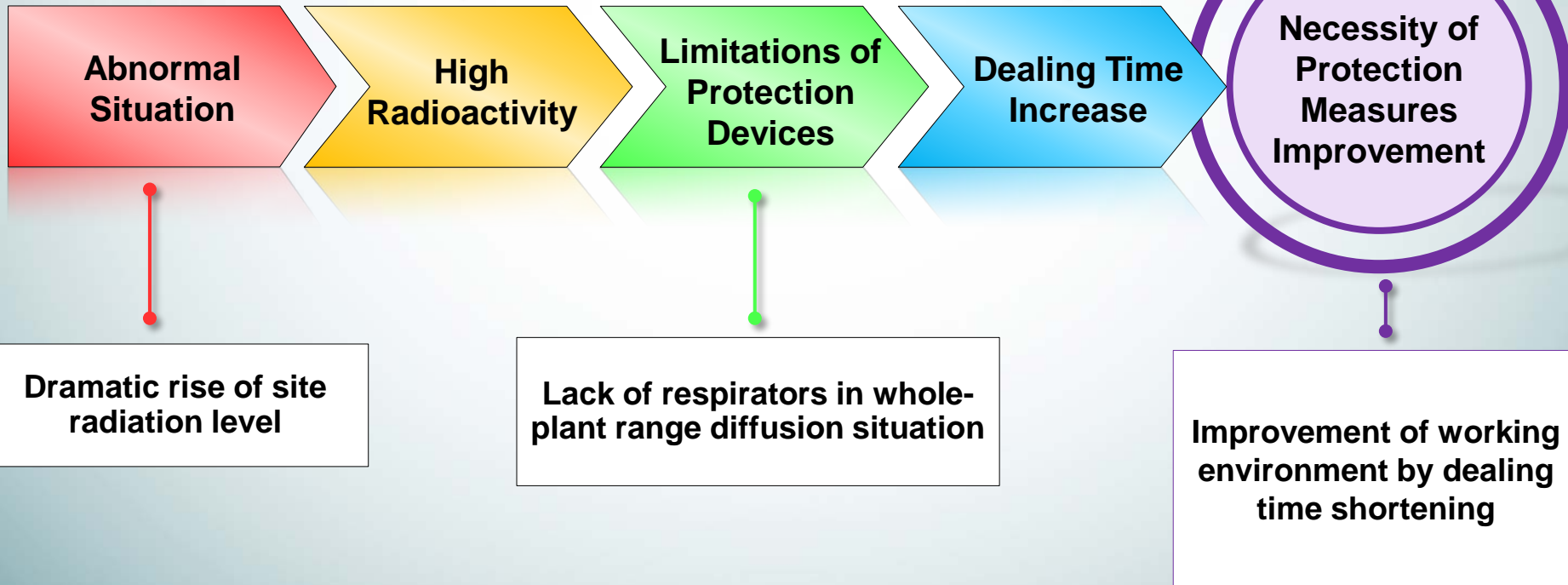
# Contents

- I **Outline**
- II **Present & Problem**
- III **Development**
- IV **Expectation**
- V **Future Plan**

# Outline

100 times air pollution level compared to normal condition (H3)

Increase of dealing time due to limitation of protection devices



## ■ Example of Abnormal Situation

### ◇ D<sub>2</sub>O Leakage at Wolsung Unit 2 in 2004

#### ▷ Tritium Density in Reactor Building

☞ Main Access Area (R-002, 201) : 33 ~ 88 DAC

☞ Leakage Concerned Work Area (R-108) : 591 DAC

※ 1DAC = 0.01mSv

#### ▷ Current State of Abnormal Situation Dealing

☞ Annual Personnel Access : 71 persons

☞ Dealing Time : '04. 06. 17 06 : 00 ~ 06. 21 09 : 00 (99h)

☞ Used Respirator : Self-Contained Breathing Apparatus (SCBA)

※ Source : Nuclear Safety Information Center in Korea Institute of Nuclear Safety

## ■ Standard of Respirator Use

Classification	Wearing Range (Tritium)	Operating Radius
Tritium Respirator	1 ~ 10 DAC	Wide Area
Air-line Respirator	Over 10 DAC	Narrow Area
SCBA	Over 50 DAC	Wide Area
Plastic Respirator	Over 50 DAC	Narrow Area

- ※ Feature of Heavey Water Reacor :
- D<sub>2</sub>O is used for coolants and moderators
  - In abnormal situation, tritium protection respiator is used

## ■ Feature of Respirator

### SCBA



### Feature

- High air pollution level  
and frequent moving case
- Unlimited Working Range
- Limited Using Time  
**(Time Available : about 20 minutes)**
- Using Point : In Abnormal situation

## ■ Feature of Respirator

### Plastic Respirator



### Feature

- High air pollution level  
and short moving range
- Unlimited Using time
- Cannot used in abnormal situation**
- Using point : In expectable work
- ※ light-water reactor : continuous air-line worksuit

## ■ Problems in Abnormal Situation

**SCBA**

**Limited air-volume**  
☞ **Limited using time**

**Wearing SCBA**  
☞ **Inaccessible to narrow area**

**Plastic  
Respirator**

**Using by connecting with the work  
area B/A**  
☞ **Unusable in abnormal situation**



## ■ Problems in Abnormal Situation

SCBA

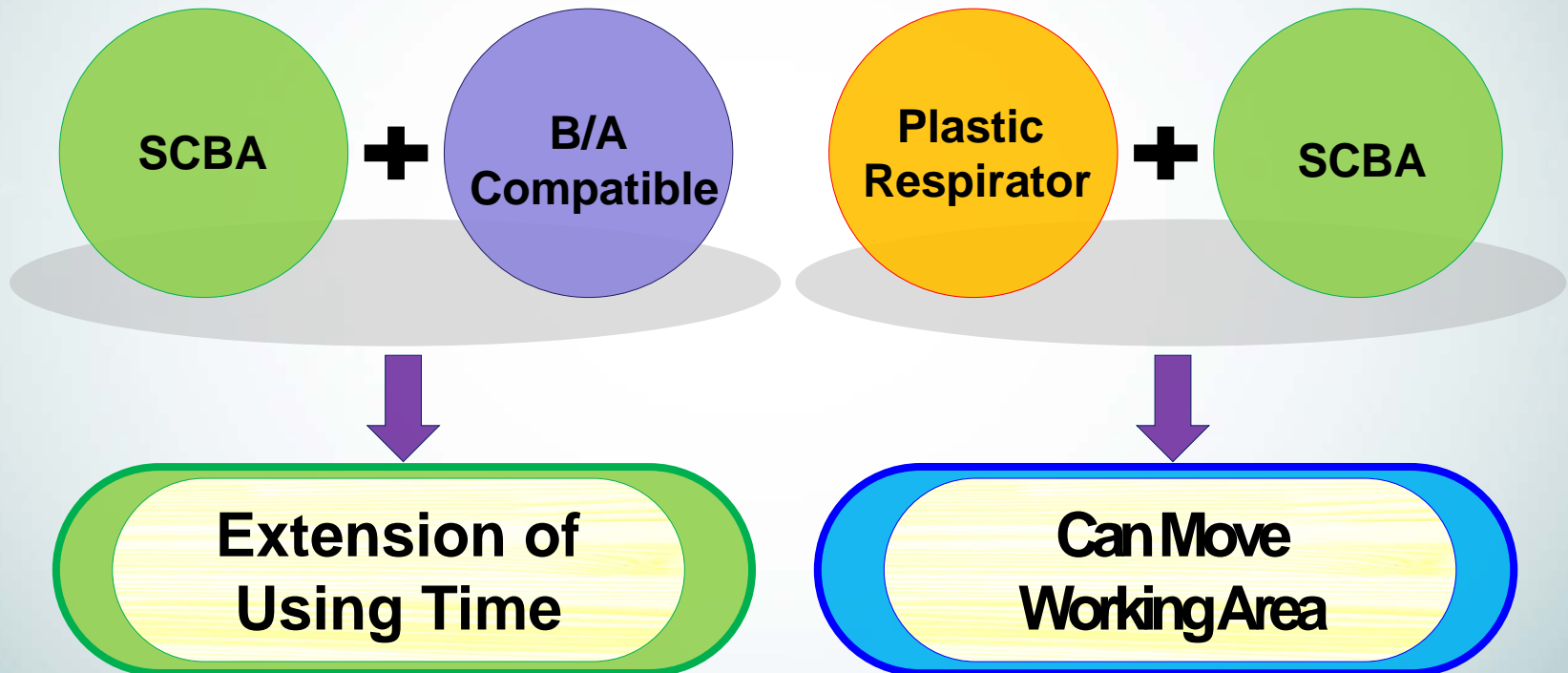


Plastic Respirator



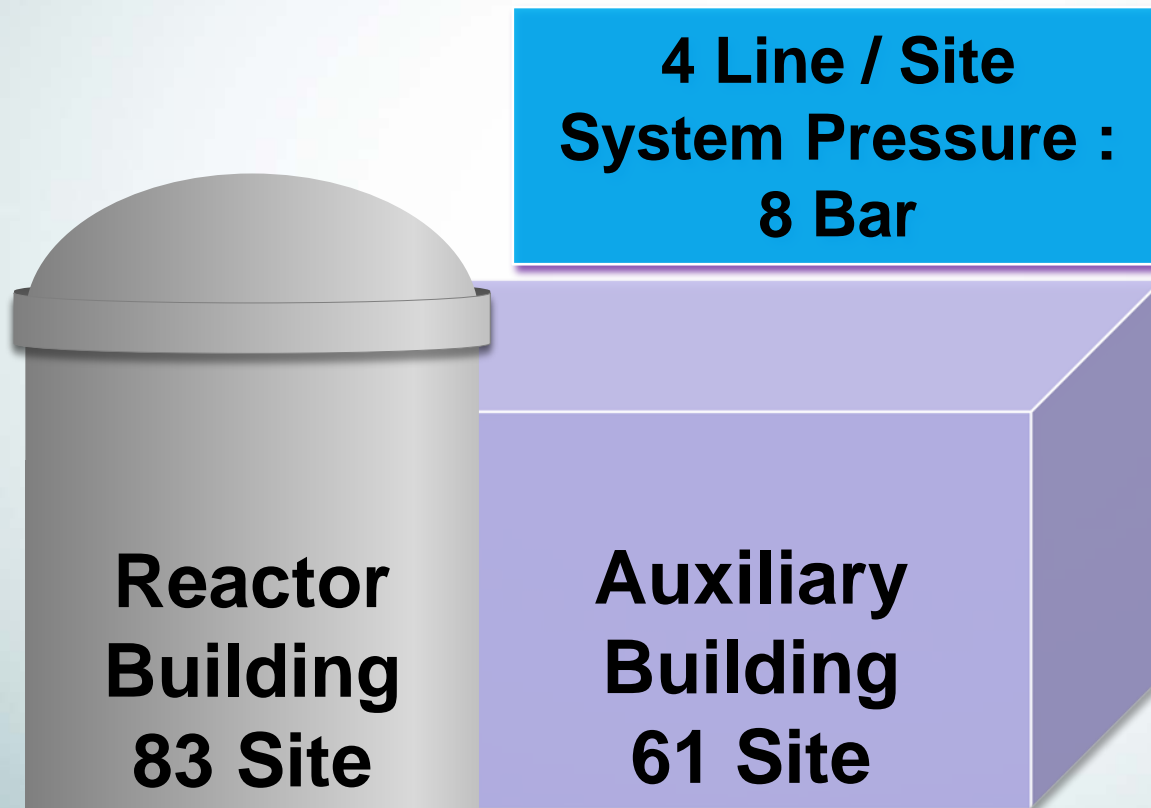


## ■ Development Goals





## ■ Current State of Breathing Air (Wolsung Unit 1) (Light-water Reactor : Service Air)





## ■ SCBA - SCA 680

(SCBA : Self-Contained Breathing apparatus)



### Main Feature

Using Time	About 45 min (40L/min)	
Total Weight	Less than 9kg	
Cylinder	Mateirals	Carbon Composite
	Internal Volume	More than 6.8L
	Maximum Charing Pressure	300 bar
	Pressure Proof Testing Pressure	500 bar
	Maximum Charge Amount	About 2,040L
	Weight	About 3.6kg

## 1. SCBA Connector

### ■ Outline

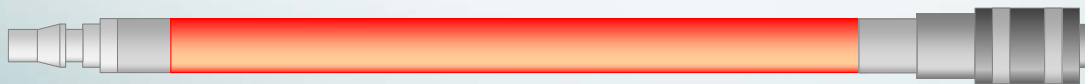
Secure the **compatible with B/A sysem**

**Extense the using time of SCBA**



**B/A plug**

**Mail mask coupling**



## 1. SCBA Connector

### ■ Test product and trial performance

SCBA Connector



## 2. Plastic Respirator Connector

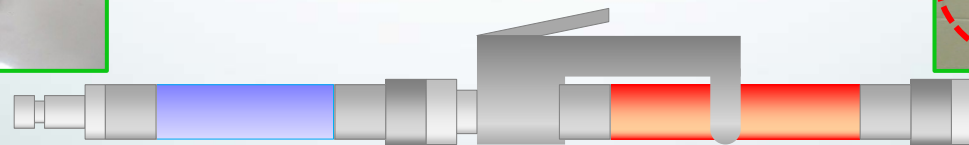
### ■ Outline

Give a mobility to plastic respirator

Can be used in abnormal situation



Button Type Valve



SCBA Plug

Plastic Respirator Plug

## 2. Plastic Respirator Connector

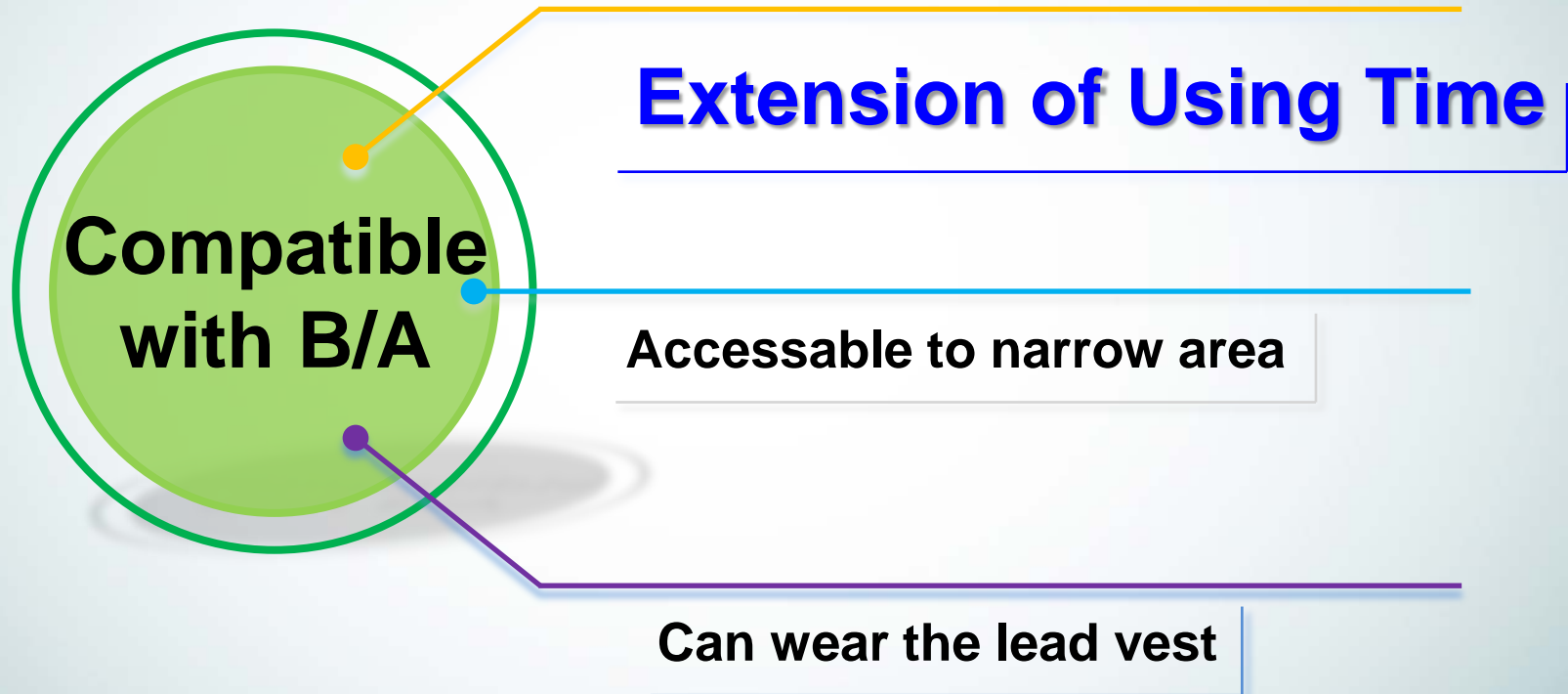
### ■ Test product and trial performance

Plastic Respirator  
Connector

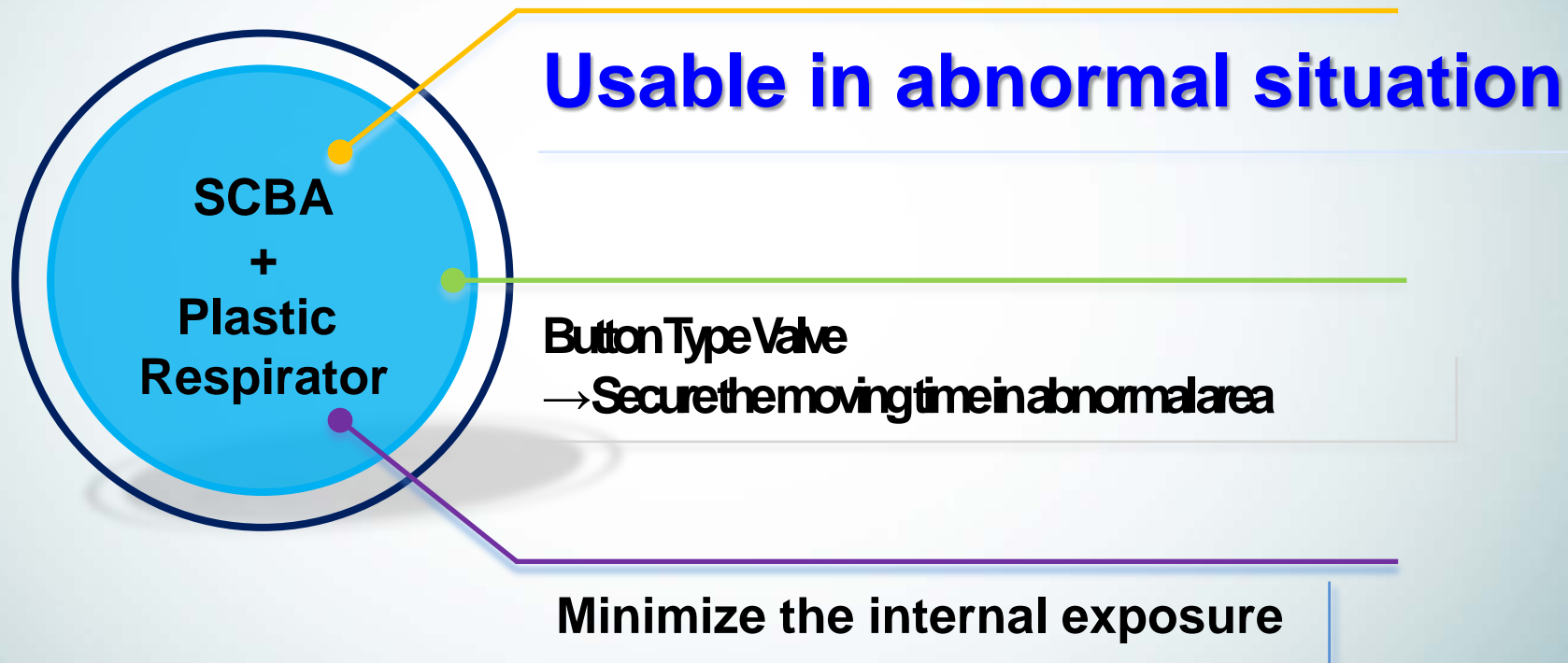




## 1. SCBA Connector



## 2. Plastic Respirator Connector



## 3. After Connector Application (case of 2004)

Classification	Wolsung Unit 2 in 2004	After Connector Application	Note
Real SCBA Using Time	20 minutes	more than 1 hour	3 times extended
Abnormal Situation Dealing Time	8 hours	4 hours	1/2 lessened
Abnormal Situation Dealing Workers	71 persons	20 persons	2/3 lessened
The Amount of Used Protection Device	1 drum	1/3 drum	2/3 lessened

**Secure the reliability  
of nuclear power  
plant operation**

**Radiation exposure  
lessened**

**Achievement  
of ALARA**

**Reduction of  
nuclear waste**

**Improvement of  
working environment**

1

**Enlargement of convenience by additional improvement of connector**

2

**Promote an application plan such as work site equipping in power plant**

3

**Review the compatibility with other plant's protection device**

4

**Promote for patent and utility model registrations**

**Thank YOU!**

---



**KORASOL CO.,LTD**  
<http://www.korasol.co.kr>