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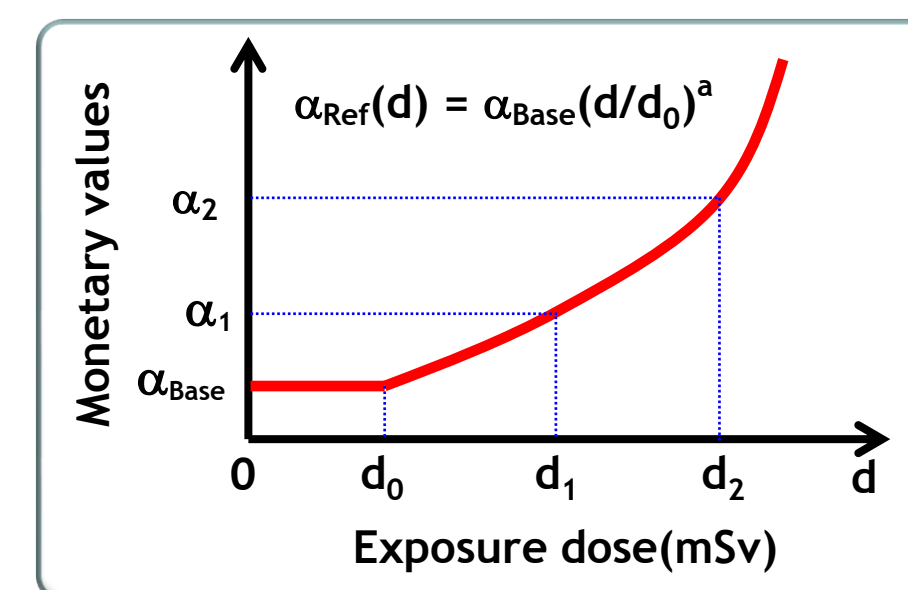
## 1 Introduction

There is no inherent monetary value of the man-mSv for operators of Korean NPPs. So International practices and cases are referenced on a case by case basis. Therefore, setting a unique monetary value of the man-mSv of KHNP is necessary as an essential means of decision-making in radiation protection optimization.

In this study, the risk aversion factor was analyzed based on a survey of NPP workers and the socioeconomic condition of Korea to evaluate the monetary value of the man-mSv that reflects the characteristics of NPPs in Korea. The monetary value according to the radiation exposure level is presented.

## 2 Materials and Methods

### Model of monetary values of the man-mSv incorporating radiation aversion factor



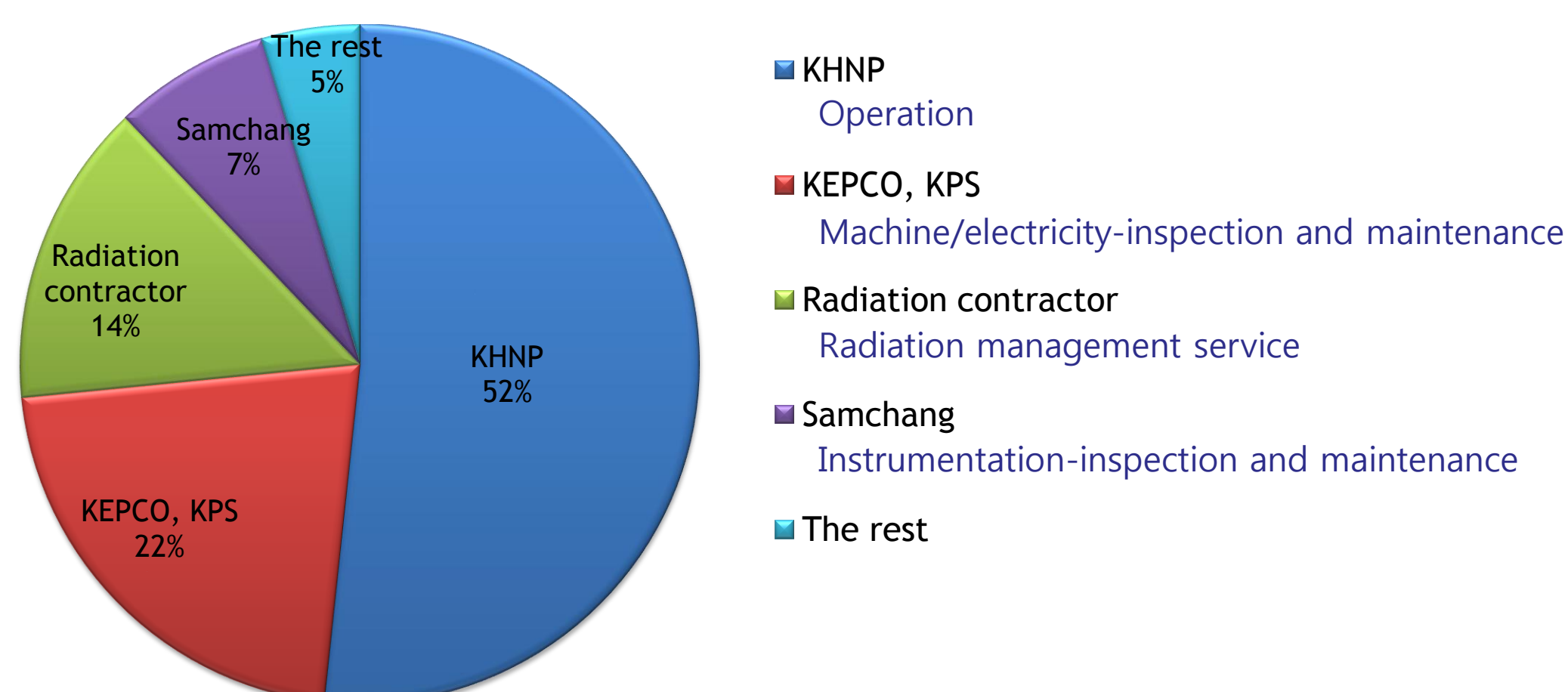
$\alpha_{Ref}(d)$  : monetary value of the man sievert for individual exposure level  $d$   
 $\alpha_{Base}$  : basic monetary value of the man sievert  
 $d$  : annual individual exposure level  
 $d_0$  : the lower value of the individual dose range from which the aversion phenomenon can be applied  
 $a$  : coefficient representing the degree of aversion ( $a = 0$  when  $d < d_0$ ,  $a \geq 0$  when  $d \geq d_0$ )

### Survey contents and calculation of the radiation aversion factor

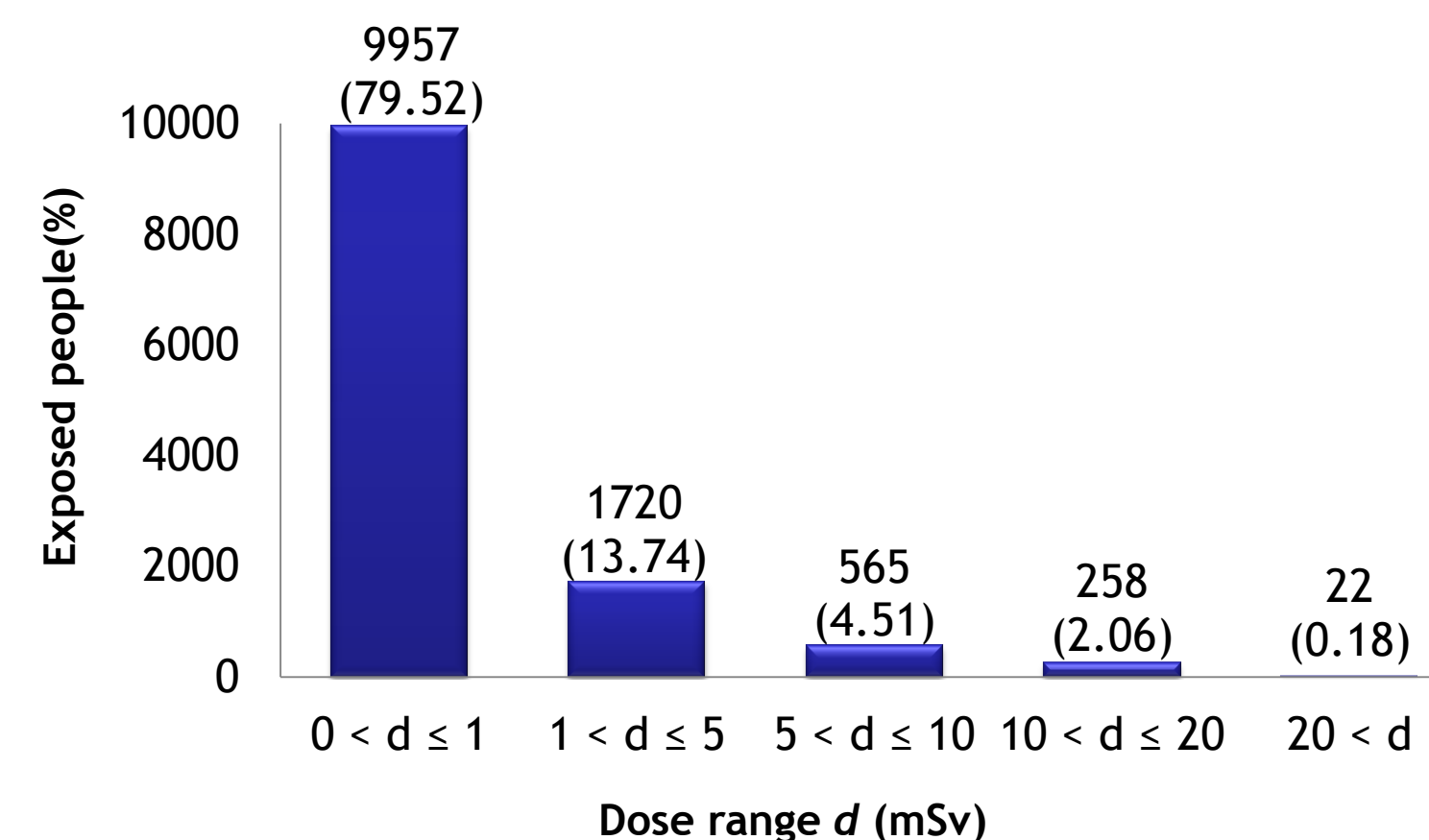
Dose level (mSv)	Radiation aversion value (1-5)	Risk aversion feeling	Original response	Recorded value
1	( )	None	1	1.00
3	( )	Very little	2	1.25
8	( )	Some	3	1.50
15	( )	Considerable	4	1.75
>20	( )	Complete	5	2.00

## 3 Results and Discussion

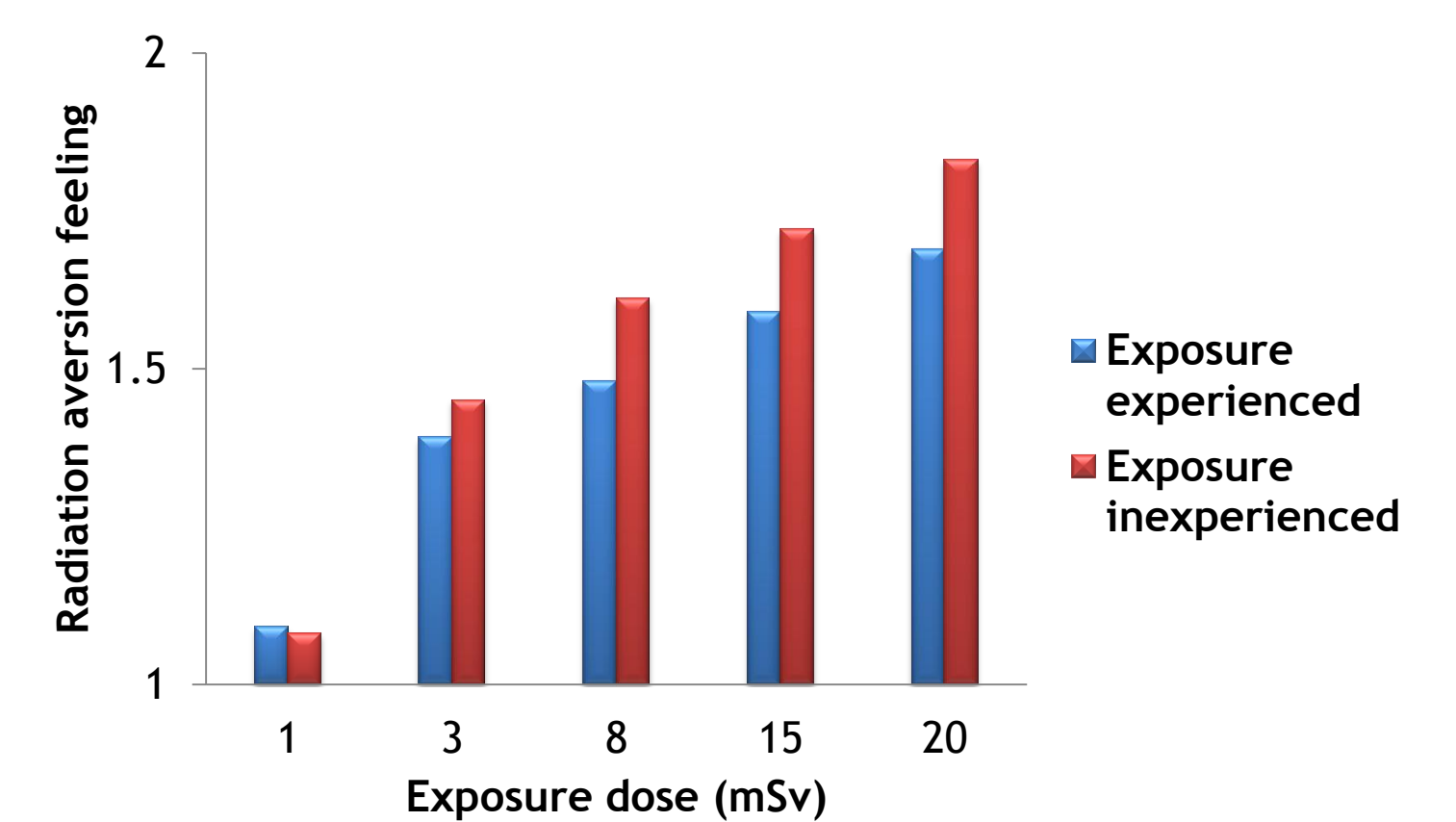
### Distribution of respondents for the survey



### Radiation dose distribution of Korean NPP workers in 2010



### Differences in the radiation aversion feeling between respondents



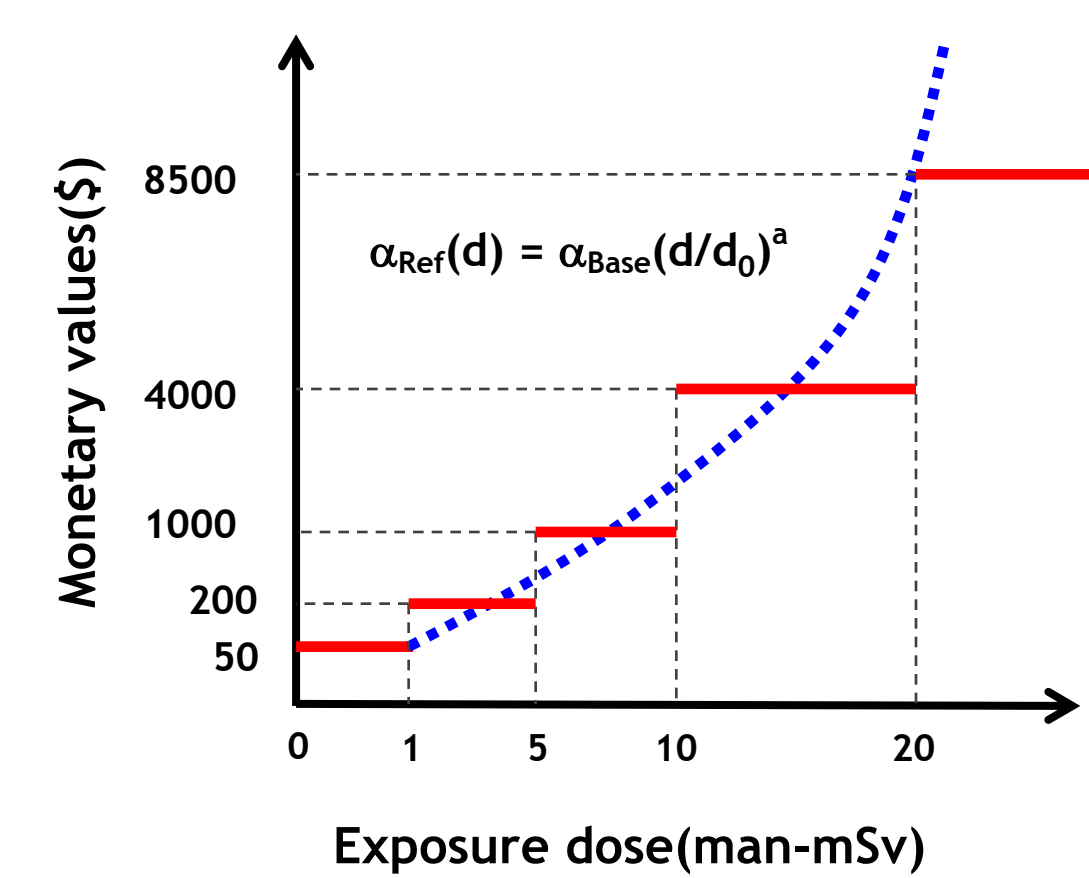
### Korean specific factors and basic monetary value ( $\alpha_{Base}$ ) as of 2009

Life expectancy in population (A)	79.4 years
Average age of cancer occurrence (B)	60.0 years
Loss of life expectancy induced by radiation exposure (C = A-B)	19.4 years
Average annual wage for electric worker (W)	56,000\$/year
Nominal risk coefficient induced by radiation (P)	$4.2E^{-2}Sv^{-1}$
Basic Monetary Value ( $\alpha_{base} = C \times W \times P$ )	45.6 \$/mSv

### KHNP's radiation aversion factors and monetary values by dose level

Dose level (mSv)	Dose level (mSv)				
	0-1	1-5	5-10	10-20	≥ 20
Radiation aversion factor	1.26	1.38	1.52	1.65	1.74
$\alpha_{Ref}(\$)$	46	210	1075	3977	8370

### Representative figures of monetary values



## 4 Conclusion

A comparison of the internationally and domestically managed monetary values of man-mSv reveals that most values used by NPP operators are 2-10 times greater than the values used by regulatory agencies. This finding is interpreted to be due to the regulatory agencies using the gross domestic product per capita and NPP operators using the average annual wage of employees in calculating the basic monetary value ( $\alpha_{Base}$ ).

The radiation aversion factors derived from the survey of NPP radiation workers are values based on the individual's radiation exposure and underlying perception of radiation. These radiation aversion factors were used as an important basis in determining the monetary value of the man-mSv by the NPP operators.

The monetary value of the man-mSv is expected to contribute significantly in the NPP radiation protection optimisation of KHNP.