

HW#20

Recall in detail

1) Radiological risk before the addition of the ESF.

$$\begin{aligned} F_T R_T &= \sum_{i=1}^n F_i R_i = F_A R_A + F_{S1} R_{S1} + F_{S2} R_{S2} + F_{TMLB} R_{TMLB} \\ &= 8e3 + 2.4e4 + 8e4 + 2.4e4 \\ &= \underline{1.4e5 \text{ person}\cdot\text{rem}/\text{year}} \end{aligned}$$

2) after ESF addition

$$\begin{aligned} F_T R_T &= \sum_{i=1}^n F_i R_i = F_A R_A + F_{S1} R_{S1} + F_{S2} R_{S2} + F_{ADB} R_{ADB} + F_{AD} R_{AD} + F_{AH} R_{AH} + \\ &\quad F_{S1B} R_{S1B} + F_{S1D} R_{S1D} + F_{S1H} R_{S1H} + F_{S2B} R_{S2B} + F_{S2D} R_{S2D} + F_{S2H} R_{S2H} + F_{TMLB} R_{TMLB} \\ &= 4e0 + 1.2e1 + 4.0e1 + 8e0 + 1.6e2 + 4.4e1 + 1.6e1 + 2.4e2 + 1.2e2 \\ &\quad + 6.4e1 + 7.2e2 + 2.6e2 + 2.4e4 \\ &= \underline{2.5e4 \text{ person}\cdot\text{rem}/\text{year}} \end{aligned}$$

$$3) \text{ cost effectiveness Ratio} = \frac{C = 1.5e6 \text{ \$/year}}{(1.4e5 - 2.5e4) \text{ [person}\cdot\text{rem}/\text{year}]}} = \$14 / (\text{person}\cdot\text{rem})$$

4) a system is cost effective if the cost of implementation is $< \$1000 / (\text{person}\cdot\text{rem})$. Therefore, there is a cost effective implementation as $\$14 < \$1000 / (\text{person}\cdot\text{rem})$