

1) Hydrogen bomb of 1 megaton size generates $8.4 \times 10^{15} \text{ J}$ of kinetic energy. This energy is used to heat a cube of water $2.0 \times 10^3 \text{ m}$ on a side. Water is at 25°C . What is the increase in temperature?

$$m = \rho V = (1000 \times 10^3 \text{ kg/m}^3) \times (2.0 \times 10^3 \text{ m})^3 \\ = 8.0 \times 10^{12} \text{ kg of water}$$

$$c = 4.186 \text{ kJ/(kg}\cdot\text{K)} = 4.186 \times 10^3 \text{ J/(kg}\cdot\text{K)}$$

$$\text{Energy} = mc \Delta T$$

$$\Delta T = \frac{8.4 \times 10^{15} \text{ J}}{8.0 \times 10^{12} \text{ kg} \times 4.186 \times 10^3 \text{ J/kg}\cdot\text{K}} = 0.25^\circ \text{C}$$

(A)