

18. (a) Using the result of problem 4, the TNT equivalent is

$$\frac{(2.50 \text{ kg})(4.54 \times 10^{26} \text{ MeV/kg})}{2.6 \times 10^{28} \text{ MeV}/10^6 \text{ ton}} = 4.4 \times 10^4 \text{ ton} = 44 \text{ kton} .$$

- (b) Assuming that this is a fairly inefficiently designed bomb, then much of the remaining 92.5 kg is probably “wasted” and was included perhaps to make sure the bomb did not “fizzle.” There is also an argument for having more than just the critical mass based on the short assembly-time of the material during the implosion, but this so-called “super-critical mass,” as generally quoted, is much less than 92.5 kg, and does not necessarily have to be purely Plutonium.