Ch. 5 Challenge Problem

On March 4, 1996 five tank cars containing propane \((\text{CH}_3\text{CH}_2\text{CH}_3); \text{molar mass} = 44.09 \text{ g/mol}\) derailed in Weyauwega, WI forcing evacuation of the town for over a week. Residents within a square mile of the accident site were unable to return to their homes for over two weeks.

a. (20 pts) Assuming that each tank car had a capacity of 33,500 gal and knowing that the density of propane is 0.5853 g/cm\(^3\), how many kJ of heat would be evolved if all the propane in the five tank cars reacted explosively with oxygen in the air?

Answer: _______________

b. (5 pts) \(\Delta H^\circ_{\text{rxn}}\) for the explosive decomposition of TNT (molar mass = 227.13 g/mol) is -1066.1 kJ/mol. How many kilotons of TNT would provide the amount of energy equivalent to that produced by the combustion of five tank cars of propane?

Answer: _______________

1 kiloton = 1000 tons
1 ton = 1000 kg