1. A tank contains pressurized gas. Develop an equation describing the gas pressure as a function of time if the tank develops a leak. Assume choked flow and a constant tank gas temperature of To.

2. A storage tank contains water contaminated with a small quantity of a soluble hazardous waste material. The tank is 3 m in diameter and 6 m high. At the current time the liquid height is within 1 m of the top of the tank. Assume that the tank is vented.
   a. If a 3-cm (internal diameter) feed pipe at the bottom of the tank breaks off, how much liquid (in m^3) is spilled if an emergency response procedure requires 30 min to stop the flow?

   b. What is the final liquid level (in m)?

   c. What is the maximum spill rate of liquid (in kg/s)?

3. A burning dump emits an estimated 3 g/s of oxides of nitrogen. What is the average concentration of oxides of nitrogen from this source directly downwind at a distance of 3 km on an overcast night with a wind speed of 7 m/s? Assume that this dump is a point ground-level source. Neutral stability class D applies, with rural conditions.