

The Chloroform Incident

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When I was in the Remediation unit in New York's region 1 (Long Island), I was called out to a spill of an unknown chemical at a commercial building that was no longer being used as a factory and was now a dance studio for young ballerinas.

A cesspool pumping company had been hired to pump out the cesspools at the dance studio and while the man was pumping out the pools, he had become dizzy with fumes and almost passed out, falling down and hitting his head. (a cesspool pumping truck works like a large vacuum cleaner- the suction hose pulls the wastewater into the truck but the air that was in the truck's tank has to exit the tank and go into the outside air. There was a chemical in the wastewater and it went into the air in the tank and then left the tank and caused the man to become dizzy)

The county health department evacuated the ballerinas. The NYSDEC responded to the scene. When I got there, I found out from the county guy and the other state guys the following:

1. This cesspool company was under investigation by the district attorneys office,
2. The truck had come to the site half full and that the sewage that was already in the truck was from a pharmaceutical company
3. The chemical that caused the man to get sick was probably from the pharmaceutical company
4. As the truck driver was getting dizzy, he reversed the pumping and dumped all of the contaminated sewage into the cesspools at the dance studio.



We hired a pollution cleanup contractor to pump out the contaminated sewage from the cesspools- they wore air tanks and level B protection (tyvek suits, gloves boots). But we still did not know what the chemical was- I called the pharmaceutical company, and I asked them what the chemical could possibly be (I had to be careful not to tell them that they were under investigation by the District Attorney). The environmental and safety manager told me he had no idea what the chemical could be (I later found out he was lying).

I also found out the cesspool truck driver had picked up the sewage 3 days before at the pharmaceutical company and he had passed out there! And he was taken to the hospital, where he recovered.

So, to make a long story longer, our hazardous waste pollution contractor pumped out the contaminated sewage into his tank truck. A sample of the waste had to be analyzed before the contents could be properly disposed of (that meant the state had to rent the tank truck for a week while the lab was testing the waste)

The waste was properly disposed of. The DA could not pursue a criminal case because the driver would not testify

in court. NYSDEC had an administrative enforcement case against the Pharmaceutical company and the sewage pumping company- total fines and reimbursement costs were received of about \$70,000.

After the waste was analyzed and the chemical was found to be chloroform, I did the following calculations to estimate how much chloroform was in the sewage- so that when we went to inspect the pharmaceutical company, we had some idea of how much they poured down the drain- and if their inventory control was tight enough to keep track of that amount.

The sample that was taken from the cesspool after the truck had dumped the waste into the cesspool (and before it was pumped out by our contractor) found that the waste contained chloroform in the concentration of 590,000 micrograms per liter (ug/l) A microgram is a millionth of a gram (one ounce equals 31 grams)

The truck contained about 3000 gallons of contaminated waste.

1 gallon = 3.785 liters

Therefore

$3,000 \text{ gallons} \times 3.785 \text{ liter/gallon} = 11,355 \text{ liters}$

Every liter of waste had 590,000 micrograms of chloroform or 0.59 grams

To find the total amount of chloroform in the truck, we multiply 0.59 grams x 11,355 liters = 6,699 grams

6,699 grams = 6.699 kilograms

One kilogram = 2.2 pounds

$6.699 \times 2.2 = \mathbf{14.73 \text{ lbs.}}$

How much volume of chloroform is that?

We have to look up the density of chloroform, which is 1.49. This means that chloroform is heavier than water, 150% heavier than water. (the density of water is 1((1cubic centimeter of water weighs 1 gram)))

Water weigh 8.34 pounds per gallon

Multiply the weight of a gallon of water by 1.49 and we get the weight of a gallon of chloroform

$8.34 \times 1.49 = \mathbf{12.42 \text{ lbs. for a gallon of chloroform.}}$

The pharmaceutical company improperly disposed of only a little over **one** gallon of chloroform.

Later, when we inspected the pharmaceutical company, they told us that they had purchased 208 liters of chloroform that year and had used 72 liters (19 gallons). We could not estimate how much of these 72 liters were properly disposed of as hazardous waste and how much was disposed of improperly because the manifested hazardous wastes were a mixture of chloroform and other halogenated chemicals.

Isn't it important to learn that only one gallon of chloroform can cause that much trouble?

The next question is... if we had not removed the chloroform from the cesspool, and the chloroform had leached down and contaminated the groundwater, how many gallons of drinking water could it have ruined? (The New York State Groundwater Standard for Chloroform is 7 micrograms per liter)