ESTIMATING AIR EMISSIONS FROM PETROLEUM UST CLEANUPS

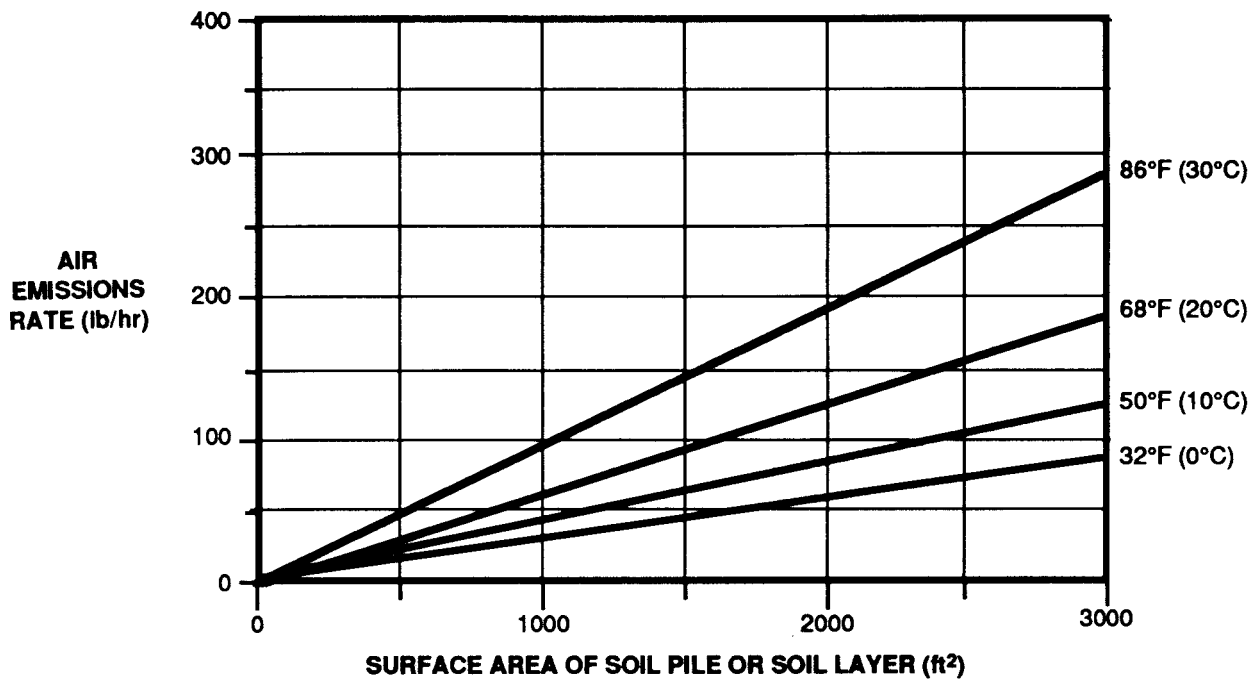
— FIELD CARDS —

U.S. Environmental Protection Agency
Office of Underground Storage Tanks

September 1989

The following field cards contain graphs that have been generated from data in the OUST report Estimating Air Emissions from Petroleum UST Cleanups. The graphs help in estimating the rate of emissions at petroleum UST cleanup sites. Rather than looking through the entire report for the appropriate graph, you can now refer to this portable and durable set of field cards.

The graphs for both benzene and volatile organic compound (VOC) emissions are included for soil excavation, vacuum extraction and air stripping. On the back of each graph are the instructions for its use. For additional information, refer to the section of Estimating Air Emissions from Petroleum UST Cleanups that is called out below the graph.



SOIL EXCAVATION / GASOLINE VOCs

SOIL EXCAVATION

To Estimate Emissions:

- What is the surface area of the pile?
  - If soil pile is a horizontal layer,

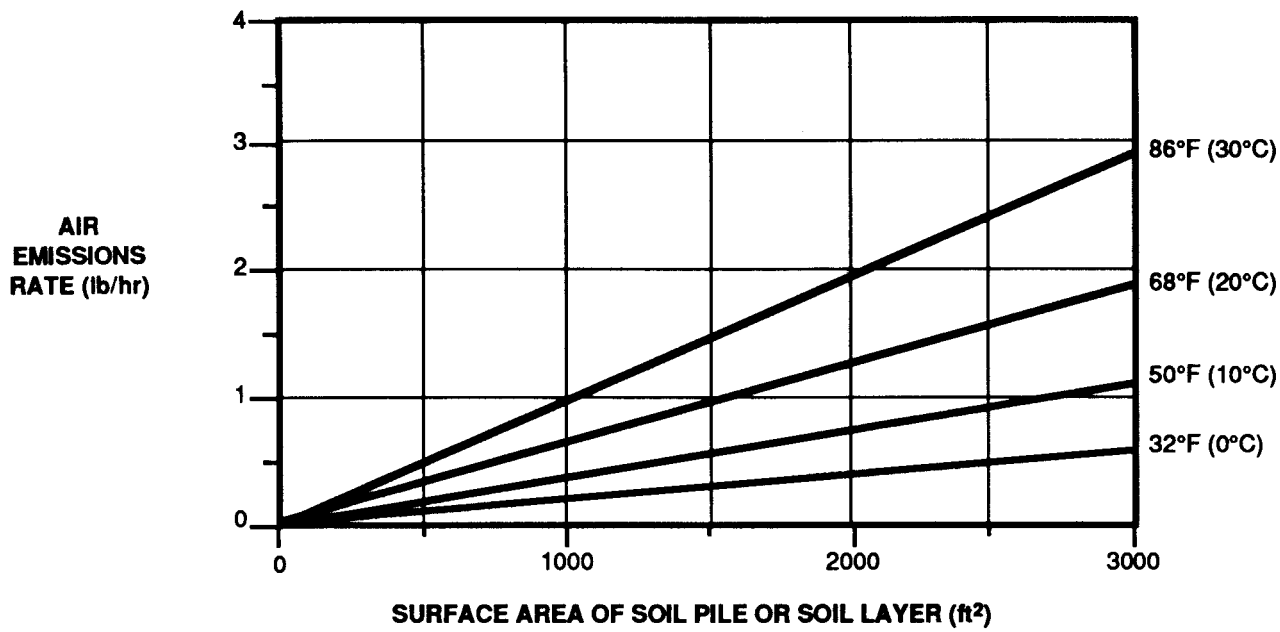
    $$\text{surface area} = \frac{\text{volume}}{\text{height}} \quad \text{OR} \quad \text{surface area} = \text{length x width.}$$

  - If soil pile is a cone and r = 0.5 x diameter,

    $$\text{surface area} = 3.142\, r \sqrt{r^2 + h^2} \quad .$$

  - If soil pile is a cone and r = h (approximately),
    surface area = 1.11 x (diameter).
- What is the approximate temperature at the site?
- Locate the line corresponding to the temperature.
- Locate the surface area of the soil pile on the x axis and draw a vertical line upward to the temperature line.
- At the intersection of these lines, draw a horizontal line to the y axis and read the emission rate off the y axis at this point.

For additional information, see Estimating Air Emissions from Petroleum UST Cleanups, Section 2.0.



SOIL EXCAVATION / BENZENE

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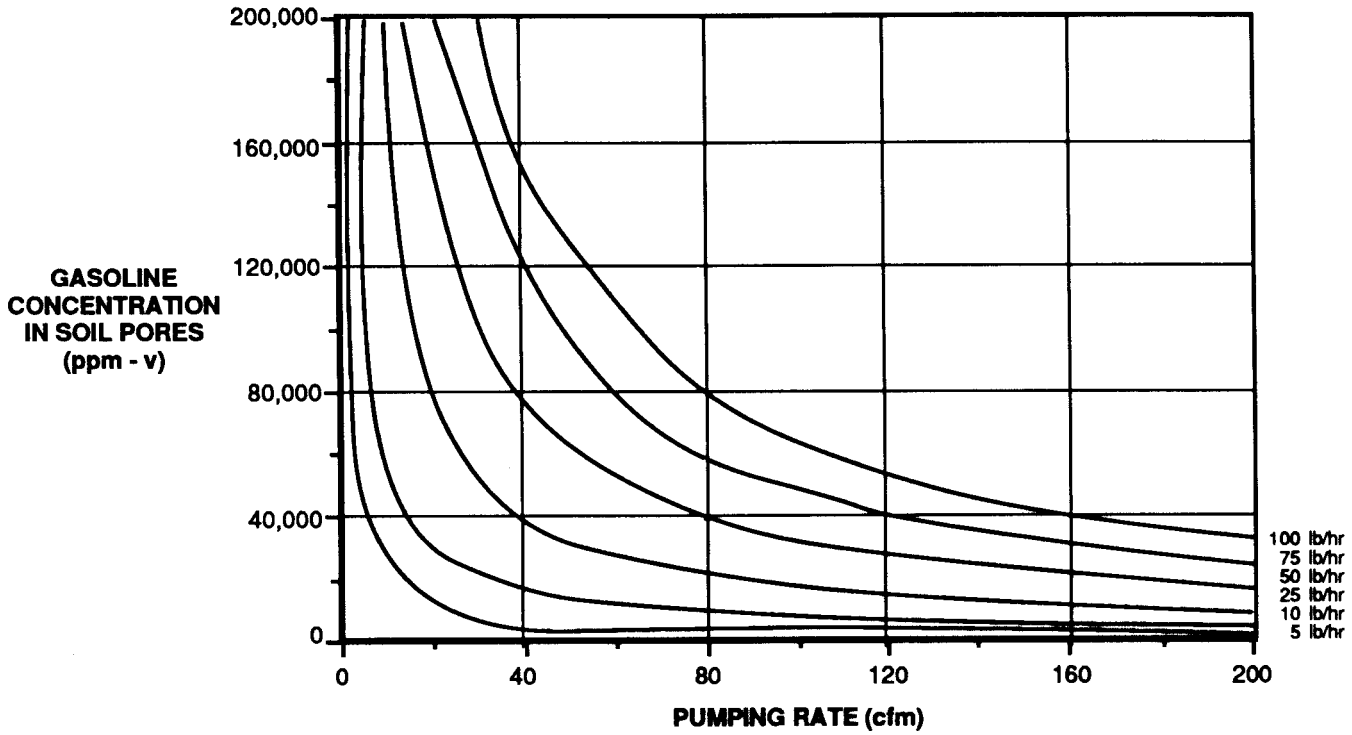


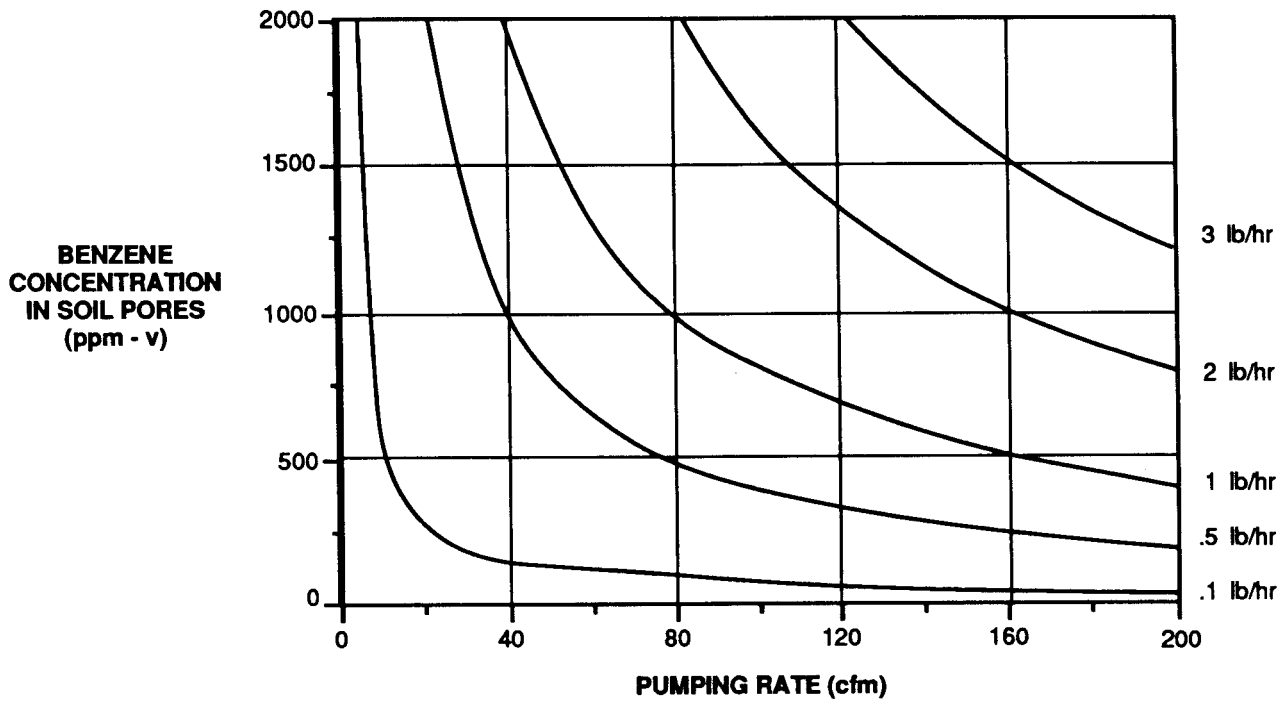
VACUUM EXTRACTION / GASOLINE VOCs

VACUUM EXTRACTION
(GASOLINE VOCs)

To Estimate Emissions:

- What is the pumping rate of the well in cubic feet per minute?
- What is the level of contamination?
    - To obtain a conservative estimate, determine the maximum soil gas concentration of gasoline (ppm-v).
    - To obtain a short-term average, determine the average soil gas concentration of gasoline (ppm-v).
- Locate the pumping rate on the x axis.
- Locate the soil gas concentration on the y axis.
- The intersection of these two points will fall on or near a curve having a specific emission rate.

For additional information, see Estimating Air Emissions from Petroleum UST Cleanups, Section 3.0.



VACUUM EXTRACTION / BENZENE

VACUUM EXTRACTION
(BENZENE)

To Estimate Emissions:

- What is the pumping rate of the well in cubic feet per minute?
- What is the level of contamination?
  - To obtain a conservative estimate, determine the maximum soil gas concentration of benzene (ppm-v).
  - To obtain a short-term average, determine the average soil gas concentration of benzene (ppm-v).
- Locate the pumping rate on the x axis.
- Locate the soil gas concentration on the y axis.
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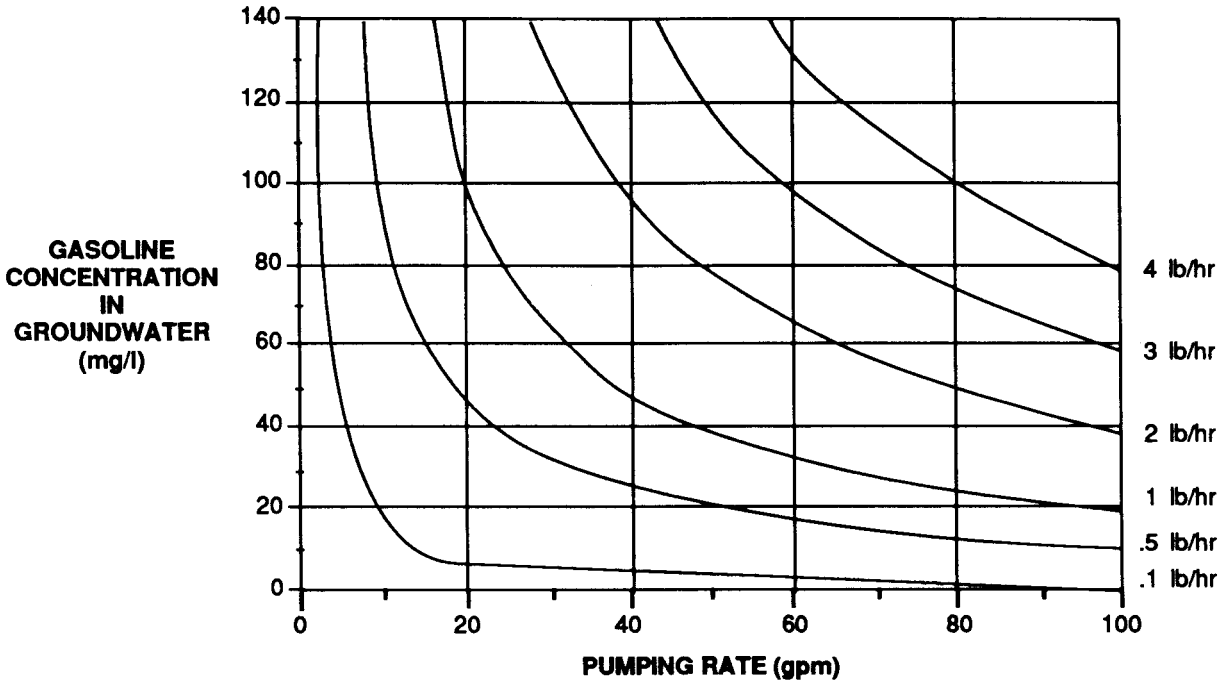


AIR STRIPPER/GASOLINE VOCs
REMOVAL EFFICIENCY = 99.99%

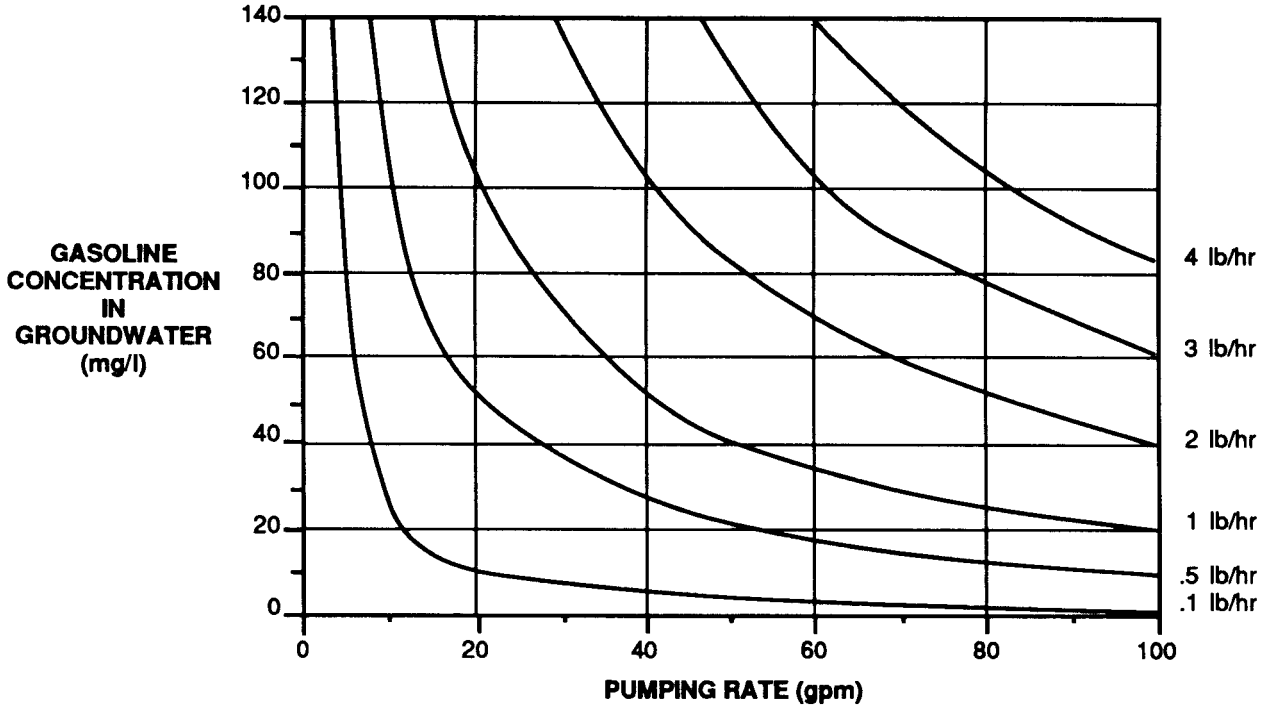
AIR STRIPPING
(GASOLINE VOCs)

To Estimate Emissions:

- What is the removal efficiency of the air stripping system?
  - Turn to the chart that corresponds to the system's removal efficiency (99.99%, 95%, or 85%).

- What is the pumping rate in gallons per minute?
- What is the maximum concentration of gasoline in the ground water (mg/l)?
- Locate the pumping rate on the x axis.
- Locate the contamination level on the y axis.
- The intersection of these two points will fall on or near a curve having a specific emission rate.

For additional information, see Estimating Air Emissions from Petroleum UST Cleanups, Section 4.0.



AIR STRIPPER/GASOLINE VOCs
REMOVAL EFFICIENCY = 95.00%

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(GASOLINE VOCs)

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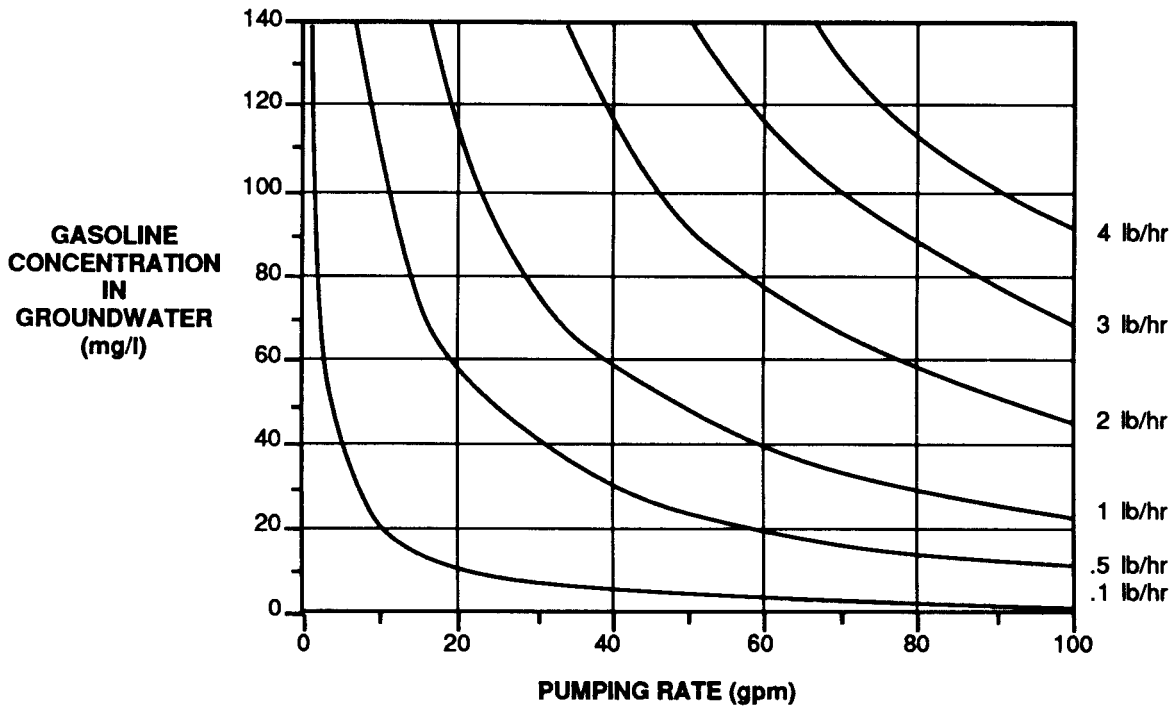

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REMOVAL EFFICIENCY = 85.00%

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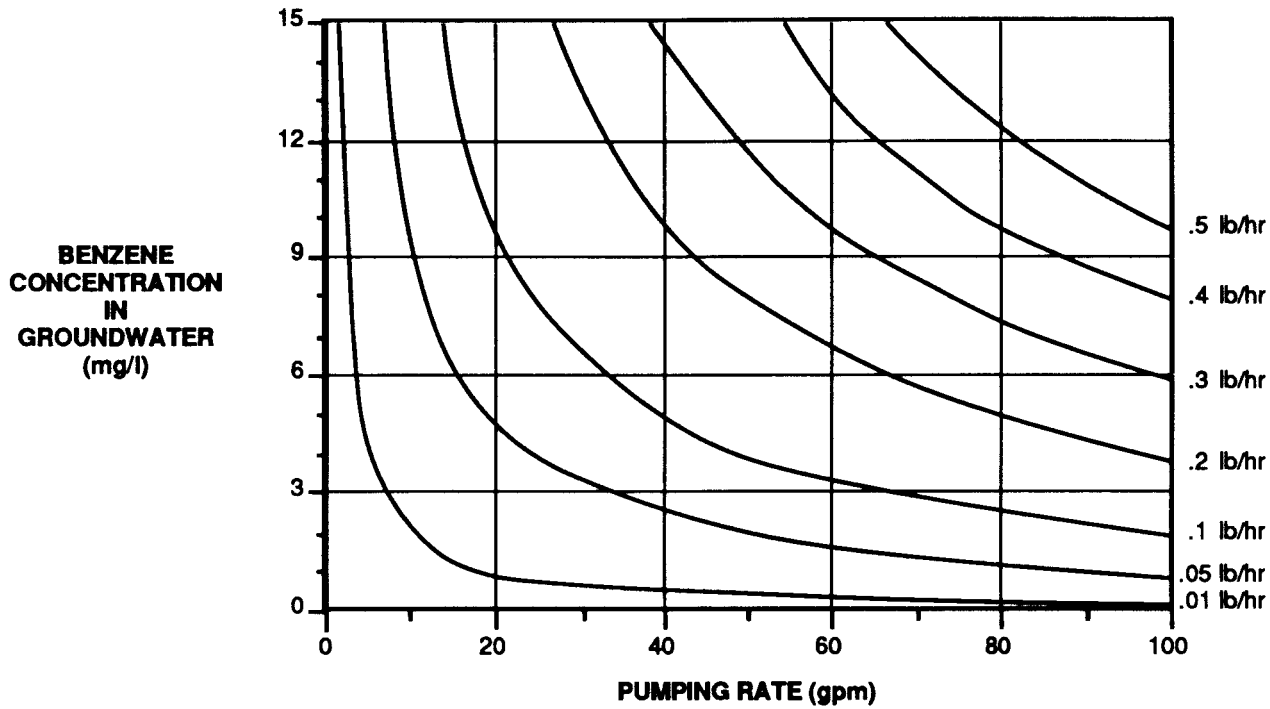

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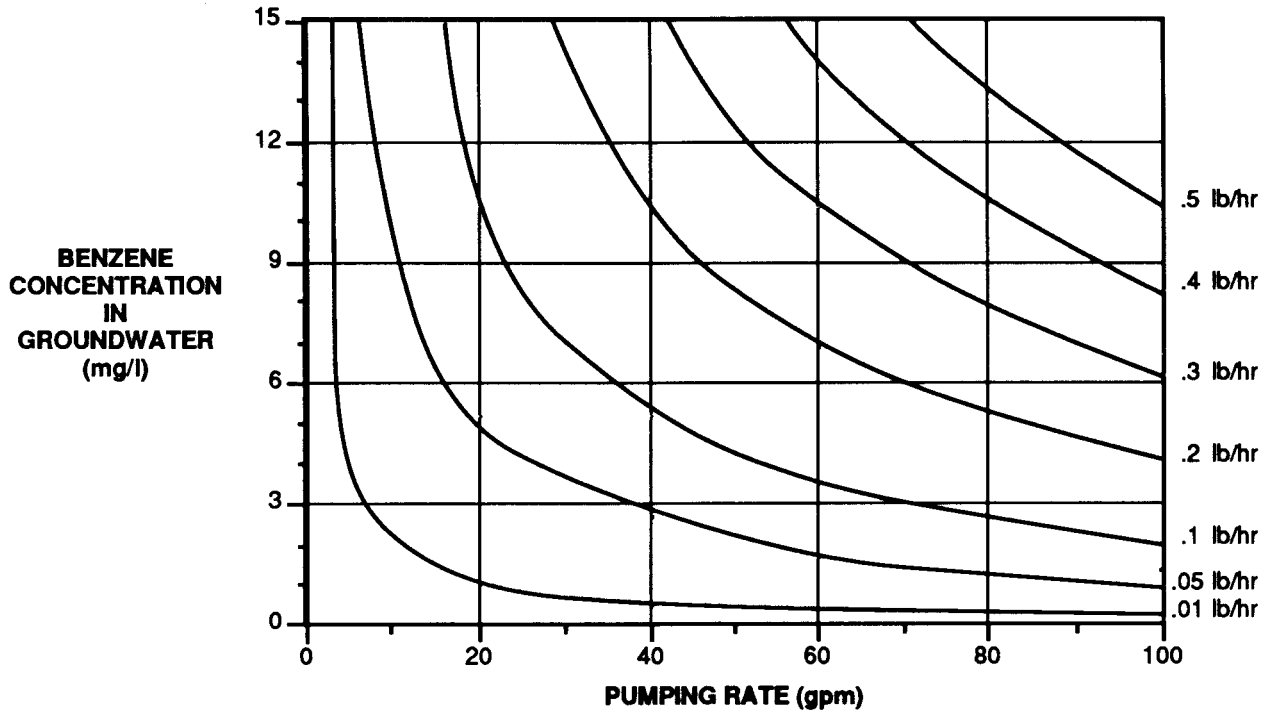

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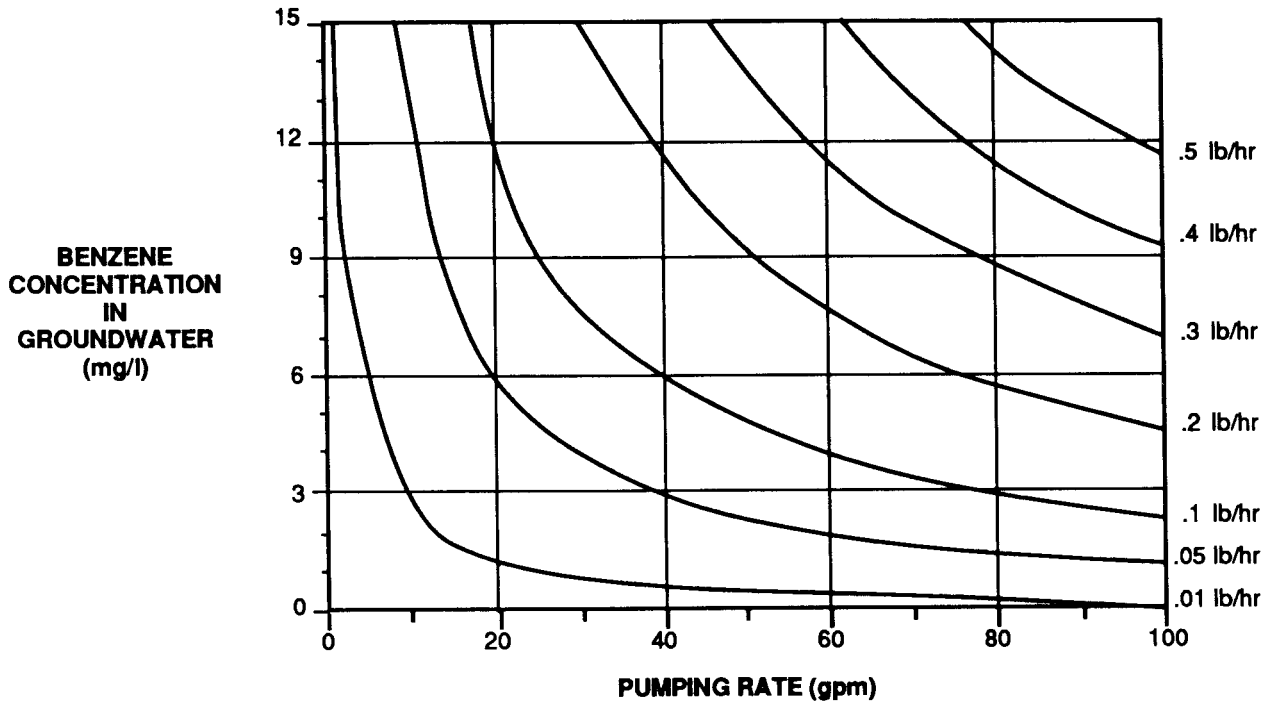

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