SOIL AERATION EXAMPLE

An example of how to calculate the allowable quantity of soil to be aerated on a daily basis is demonstrated below:

Assume:
a) Quantity of Soil - 200 yd^3
b) Average Benzene Concentration - 0.3 ppm
c) Average Total Hydrocarbon (TPH) Concentration - 1000 ppm
d) Distance from edge of soil aeration to property line - 50 meters

Compliance With Cancer Risk Limit Of 1/100,000 (concentration < 0.3448 ug/m3)

Calculate total amount of benzene in soil:

200 yd^3 x 27 ft^3/yd^3 x 100 lb/ft^3 x 0.3 ppm/10^6 = 0.16 lbs Benzene

From Graph 1, approximately 0.08 lbs/day of benzene can be emitted given 50 meters from the edge of the aeration project to the property line, and still remain in compliance with District Rule 1000 limit of 1/100,00 cancer risk.

Calculate the number of days to complete the operation:

0.16 lbs benzene ÷ 0.08 lbs benzene/day = 2 days

Compliance With The PEL/420 For TPH (concentration < 2143 ug/m3)

Calculate total amount of TPH in soil:

200 yd^3 x 27 ft^3/yd^3 x 100 lb/ft^3 x 1000 ppm/10^6 = 540 lbs TPH

From Graph 2, up to 50 lbs/day of TPH can be emitted given 50 meters from the edge of the aeration project to the property line, and still remain below the PEL/420 for TPH, and thus in compliance with District Rule 1000 criteria.

Calculate the number of days to complete the operation:

540 lbs TPH ÷ 50 lbs/day = 11 days

Based upon the Benzene unit risk value (URV) and the PEL/420 for TPH the project could be completed within 2 and 11 days, respectively. Therefore to insure compliance with both the URV and PEL/420, the project will require 11 days to complete. In conclusion the following allowable quantity of soil to be aerated on a given day is 18 yd^3/day as calculated below:

200 yd^3 ÷ 11 days = 18 yd^3/day

AERATION OF GASOLINE CONTAMINATED SOIL
BENZENE EMISSIONS - GRAPH 1

Legend: URV 0.3448 UG/M3

X-axis: DISTANCE (METERS)
Y-axis: EMISSIONS (LBS/DAY)
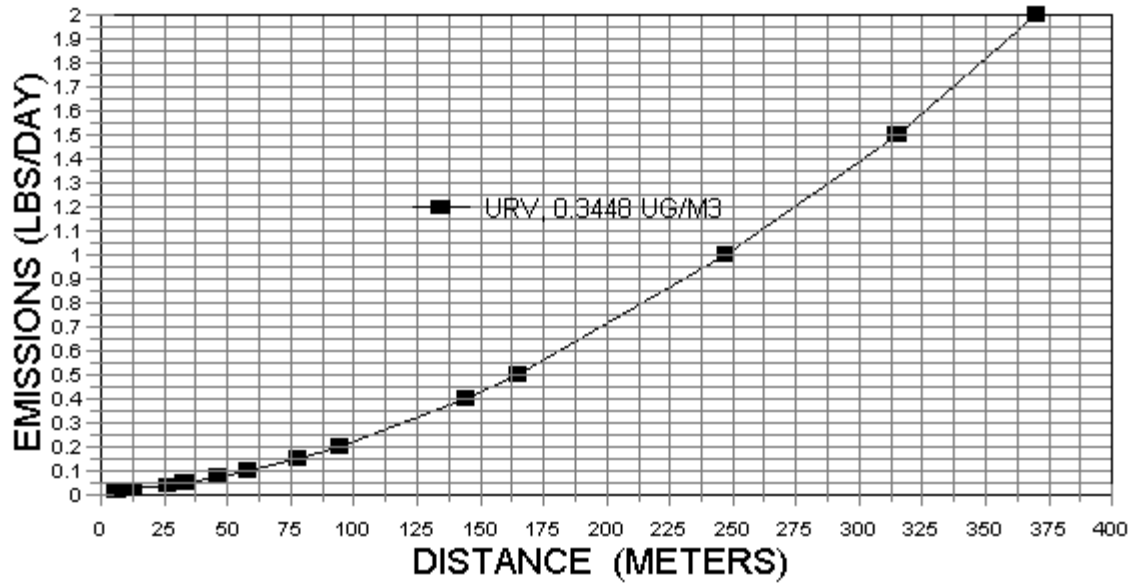
AERATION OF GASOLINE CONTAMINATED SOIL
GASOLINE VAPOR EMISSIONS - GRAPH 2

Legend: PEL/420, 2143 UG/M3

X-axis: DISTANCE (METERS)
Y-axis: EMISSIONS (LBS/DAY)