

Unlined Earthen Pit Calculation Page

Facility: Pronghorn #1

I. Evaporation Calculation

67.69 in/yr Average from NOAA Akron CO measuring station, 1918-2005
Evaporation Rate 47.4 in/yr Multiplied by 0.7 to more closely estimate the evaporation from shallow lake or wet soil
Pit Size Width 25 ft
Length 275 ft
Depth 20 ft

Surface Area 6875 ft² at ground level

Pit Capacity 261430 ft³ = 46559 bbls for each pit

Pit Evap Rate $47.38 \text{ in/yr} * 1 \text{ ft}/12 \text{ in} * 1 \text{ yr}/365 \text{ d} * 15000 \text{ ft}^2 / 5.615 \text{ ft}^3/\text{bbl}$
13.2 bbl/d for each pit

II. Percolation Calculation

Soil Type 4—Ascalon sandy loam

Perm (0-80") 0.60-5.98 in/hr 3.29 in/hr avg

Perc. Rate $3.29 \text{ in/hr} * 24 \text{ hr/d} * 1 \text{ ft}/12 \text{ in} * 15000 \text{ ft}^2 / 5.615 \text{ ft}^3/\text{bbl}$
8056.54 bbl/d

Assume 50% due to Clay Swelling and clogging

Perc Rate 4028.27 bbl/d for each pit

III. Precipitation Calculation

Precipitation Rate 13-18 in/yr

Maximum 18 in/yr

Surface Area 6875 ft²

Precipitation Volume $18 \text{ in/yr} * 1 \text{ ft}/12 \text{ in} * 6875 \text{ ft}^2$
10312.5 ft³/yr = 1836.6 bbl/yr

Works Cited:

“Evaporation Stations.” *Western Regional Climate Center*, wrcc.dri.edu/Climate/comp_table_show.php?stype=pan_evap_avg.