

Oilfield Synthetic Dataset Metadata Sheet

This metadata summarizes the statistical design of the synthetic dataset used for field-scale modeling.

Parameter	Unit	Min	Max	Mean	Std	Distribution
Porosity	fraction	0.05	0.3	0.18	0.06	Normal ($\mu=0.18$, $\sigma=0.06$)
Permeability	mD	1.0	500.0	120.0	100.0	Log-Normal ($\mu=120$, $\sigma=100$)
Facies	-	1.0	5.0	3.0	1.2	Categorical (1–5 facies)
Oil Rate	STB/day	50.0	1500.0	500.0	300.0	Normal ($\mu=500$, $\sigma=300$)
Water Rate	STB/day	10.0	600.0	250.0	180.0	Normal ($\mu=250$, $\sigma=180$)
Pressure	psi	1500.0	4500.0	3000.0	800.0	Normal ($\mu=3000$, $\sigma=800$)
Cumulative Oil	STB	1000.0	500000.0	150000.0	90000.0	Log-Normal ($\mu=150k$, $\sigma=90k$)

All variables were simulated using random sampling with realistic oilfield ranges based on SPE and public datasets.