



PREDICT-K “TIP OF THE MONTH”

Damage Reports

One of the many report types that can be exported in Predict-K is the damage report in Production Analysis mode. Like all of the reports, the damage report provides additional detail about the values used to calculate the final Predict-K results. The damage report specifically lists the percent reduction in permeability and width from a number of fractures at each time step in the simulation process. Part of an example report is shown below.



PREDICT-K

Production Damage Report Single Primary Transverse Fracture

Reservoir name:

Water production (bbl/MMscf): 10.00

Condensate yield (bbl/mmscf): 0.0000

Treatment: Marcellus Well 1

Proppant: UNIFRAC Jordan 30/50

Proppant conc. (lb/sq ft): 1.00

Fluid: 20# Linear Gel

Proppant avg. Tau (1/cm): 11.80

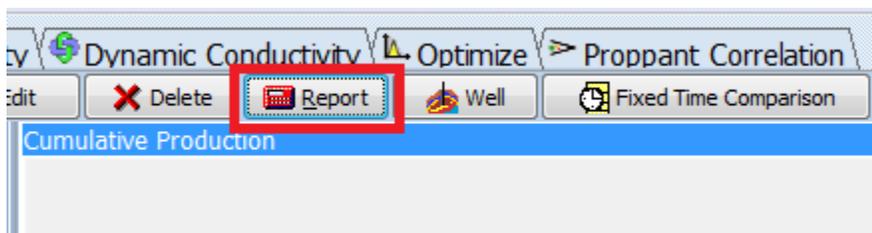
Fluid max. retained perm. factor (%): 80.0

Conductivity Adjustment Factors (%)

Time (days)	Original Perm. (d)	Corrected Perm. (d)	Non-Darcy Multiphase Factor	Fluid Retained Perm. Factor	Available Width (%)
1.00	130.5	2.455	15.5	12.0	95.35
2.00	130.1	2.463	15.6	12.0	94.97
3.00	128.1	3.224	15.7	15.9	93.73
4.00	116.1	3.479	17.2	17.3	90.20
5.00	116.1	4.119	16.3	21.6	90.23
6.00	107.8	5.210	18.1	26.6	88.71
7.00	107.8	5.197	18.1	26.6	88.71
8.00	107.8	5.198	18.1	26.6	88.71
9.00	107.8	5.226	18.2	26.6	88.71
10.00	107.8	5.148	17.9	26.6	88.71
11.00	107.8	5.203	18.1	26.6	88.71

The first two columns provide the baseline (stress, cycling, and temperature corrected) permeability and the final permeability that is used by the model after all corrections have been applied. Often, these numbers alone can help a user to understand why production results did not meet expectations. For instance, the closure stress during production may have resulted in similar baseline conductivities for two proppants being compared and similar production for the two options. The Non-Darcy multiphase factor shows the percent of remaining permeability after velocity and multiphase flow effects are accounted for. As can be seen in the report above, this damage factor is often substantial, especially in a gas well. Next, the percent of remaining permeability after fluid damage factors are applied is shown. This number will start low and increase to a maximum when the maximum flow velocity is achieved due to fluid cleanup. Depending on the fluid selected and the production rate, this can be a significant or minor factor. In this particular simulation, both factors result in similar permeability reduction. The factors multiply resulted in a net remaining permeability percent of only 1.86% ($0.155 \cdot .012$) at the first time step. These two numbers explain the permeability drop from 130.5 D to 2.455 D. The last column shows the percent remaining width which is the final factor in determining conductivity. This factor is typically less substantial and primarily driven by the drop in width resulting from tighter packing at increased stress. A separate report is available that catalogs the various width reduction mechanisms.

After running the Predict-K simulation, the various reports can be accessed by clicking the report button that appears just above the main screen. After clicking this button, a separate menu will pop up showing the various available reports. In Production Analysis mode, the damage report is the second available report.



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6. [Running the Proppant Manager Correlations](#)
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8. [Baseline Conductivity](#) [Demonstration Base Project for Videos 8 - 10](#)
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