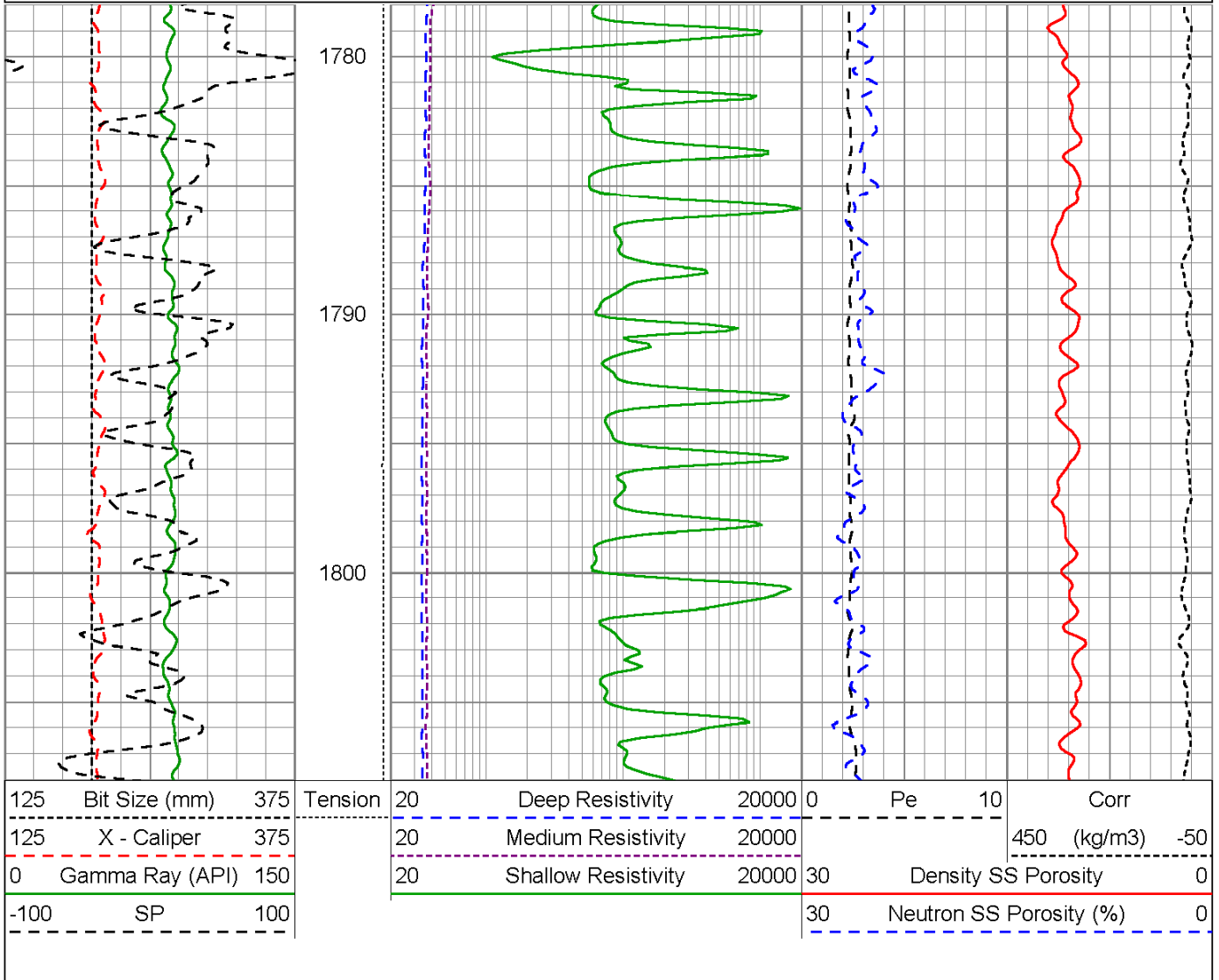


Quad Neutron™ vs Openhole Hz Oil

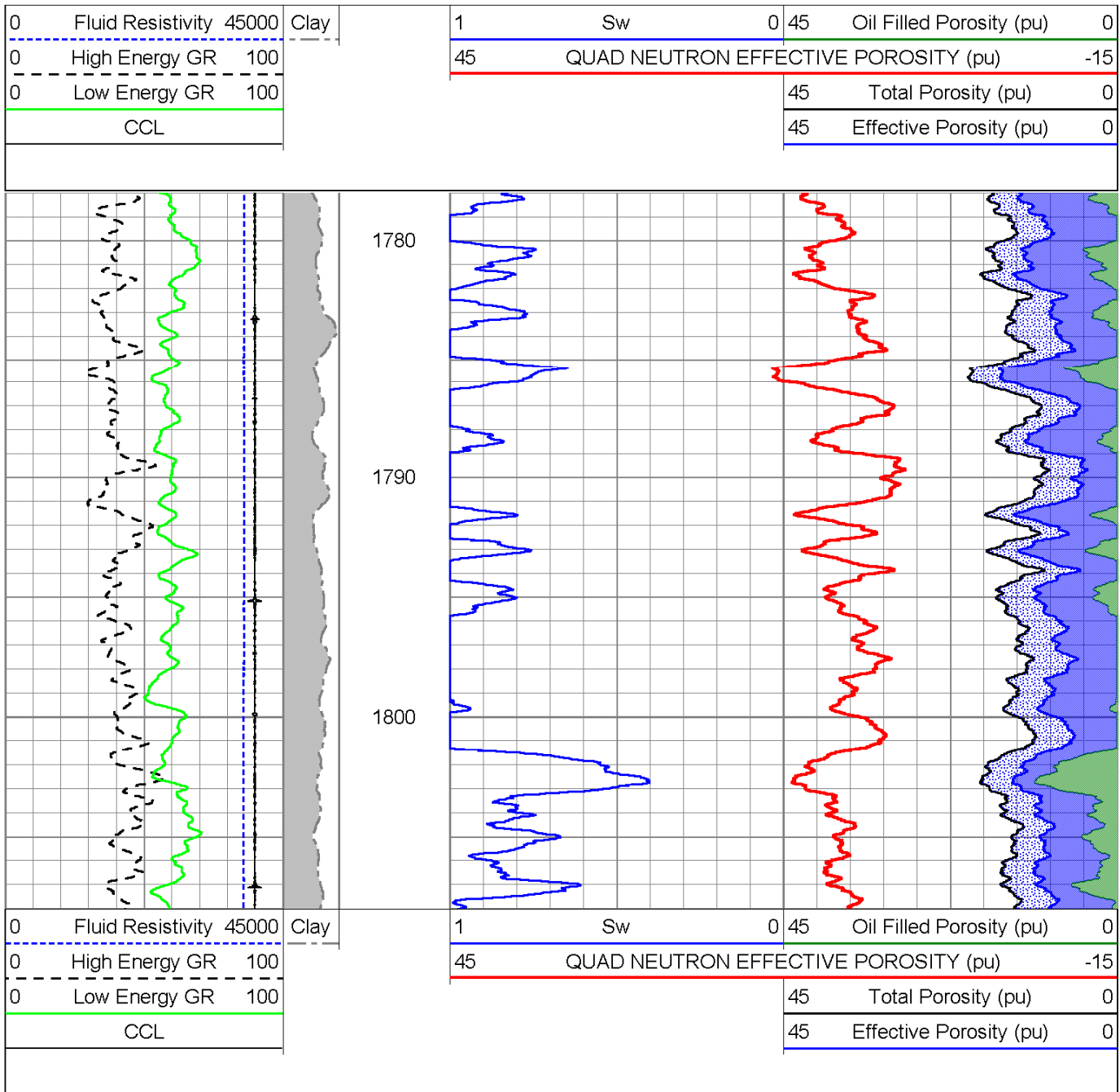
125	Bit Size (mm)	375	Tension	20	Deep Resistivity	20000	0	Pe	10	Corr
125	X - Caliper	375		20	Medium Resistivity	20000				450 (kg/m3) -50
0	Gamma Ray (API)	150		20	Shallow Resistivity	20000	30	Density SS Porosity		0
-100	SP	100					30	Neutron SS Porosity (%)		0



As the industry trends towards horizontal wells to increase production, the risk and cost of open hole logging increases. This example comes from a client that wanted to compare Quad Neutron against open hole in this horizontal oil well. The open hole data is presented above and the Quad Neutron data is presented on the following page.

The open hole data is affected by the bore hole rugosity as shown by the sinusoidal response on the X-Caliper. This same sinusoidal response appears in both the SP and the Shallow Resistivity. The remaining curves appear to be responding to a relatively homogeneous formation. Saturation measurements from open hole data calculate a uniform saturation throughout the interval.

Quad Neutron™ vs Openhole Hz Oil



The Quad Neutron identifies the heterogeneity of this formation. The two energy gamma rays come together at 1802.5m indicating good flow ability at this point. In addition, the Quad Neutron porosity curves indicate that this point has the highest oil saturation. Normally this formation requires stimulation by hydraulic fracturing to produce oil and knowing where the higher oil saturation is can help in planning the stimulation and reducing fracing costs.

The Quad Neutron Clay curve, presented near the depth track shows clay volume variations throughout the interval. The Quad Neutron effective porosity averages around 9 pu while the OH Density porosity averages around 10 pu. The Density data has not been corrected for the shale effect on the matrix density. The computed water saturation indicates that there is little oil saturation from about 1802m and shallower towards the heel of the well. The majority of the oil saturated reservoir rock is from 1802 and deeper towards the toe of the well.