

THE 1986 PESA OVERSEAS DISTINGUISHED LECTURE

INTEGRATING GEOLOGIC AND ENGINEERING DATA TO EVALUATE THE EFFECT OF FORMATION DAMAGE ON WELL TESTS [Summary]

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John R. Farina was the 1986 PESA Overseas Distinguished Lecturer. A consulting petroleum engineer, he emphasized the importance of integrating engineering and geological expertise to enhance our ability to discover additional oil and gas reserves. The Lecture concentrated upon formation damage, how it is caused, its effect on typical well tests, and how it may be measured and removed.

Some of the causes of damage are from incompatibility of fluids (introduced into the formation during drilling, testing, and completion procedures) and clays, resulting in serious restrictions to flow. Even in formations with relatively low clay content, these fluids, owing to capillary effects, can remain in the formation resulting in a waterblock that can reduce, or even prevent, production into the wellbore. Failure to recognise that low productivity, or no flow, is due to damage rather than low formation permeability, can be critical to properly evaluating reservoir potential.

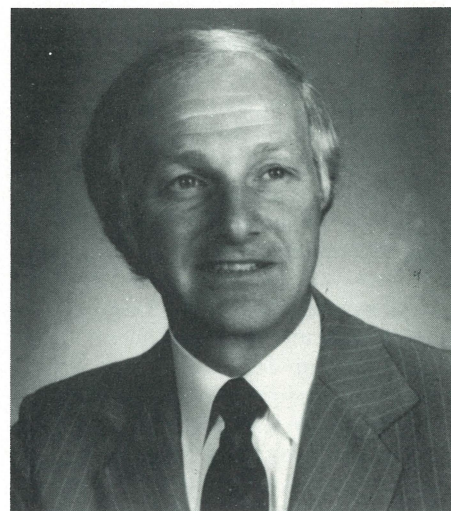
World wide, there are many examples where early tests in a prospect did not correctly assess formation damage effects, resulting in abandoning the prospect, only to have a major field

discovered on this prospect by subsequent tests drilled by new operators who recognized the damage.

Important tests for formation productivity are pressure transient tests, such as: drill stem testing, production testing, and repeat formation testing. The strengths and weaknesses of quantitative evaluation procedures were described and discussed. Canadian well examples were used to demonstrate that formation damage affects not only production rates, but also measured pressures. These tests showed that a drill stem test recovering no hydrocarbons and with extremely poor pressure buildup can still be a commercial producing zone, if damage caused the poor test results. Mr Farina stressed that the drill stem test is one piece of information—if used by itself it can be misleading and lead to erroneous decisions. He illustrated the importance of integrating all of the geologic and engineering data to properly evaluate a formation.

The talk was interposed with many actual examples of how formation damage problems were recognised and addressed. Effective communication between the geologist and engineer is the key to unravelling and understanding the

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difficult problems encountered in accurately describing a reservoir.

