

Market Evidence of Reserve Adjustment Factors and Risk Adjusted Discount Rates in a North American Unconventional Play

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Abstract

There is a significant lack of information on how the U.S. oil and gas industry handles investment risk when valuing mineral rights. The most useful tool currently available is the Society of Professional Evaluation Engineers' (SPEE) annual survey that asks industry experts to share their opinion concerning Reserve Adjustment Factors (RAF) and Risk Adjusted Discount Rates (RADR) for different reserve categories. Be it large mergers and acquisitions or small royalty purchases, little has been done to observe direct market evidence of RAFs or RADRs. This investigation gathered information on the sale of mineral rights in two regions of the Oklahoma and then conducted discounted cash flows to establish the un-risked fair market value (FMV) of the mineral rights at the date they were transacted. We compare these un-risked FMV's to the actual sale price, and use the difference between the two to make assumptions on the industries perspective of investment risk. As would be expected, we observe progressive de-risking over the life-cycle of mineral rights, with large risk adjustments prior to initial drilling when reserves would be categorized as possible or probable. Then smaller risk adjustments as appraisal wells are drilled and the majority of reserves are proved-undeveloped. Once a production unit is fully drilled-out and the reserve category is Proved Developed Producing (PDP) there is almost no risk adjustment and a standard 10% discount rate is often applied. Our findings serve as an example for how oil and gas evaluators can approach RAFs and RADRs in a way that is more consistent with the real- property appraisal and encourage oil and gas evaluators to seek market driven risk adjustments and discount rates when estimating FMVs.

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