

The Evaluation Engineer and The Law

The large majority of evaluation engineers will never do an engineering or economic evaluation that is used for legal or regulatory purposes in a court of law, or in a quasi-judicial setting such as a regulatory commission. Even fewer will be called upon to testify and/or promote or defend their work in legal or regulatory settings. Having said that, it is also the case that the opportunity or likelihood for either or both to occur has been increasing over the past 10-20 years and is more likely to increase rather than decline in the future.

The reason for this is not that petroleum engineers and their evaluations have declined in quality and veracity, or have come to be seen as unreliable. The cause is the unrelenting increase in the reach of the law and government regulation at all levels into areas that heretofore had not been heavily exposed to legal and regulatory controls. This expansion of law and regulatory authority is a direct result of an ever-growing definition of “*liability*” and the stretching of the law to widen the expanse of liability and ensnare a larger population of those who are potentially liable.

There are many aspects to this issue, but only one is of interest here. That issue is the relationship between the law as it applies to petroleum property evaluation and the regulatory interpretation of the law that impacts the manner in which evaluation engineers conduct and present their work. We discuss this in the context of two major legal/regulatory events which have come about in the past 10 years. These are the promulgation of the Uniform Standards of Professional Practice, known as USPAP, and the series of U.S. Supreme Court and other court decisions which are collected under the heading of *Daubert/Kumho Tire* or *Daubert*.

Before going into a discussion of USPAP and *Daubert*, it is necessary to acknowledge that many evaluation engineers do not believe that either USPAP or *Daubert* applies to petroleum engineering and/or evaluation work, unless one is preparing an evaluation as part of a litigation effort, and even then, there is reluctance to accept that evaluation engineering fits into either framework. This may be because thus far, there have been no court or regulatory body decisions that directly involve petroleum evaluation engineering. This is not an enduring position. *Daubert* has been applied to virtually every aspect of science, and there have been numerous cases and decisions involving the evaluation and appraisal of real estate. These latter cases have been reported from federal and state courts, and it is only a matter of time before a petroleum property evaluation is reported as the centerpiece of a *Daubert* decision.

In the meantime, evaluation engineers should become very familiar with the responsibilities imposed on the evaluator by USPAP and *Daubert*. The primary argument for doing so is that, in both cases, the requirements are not new impositions on the evaluation process, but codify, in a sense, the general methods and procedures already being followed by evaluation engineers with the result of requiring explicit acknowledgment of many aspects of evaluation which had been implied or were understood to be part of the process. They are requirements which will cause (a) specific

consideration of parts of the evaluation process that are often taken for granted, and (b) modification of the construction of evaluation reports to cover the required tests, etc. The prudent engineer might then be well advised to adopt the USPAP/*Daubert* criteria as part of his or her other evaluation practice as both an improvement of the evaluation and partial insurance against the day when the evaluation ends up as Exhibit A and the evaluator is asked to defend it.

USPAP

The Uniform Standards of Professional Appraisal Practice (“USPAP”) were originally developed in 1986-87 by the Appraisal Standards Board (“ASB”) of the Appraisal Foundation, which is an umbrella coalition of several appraisal groups. In 1989, the then current USPAP standards were adopted by the ASB and were incorporated into law by the Financial Institutions Reform, Recovery and Enforcement Act of 1989 (“FIRREA”). This was the legislation brought about by the collapse of the savings and loan industry in the last 1980's. One of the reported causes of the losses by many Savings & Loan institutions were the large number of misleading, inaccurate, and in many cases, fraudulent appraisals of real estate that were used to establish the collateral value of properties for loans. The result was the inclusion in FIRREA of a requirement that all appraisals that are done for the purpose of financing where federal funding may be involved must be done according to specified (USPAP) standards. While the original objective was real estate appraisal for institutional financing that may be FDIC insured, the interpretation of USPAP has been broadened to include virtually all real estate appraisal, as the Appraisal Institute and ASA have made adherence of USPAP a requirement for continued certification.

USPAP does not specifically apply to petroleum evaluation, but there is no particular reason why it does not. First, oil property evaluation already incorporates many of the components of USPAP so that the difference between “*evaluation*” and “*appraisal*” is not very great. Upgrading an evaluation to an appraisal requires the addition of a few more steps to the evaluation process and the expansion of some sections of the report. USPAP codifies and formalizes generally accepted practices whether they be real estate appraisal or oil property evaluation. Indeed, many of the components of USPAP reflect the enshrinement of common sense.

Second, oil property evaluation is the estimation of value of the mineral rights owned by one party or another in a property. While we normally think of real estate as the surface land and improvements (buildings, etc.), the mineral rights to that property are also real estate and are treated as such by federal and state law. Therefore, it should be expected that at some point, USPAP would be applied to oil property evaluation.

It is entirely possible that an evaluation done for a client who may be a lender or a borrower could be considered to fall under USPAP, particularly if that evaluation were to be challenged at some point. The same might be true of an evaluation done for estate tax submitted to the IRS or state tax authority. Evaluations done for the purpose of reporting to the SEC are not usually considered to be appraisals and are not commonly thought of as falling under USPAP. However, the evaluation is reported through the SEC to stockholders, and the latter have become more litigious

with the passage of time. This makes it possible for the evaluation to be challenged under USPAP as either a part of or separate from the formal audit and/or management information.

Lastly, Standard 6 of USPAP applies directly and specifically to the process of mass appraisal as is done for ad valorem tax. This is an issue that receives relatively little consideration in oil property evaluation, but which is nonetheless a very large market for evaluation services.

It is not the purpose of this discussion to include a complete review and analysis of USPAP as it may apply to oil property appraisal. Nor should this discussion of USPAP be considered to be an instruction or recommendation that oil property evaluation reports be done in strict conformance to USPAP. However, the USPAP standards for evaluations and reporting of evaluations are not at variance with generally accepted petroleum engineering practice and could be incorporated without substantial change in that practice.

Daubert/Kumho Tire

The following are some court cases with which every evaluation engineers should be familiar:

Frye vs. United States
Daubert et al vs. Merrill Dow Pharmaceuticals
Robinson et al vs. E. I. DuPont de Nemours
Kumho Tire co., LTD et al vs. Carmichael et al

Frye, *Daubert* and *Kumho Tire* are U.S. Supreme Court cases; *Robinson* is a Texas Supreme Court case.

Daubert is a landmark case because of the influence it has on the treatment of “*expert*” testimony and evidence in court. The *Daubert* decision brought about a change in the standard by which such testimony and evidence is to be considered for admission by the trial judge, and in so doing, provides a basis for challenge of expert testimony by both the court and the other party.

The Frye Standard

Until 1993, the prevailing standard in federal and state courts was *Frye vs. United States*, which enunciated the “*general acceptance*” test as the criteria for judging admissibility of evidence. The Supreme Court in *Frye* said,

“When the question involved does not lie within the range of common experience or common knowledge, but requires special experience or special knowledge, then the opinions of witnesses skilled in that particular service, art, or trade to which the question relates are admissible in evidence.”

“Just when a scientific principle or discovery crosses the line between the experimental and demonstrable stages is difficult to define. Somewhere in this twilight zone the evidential force of the principle must be recognized, and while courts will go a long way in admitting expert testimony deduced from a well-recognized scientific principle or discovery, the thing from which the deduction is made must be sufficiently established to have gained general acceptance in the particular field in which it belongs.” (Emphasis added)

The “*general acceptance*” test, or Frye test, became the standard in federal courts and in many state court systems for 70 years. Along the way, however, it seemed to some that so-called expert testimony got out of hand and, further, various courts, even within the federal system, had differing definitions of the “*general acceptance*” standard and/or placed all weight on the acceptance of the expert and gave indifferent attention to the methods used by the expert and the science (engineering) behind the testimony. In some jurisdictions, acceptance by the court of a witness as an expert was sufficient to allow whatever the witness had to say into the record and into jury deliberations.

During the late 1970's, but especially into the 1980's and up to today, the growth of the contingency fee litigation industry brought literally hundreds of civil law suits regarding products such as Bendectin, Benlate, silicone implants and others that purported to show damages to plaintiffs, but where the claims were supported by little or no scientific evidence. Much of the testimony offered in these cases quickly spawned the term “*junk science*,” which has also been expanded to cover other issues where the ratio of publicity to real science is highly inflated.

Daubert v. Merrell Dow

The *Daubert* case became the classic example of “*junk science*.” *William Daubert et al* claimed that serious birth defects in their children had been caused by prenatal ingestion by the mothers of Bendectin, a prescription drug to alleviate morning sickness, made by Merrell Dow. The trial court granted summary judgement to Dow based on testimony by Dow experts that the “...*extensive published scientific literature*...” had not shown Bendectin to be a risk factor regarding birth defects. Plaintiffs (*Daubert et al.*) presented eight expert witnesses who disputed the Dow experts, but the court found that the testimony by these witnesses did not meet the Frye test.

The plaintiffs appealed to the U.S. Ninth Circuit Appeals Court, which upheld the trial court stating that the methodology used by Plaintiffs’ experts diverges “...*significantly from the procedures accepted by recognized authorities in the field...cannot be shown to be generally accepted as a reliable technique*...” The plaintiffs appealed the case to the Supreme Court. In a June, 1993 decision, the Supreme Court issued a decision which decided that the Frye test had been superseded by the Federal Rules of Evidence, which were adopted in the 1970's, and stated, “*Nothing in (the Federal) Rules...gives any indication that ‘general acceptance’ is a necessary precondition to the admissibility of scientific evidence.*” The court characterized the Federal Rules as “*liberal*” and endorsed “*relaxing the traditional barriers to ‘opinion’ testimony.*”

The Supreme Court went on to say that the trial judge (a) is responsible for making a “*preliminary assessment*” of whether the testimony offered (1) is “*scientifically valid*” and (2) “*can be applied to the facts at issue*,” and (b) should rely on cross-examination and presentation of contrary evidence to challenge evidence presented by an expert. The judge is instructed to focus on “*...principles and methodology not on the conclusions they generate...*” and that the “*...Rules are not designed to seek cosmic understanding, but, rather, to resolve legal disputes...*”

In short, the Supreme Court, citing the Federal Rules of Evidence, made the judge of the court a screener or gatekeeper of expert testimony and required the judge to make a determination of “*...whether the testimony’s underlying reasoning or methodology is scientifically valid and properly can be applied to the facts at issue.*” The result is that the screening of expert testimony and evidence, which under *Frye* was effectively done by the “*general acceptance*” of methods, procedures and practices by the relevant scientific community, would now be done by a lawyer (judge) in a courtroom setting.

The Court offered some “*general considerations*” to help the judge, cautioned that these were not a definitive checklist or test, and also said there could be “*...many considerations...*” and that “*The inquiry is a flexible one...*” The general considerations mentioned were:

- Has the theory or technique in questions been tested?
- Has it been subjected to peer review and publication?
- What is its known or potential error rate?
- Are there standards which control its operation?
- Has it attracted widespread acceptance within a relevant scientific community?

The Supreme Court overturned the Ninth Circuit and ordered the *Daubert* appeal be reheard.

The U.S. Ninth Circuit court in San Francisco decided to re-hear the *Daubert* appeal and issued its opinion in January, 1995. The Appeals Court responded to the concerns of the Supreme Court regarding the previous use of the *Frye* test and reviewed the expert testimony based on the directions contained in the higher court decision. While not exactly humorous, it does have its entertaining moments. Judge Kozinski, writing for the court majority, focused on the new requirements of the *Daubert* decision:

“Under Daubert, we must engage in a difficult, two-part analysis. First, we must determine nothing less than whether the experts testimony reflects “scientific knowledge,” whether their findings are “derived by the scientific method,” and whether their work product amount to “good science.” Second, we must ensure that the proposed expert testimony is “relevant to the task at hand.” “Our responsibility,..., is to resolve disputes among respected, well-credentialed scientists about matters squarely within their expertise.”

Judge Kozinski further noted, “*...the question of admissibility (of evidence or testimony) only arises if it is first established that the individuals whose testimony is being proffered are experts in a particular scientific field;.... Yet, something doesn’t become “scientific knowledge” just because*

it's uttered by a scientist; nor can an expert's self-serving assertion that his conclusions were 'derived by the scientific method' be deemed conclusive, else the Supreme Court's opinion could have ended with footnote two."

The Appeals Court decision went on to discuss the application of the *Daubert* "considerations."

- "...the party presenting the expert must show that the expert's findings are based on sound evidence..."
- "One...fact to be considered is whether the experts are proposing to testify about matters growing...out of research...conducted independent of the litigation, or...expressly for purposes of testifying."
- "...we may not ignore the fact the a scientist's normal workplace is the lab or the field, not the courtroom or the lawyer's office."
- Re: Scientifically valid principles: "One means of showing this is by proof that the research supporting the proffered conclusions have been subjected to normal scientific scrutiny through peer review and publication."

The Ninth Circuit noted the difference between *Frye* and *Daubert* as one of focus.

"The focus under Daubert is on the reliability of the methodology and, in addressing that question the court and the parties are not limited to what is generally accepted; methods accepted by a minority in the scientific community may well be sufficient..." BUT, acceptance *"...by only a minority of scientists would be a proper basis for impeachment at trial."*

The Ninth Circuit decided the Plaintiff's experts did not meet the new *Daubert* criteria either and again found for Merrell Dow.

Robinson v. DuPont

While the original *Daubert* decision was a federal court issue and was resolved based on the Federal Rules of Evidence, the state courts have taken notice of the decision with predictably mixed results.

The Supreme Court of Texas adopted the *Daubert* approach in deciding *Robinson et al v. E. I. DuPont de Nemours*. In a July, 1995 decision, the Court affirmed a trial court which had excluded the testimony of the Plaintiff's only expert witness for several reasons, saying that the witness' testimony:

- (1) was not grounded upon careful scientific methods and procedures,
- (2) was not shown to be derived by scientific methods or supported by appropriate validation,
- (3) was not shown to have a reliable basis in the knowledge and experience of the witness' scientific discipline,
- (4) was not based on theories and techniques that had been subjected to peer review and publication,
- (5) was not based on a procedure reasonably relied upon by experts in the field.

The Texas Supreme Court decision specifically notes that many lower courts had been disposed to allow any testimony by witness' considered or offered as experts in their fields and that often the scrutiny of the underlying support was limited. Indeed, there was an extensive dissenting opinion to the *Robinson* decision based largely on the idea that judges should not be placed in the position of deciding the validity of testimony in fields far distances from their own training and experience.

Kumho Tire v. Carmichael

The Daubert decision was well publicized and was applied immediately in several cases including several involving real estate appraisal. A difficulty in the application of *Daubert* quickly became apparent. Whereas *Frye* and Federal Rules of Evidence refer to “...*scientific, technical, or other specialized knowledge...*” *Daubert* was often construed to apply only to scientific testimony and evidence. As noted by Hoyt and Aalbert, this difficulty was apparent from the several post-*Daubert* cases.

“Early court cases that referred to Daubert focused on the rigor of scientific-type expert testimony, but subsequent courts led to a split in how the Daubert principles should be applied to scientific-type testimony and whether to apply them to testimony involving specialized, non-scientific or technical knowledge. Some courts indicated that Daubert standards should apply to all testimony. Other courts stated that Daubert standards do not apply to specialized knowledge testimony because scientific knowledge is grounded on the methods and procedures of science, whereas specialized, technical knowledge involves skills based on experience, training, or education.”

This uneven application of *Daubert* created an unpredictable legal environment. In March, 1999 the Supreme Court decided *Kumho Tire vs. Carmichael, et al.* In *Kumho Tire*, a lower court held that an tire damage expert who appeared as a witness for Carmichael should be excluded because his testimony and evidence failed to meet the *Daubert* (and Rule 702) tests. The Appeals Court overturned, saying that *Daubert* applied only to scientific evidence, while the evidence of

Carmichael's witness was only skill-, or experience-based. The Supreme Court reversed and held that "*The Daubert factors may apply to the testimony of engineers and other experts who are not scientists.*"

The Supreme Court in *Daubert* did not intend for the four or five criteria which were discussed in the opinion to become a checklist or to be taken literally. Indeed, the Ninth Circuit in re-hearing *Daubert* commented on that concern, but also recognized that, irrespective of intent, the criteria would become the tests applied to expert testimony and evidence. Since the *Daubert* decision, and particularly with the broadening effect of *Kumho Tire*, there have been numerous cases wherein the *Daubert* criteria are used as part of the court's decision, and in some instances, the courts have allowed challenges to testimony and/or evidence prior to the expert taking the stand. This gives a whole new dimension to the discovery and deposition process and puts the court squarely into the gatekeeper role that the *Daubert* court intended.

So, let us review those five criteria:

- Has the theory or technique in question been tested?
- Has it been subjected to peer review and publication?
- What is its known or potential error rate?
- Are there standards which control its operation?
- Has it attracted widespread acceptance within a relevant scientific community?

Note that the last point essentially states the Frye test that the *Daubert* court expanded.

It would not be particularly productive to go through the five points for specific application to oil and gas property evaluation. Examples would necessarily be generic and over broad, or so specific as to create unnecessary argument. Also, the *Daubert* criteria are best illustrated either by citing actual occurrences or by examples of practice that would not satisfy the criteria. Fortunately (or unfortunately) there have not been any published opinions involving the application of *Daubert* to oil property evaluation, so that actual examples are not available. There have been numerous court cases involving real estate appraisal that have been published and commented upon in professional journals. Articles by Hoyt and Aalbert, and Dorchester in the *Appraisal Journal*, and by Black in the *Texas Law Review*, contain very good discussions of the application of *Daubert* in actual cases.

Of these, a 1997 article by Hoyt is the most useful. In addition to citing several court cases and the inferences drawn from those decisions, Hoyt also cites the Black article as suggesting nine criteria developed out of *Daubert* to help in evaluating expert testimony and evidence. These are probably most useful for this review:

The following are taken from Hoyt and Aalberts, Appraisal Journal, Oct. 1997.

Explanatory Power

Explanatory power was not specifically addressed in the Supreme Court decision. Still Black et al. indicate that the lack of inclusion highlights the need to go beyond the court's four factors. This guidepost involves using scientific models to predict, explain, and clarify relationships. For example, in Newport the court allowed the use of multiple regression for predicting absorption of space in industrial parks.

Falsifiability

Hypothesis testing involves rejection of the null hypothesis if the observations are inconsistent with the null hypothesis.....Testing certain methods can help lend credibility to the particular method in question. It is important for an appraisal expert witness to look into prior tests of the method being used in testimony. Such "homework" can help establish the "scientific" nature of the testimony. For example, in Newport the court recognized that multiple regression had been used in previous judicial testimony and was widely accepted.

Logical Consistency

If a hypothesis is illogical, self-contradictory, or untested, it must be rejected. Furthermore, "hypotheses developed to fit a known set of facts typically have little explanatory power." The exclusion of testimony in Frymire-Brinati is an example of illogical consistency. The expert witness maintained that raw land and an office building in the final stages of construction had no value because using DCF resulted in no cash flow.

Scope of Testing

The Supreme Court addressed the matter of testing using falsifiability. Black et al. point out that the court did not specifically discuss testing the method and how to distinguish a good test from one that does not reveal much information. However, they indicate that, in considering the applicability of the method used in the case, the variety and severity of the tests used must be considered. This is evident in Newport, in which the court indicated that the use of multiple regression has been subject to peer review, has been widely accepted, and will provide a valid analysis, as long as the assumptions are proper.

General Acceptance of the Theory

The court stated that "[w]idespread acceptance can be an important factor in ruling particular evidence admissible." This does not rule out a method with minimal scientific community support, but the trial judge has the responsibility to ensure that the testimony by the expert has a reliable foundation and is relevant. A statement by the court in 14.38 Acres of Land gives an example of a violation of this guidepost. The court rejected the appraiser's reasoning that a 50% diminution in value occurred because of a perception that the land may or may not flood. The court concluded that

the opinions were “speculative and not based on reliable foundations” and, therefore, rejected the expert testimony.

Application and Use by the Scientific Community

An aspect of acceptance and an indicator of a method’s validity is whether other professionals apply and use it. Black et al. state, “[S]cience does not move from one uncertain explanation to another, but from less certain to more certain knowledge.” In Newport, the court indicated that multiple regression analysis has been generally accepted by the scientific community. Furthermore, the court acknowledged that although a multiple regression model had not been used in court to calculate an absorption rate, the use of multiple regression has been recognized in previous testimony.

Precision

Broad generalizations have little explanatory power because they can account for many states of affairs. This guidepost is related to the “scope of testing” guidepost, in which the variety and severity of testing are indicators of the validity of the method. The projections by the expert witness in Joy may be seen as lacking a realistic degree of precision. A projected value of a house was based on a building permit rather than specific costs and market value indicators. An appreciation rate was based on the expert’s estimate of the “net value” of appreciation over other housing, an inflation factor, and improvements made in a house in another area. The court disregarded the testimony because of inclusive evidence, or a lack of precision.

Post-Hypothesis Testing

Black et al. state, “Hypotheses based only on reinterpretations of preexisting data and unsubstantiated by subsequent experimental testing should be treated very critically. “ As the Court indicated in Newport, multiple regression had not been previously used in estimating absorption in industrial parks. Although the court agreed to allow multiple regression analysis in the testimony, subsequent use of similar analysis pertaining to industrial park absorption will greatly strengthen the use of multiple regression analysis in absorption studies. Studies of this nature are often performed by real estate academics and published in academic journals.

Peer Review and Publication

The final guidepost pertains to the publication of results obtained from scientific studies published in peer-reviewed journals. This is one of the Supreme Court’s factors in Daubert. Academic-oriented peer review journals typically are blind reviewed (the reviewer does not know who the author is) and have a system of acceptance, partial acceptance or rejection. Application-oriented journals may or may not have blind reviews but are at least reviewed by an editorial committee comprised of experts. In Newport, the court states that the multiple regression technique has been subject to peer review and has been widely accepted.”

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