USING FIELD METHODS - EXPERIENCES AND LESSONS: DEFENSIBILITY OF FIELD DATA

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SUMMARY

One perceived obstacle to the use of field methods is the legal defensibility of field data. The standards which are used by the courts are quite different than the standards used in the environmental testing community. The rules on the acceptability of scientific evidence are different in federal courts than in some state courts. The federal rules were changed significantly by the *Daubert v. Merrell-Dow* decision handed down by the U.S. Supreme Court in 1993. In that decision, the Supreme Court gave judges considerable latitude to decide what evidence was relevant and reliable. California, on the other hand, still uses a standard based on "techniques which are generally accepted by the scientific community."

Neither the federal nor California standards for admissibility distinguish between analysis done in a fixed laboratory and analysis done in the field. Nor do the standards require adherence to methods approved by U.S. EPA or other standard-setting organizations. In one California case, *People v. Hale,* there were major deviations from the relevant EPA method, but an appeals court found that the deviations were harmless and allowed the data to be used.

In order for data to be accepted as evidence, whether the data come from a fixed laboratory or the field, the technique may need to generally recognized in the scientific community (state standard), and must be shown to be relevant and reliable (federal standard). Once evidence has been accepted, the weight which is given to the evidence may depend on a variety of factors, including the training and experience of the personnel, the accuracy of the equipment, and the reliability of the method. The rules for the defensibility of field methods are no different than those for fixed laboratory methods.

INTRODUCTION

A real obstacle to the wider use of field methods is the perception that field data are legally less defensible than fixed laboratory data. To actually examine this perception, it is necessary to examine the actual legal standards which are used for scientific data. Although environmental scientists have their own standards for analysis, the actual standards for the legal defensibility of scientific data involves the interaction of science and law. The courts have made significant changes in recent years to the rules for scientific evidence, which reached a climax with the U.S. Supreme Court opinion in the case of *Daubert v. Merrell Dow Pharmaceuticals*.

FEDERAL RULES FOR SCIENTIFIC DATA

First, we must realize that the rules for scientific data may be different in federal courts than in state courts. This, however, does not necessarily pose an insurmountable problem. The federal rules changed in 1993 when the U.S. Supreme Court issued an opinion in the case of *Daubert v. Merrell Dow Pharmaceuticals*. Although the case involved allegations that a drug, Bendectin, caused birth deformities, the ruling had a broad application because it abandoned an earlier standard, based on *Frye v. United States.* In its 1993 *Daubert* ruling, the court established a more flexible and liberal test of admissibility of scientific evidence. The Supreme Court received a considerable number of briefs from scientific organizations, and this is reflected in their opinion, which even dealt with the definition of science.

> "...under the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable *(Daubert v. Merrell Dow Pharmaceuticals,* 4827)".

Readers who are interested in a thorough examination of the *Daubert* ruling may want to look at Foster and Huber's book, *Judging Science*. The question of what constitutes reliable scientific evidence is still subject to debate, but the impact of the Court's ruling was to give the judge considerable flexibility in deciding that question in a particular case.

STATE RULES FOR SCIENTIFIC DATA

Unlike the federal courts, California courts still maintain a standard based on "general acceptance" in the relevant scientific community (*People v. Kelly,* 1976). The three "prongs" of this standard are:

> 1) The scientific test's reliability must be established by its general acceptance in the relevant scientific community;
> 2) The testifying witness must be properly qualified; and
> 3) The proponent of the evidence must demonstrate that the correct scientific procedures were used.

Again, none of these standards would distinguish field methods from fixed laboratory methods. They also should not pose a significant barrier, with the exception of a "black box," which may operate using principles that have not been accepted in the scientific community.

CASE HISTORIES

People v. Hale, 1994*:* The first line of this California Appellate Court ruling reads:

> "SW-846 is not the name of some new gasoline additive marketed by an oil company. It is the title of a manual compiled by the United States Protection Agency (EPA) dealing with the collection and testing of hazardous waste."

The case involved illegal dumping of 1,1,1- Trichloroethane into waste dumpsters. The appeal focused on major deviations from SW-846: no sampling plan was used, the lab had used Method 8015 (using a flame-ionization detector) instead of the accepted methods 8010 or 8240; the samples were frozen instead of cooling to 4EC.; and the 14-day holding time was exceeded. The court held that the deviations were harmless.

> "We discern no per se rule which does automatically precludes the introduction of evidence of disposal of hazardous waste just because the gathering of the sample does not follow every jot and tittle of the EPA manual."

People v. K&L Plating, 1997*:* Although this is not a case published by an appellate court, this case involved the use of field methods. This was a manslaughter case, in which a worker died after rescuing another worker who was cleaning out sludge in a waste treatment tank. The prosecution used results from a Draeger tube testing of head space in a jar of sludge and a hydrogen cyanide monitor as evidence that hazardous levels of hydrogen cyanide were emitted from the waste. The defense challenged the reliability of all of the data. Review of validation of the Draeger tube showed that a lower estimate of HCN concentration could be calculated even though the tube changed color on one stroke instead of the required ten strokes. The HCN monitor, the prosecution argued, used an accepted principle and provided an expert witness to support the data. The defendant plead guilty.

People v. Sangani, 1994: This case involved illegal disposal of hazardous waste into a sewer system. The defendant was convicted, but appealed, in part, because the lab which did the analysis was not certified by the California Department of Toxic Substances Control. The Appellate Court found that even if the Hazardous Waste Control Law required the use of an accredited lab, the data would be admissible.

> "Failure to follow precise regulatory or statutory requirements for laboratory tests generally does not render the test results inadmissible, provided the foundational requirements for establishing the reliability of the tests are met. The necessary foundational requirements are:
> (1) the testing apparatus is in proper working order;
> (2) the test was properly administered; and
> (3) the operator was competent and qualified. (*People v. Sangani*, p. 1276)"

People v. Adams: In what has been described as an explanation of the general rule of evidence in California, the court found:

> "Where a statute ...does not specifically provide that evidence shall be excluded for failure to comply with said statute...such evidence is not inadmissible. Statutory compliance or noncompliance goes to the weight of the evidence (*People v. Adams*, 567)."

THE APPLICATION OF RULES OF EVIDENCE

The legal cases which established rules of evidence were primarily created to deal with new scientific techniques, e.g., a crude predecessor to the lie detector, or to distinguish real science from "junk science." The examples of rules for admissibility of evidence given in the examples above should pose little problem for a validated technology which is operated correctly by a trained operator.

CONCLUSION

The rules on the legal defensibility of scientific data do not distinguish between measurements made in the field and measurements made in the laboratory. The rules used by the courts are very different than those established in regulation. In particular, courts have found that evidence may be reliable even if there were major deviations from methods specified in regulation, or if the analysis was done in a non-accredited laboratory, even if accreditation were required by regulation. As to the weight which is put to evidence, the validation of the method and the quality system documentation are certainly relevant.

REFERENCE LIST

Foster, K.R., and P.W. Huber, 1997. *Judging Science: Scientific Knowledge and the Federal Courts*: MIT Press.

People v. Adams, 59 Cal.App. 3d at 567 (1976).

People v. Hale, 29 Cal.App. 4th 730 (1994).

People v. Kelley, 17Cal.3d 14 (1976).

People v. Sangani, 94 C.D.O.S. 1273 (1994).

U.S. EPA Office of Solid Waste, *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods*.