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THE ADMISSIBILITY OF SCIENTIFIC EVIDENCE IN PENNSYLVANIA ENVIRONMENTAL LITIGATION

I. INTRODUCTION

The recent growth in environmental litigation has caused lawyers to look for new and innovative ways to challenge governmental permit and regulation decisions. Often, the most controversial element of such environmental cases is the scientific evidence utilized either by the government when making permit and regulation decisions, or by other parties attempting to obtain a permit or avoid regulation. Such evidence is frequently based on assumptions, and it is not uncommon for these assumptions to rely on uncertain or assumed evidence. Furthermore, many courts are attempting to control environmental hazards without the benefit of scientific training to guide them in their decisions, and these courts often accept such evidence from scientific "experts" to be true without addressing appropriate evidentiary standards.

The most stringent and widespread test that adjudicatory bodies apply to scientific evidence is the "Frye" test. This test was first articulated in *Frye v. U.S.*¹ It allows the admission of scientific evidence only when such testimony is deduced from a well recognized scientific principle that has been sufficiently established to have gained general acceptance in the particular field in which it belongs.²

A majority of jurisdictions originally adopted this test, including Pennsylvania. However, *Frye* has recently come under fire because of its vague terms and strict standard.³ Many jurisdictions have become disenchanted with the stringent *Frye* standard and have looked to other solutions to the problem of the admissibility of scientific evidence.⁴

This Comment will begin with an overview of national trends and will then discuss the different methods by which courts deal with the admissibility of scientific evidence. A general discussion of the Pennsylvania standards for admitting scientific evidence follows. The Comment concludes with a discussion of the Pennsylvania standards of admissibility of scientific evidence in environmental cases.

II. NATIONAL TRENDS IN THE ADMISSIBILITY OF SCIENTIFIC EVIDENCE

The dilemma of determining a reasonably uniform and precise standard for the admissibility of evidence has plagued the federal court system for many years. Relevancy has traditionally been the threshold question when determining the admissibility of suspect evidence.⁵ The Federal Rules of Evidence has codified the relevancy test into law.⁶ Scientific evidence, however, faces a more stringent admissibility test; in addition to fulfilling the relevancy requirement, it must overcome requirements placed on it by case law. These additional requirements are necessary because lay jurors are likely to consider scientific evidence infallible, and thus place an inordinate amount of credence in its results.⁷

One of the earliest cases recognizing the danger posed by unproven scientific evidence was *Frye v. United States*.⁸ In *Frye*, the court announced a new test, later to be named the "Frye" test, which requires that in order for scientific evidence to be admissible its techniques and underlying principles have to be generally accepted in the relevant scientific community.⁹ The Frye test involves the following two step analysis: 1) the identification of the scientific field in which the evidence belongs; and 2) a determination of whether the technique utilized for generating such evidence has been generally accepted by the members of that field.¹⁰

In formulating this test the court attempted to develop criteria that would encourage uniformity in the admission of scientific evidence. However, when depending on a court's interpretation of the terms "scientific field" and "general acceptance," the test for admissibility of scientific evidence can vary. For example, if a "scientific field" is construed by the court to include several unrelated disciplines, the likelihood that these disciplines share the same acceptance of a particular scientific method or procedure is remote and the evidence will most likely be excluded.¹¹

If, however, the courts narrowly construe the relevant scientific field, the possibility that acceptance can be found within this field gets proportionally higher.¹² By increasing the rate of acceptance, the probability that a given piece of evidence will be admitted at trial also increases. Thus, by simply controlling the relative parameters of the terms "scientific field" and "general acceptance" a court can

greatly influence the admissibility of a given piece of scientific evidence at trial.¹³

Federal courts have traditionally taken a conservative stance regarding the admission of scientific evidence at court. Recently, however, some federal courts have distanced themselves from the strict standard articulated in *Frye*. In 1985, the Third Circuit was confronted with a case that involved the admissibility of scientific evidence. Citing dissatisfaction with the vagueness and ambiguity associated with *Frye*, the Third Circuit, in *United States v. Downing*,¹⁴ developed a new test which they hoped would continue to restrict unwarranted scientific evidence, but also would apply a more liberal standard for reliable scientific evidence.¹⁵

The *Downing* court developed a three prong test for determining the admissibility of scientific evidence. The elements of the test are: 1) how sound and reliable is the process or technique used to generate the data or evidence;¹⁶ 2) what is the probability that the admission of the evidence will overwhelm, confuse, or mislead the jury;¹⁷ and 3) what is the proffered connection between the scientific data and the particular disputed factual issues in the case?¹⁸ The *Downing* test differs from the standard established in *Frye* in that it deemphasizes acceptance in the scientific community and stresses reliability of the techniques used to generate the data.

Acceptance of the *Downing* test has varied from circuit to circuit. For example, the Third Circuit uses the liberal *Downing* test and pays special attention to the helpfulness the information will have to the trier of fact.¹⁹ Additionally, the Third Circuit expressed the opinion that the courts, when confronted with a problem of admissibility, should err on the side of admission rather than exclusion.²⁰

The Ninth Circuit, however, continues to use a standard very similar to the *Frye* test. It requires that in order for questionable scientific evidence to be admitted, it must be "generally accepted as a reliable technique among the scientific community."²¹ The Ninth Circuit's test incorporates the stringent requirements associated with the *Frye* test, while considering the reliability factor that concerned the court in *Downing*. The Ninth Circuit also recognizes the importance of the normal peer review process associated with scientific investigation, and any technique that has not been subjected to this process is

looked at with a dose of added skepticism.²²

The lack of a uniform standard of admissibility for scientific evidence is not confined to federal courts. State courts have shown an equal amount of variance with regard to their standards. Generally, most state courts use the *Frye* test as their basic premise for admissibility. However, as one can imagine, there have also been many variations which have developed from this test. For example, the North Carolina courts have held that the underlying inquiry of the *Frye* test is one of reliability of the scientific method, rather than the method's popularity within the scientific community. As a result, in making determinations of admissibility the North Carolina courts have stressed such factors as the use of established techniques, an expert's professional background in the field, and the use of visual aides before the jury so that the jury is not asked to "sacrifice its independence by accepting the scientific hypothesis on faith."²³

III. PENNSYLVANIA STANDARDS IN ADMITTING SCIENTIFIC EVIDENCE

Pennsylvania is a long-time advocate of the *Frye* test, and applies it in many different types of cases where the admissibility of scientific evidence comes into question. One of the earliest Pennsylvania cases to apply the *Frye* test was *Commonwealth ex re. Riccio v. Dilworth, et al.*²⁴ In this case a defendant, during his trial for robbery, repeatedly requested a lie detector or polygraph test to prove his innocence.²⁵ The Pennsylvania Superior Court applied the *Frye* test, and held that because such tests had not been developed to a point of reliability, the offer to introduce the results of such tests at the lower court had been properly refused.²⁶

Pennsylvania courts have also utilized the *Frye* test when questioning the admissibility of hypnotic recollection. Such was the case in *Commonwealth v. Mehmeti*,²⁷ where the Superior Court of Pennsylvania held that witness statements obtained by hypnosis were inadmissible.²⁸ This decision was based in part on *Commonwealth v. Nazarovitch*,²⁹ a case with facts similar to *Mehmeti*, which had been decided four years earlier.³⁰

The *Frye* test has also been used in Pennsylvania in admitting certain types of scientific evidence. In *Commonwealth v. Middleton*,³¹ the Superior Court of Pennsylvania applied the *Frye* test and held that testimony concerning the results of an electro-

phoresis test³² on dried blood stains was admissible scientific evidence.³³ An expert witness for the Commonwealth testified that it was his own experience that electrophoresis of dried bloodstains is generally accepted as reliable by experts in the field of forensic serology.³⁴

Another instance in which the Pennsylvania Superior Court allowed the admission of scientific evidence was in *Commonwealth v. McCauley*.³⁵ In *McCauley*, the defendant was convicted of second degree murder and appealed on the basis that evidence from a forensic criminalist concerning a microscopic hair examination was inadmissible.³⁶ The court applied the *Frye* test and concluded that microscopic hair comparison evidence satisfied the standard.³⁷ The court admitted the testimony only after finding that the expert was qualified to illustrate to the court the extent to which the methods employed in the comparison in question, were generally accepted in the scientific community.³⁸

It is important to note at this point that while the *Frye* test has been staunchly held to be the test for determining the admissibility of scientific evidence in the Commonwealth of Pennsylvania, at least one Pennsylvania court has specifically encouraged the abandonment of this test. The case was *Quaker City Hide Company v. Atlantic Richfield Co.*³⁹ It was decided in the Philadelphia Court of Common Pleas and dealt with a situation involving the admissibility of the results of a polygraph test.⁴⁰

While the court recognized that Pennsylvania's current case law refused to receive polygraph evidence on the grounds that the technique had not been shown to be sufficiently reliable and did not meet the *Frye* test criteria, the court went out of its way to denounce the test itself.⁴¹ The court questioned whether the test truly prevented the admission of unreliable scientific evidence, since the test often focuses not on a technique's reliability, but on whether that technique's own supporters consider it reliable.⁴² The court also made the point that the *Frye* test routinely admits highly persuasive nonscientific expert testimony which is of inherently questionable veracity, since the testimony is almost always biased.⁴³ Finally, the court noted that more and more jurisdictions are abandoning the *Frye* standard in favor of a more traditional evidentiary rule that weighs the probative value against the likelihood of prejudice, and urged that Pennsylvania should do likewise.⁴⁴

IV. PENNSYLVANIA STANDARDS OF ADMISSIBILITY OF SCIENTIFIC EVIDENCE IN ENVIRONMENTAL LITIGATION

Most decisions regarding the admissibility of scientific evidence in Pennsylvania environmental cases take place before Pennsylvania's Environmental Hearing Board ("EHB").⁴⁵ These administrative decisions are afforded considerable deference in Pennsylvania courts, because the courts recognize the technical expertise that supports administrative decisions and are reluctant to disturb such decisions.

Such was the case in *Marcon, Inc. v. Com., Dept. of Environ. Resources*,⁴⁶ in which the petitioners were granted a permit by the Department of Environmental Resources ("DER") to discharge treated sewer effluent from a treatment facility. Protest clubs later appealed the issuance and presented expert scientific evidence which tended to show that the permit would have a deleterious effect on a nearby creek and lake. The Environmental Hearing Board Reversed the DER decision and set aside the permit. The petitioner then appealed to the Commonwealth Court.⁴⁷ The court found that substantial evidence supported the findings of the EHB, and held that the Court could not substitute its discretion for that of the EHB on matters which involve technical expertise and which are within the special knowledge and competence of members of the Environmental Hearing Board.⁴⁸

As stated above, most decisions regarding the admissibility of scientific evidence in Pennsylvania environmental litigation take place at the Environmental Hearing Board level, and great deference is given to these decisions. At these hearings, the EHB follows the lead of the rest of the Pennsylvania courts and uses the *Frye* test to determine admissibility.

An environmental case that exemplified the EHB's use of the *Frye* test was *Hepburnia Coal Co. v. Com., Department of Environmental Resources*.⁴⁹ In that case the EHB rejected electrical resistance test data that had been compiled and computed by the DER, because the Board found that the DER scientist who computed the data lacked an understanding of the mathematical theory underlying the test.⁵⁰ The board stated that "[U]nder the *Frye* standard, it is not enough that a qualified expert, or even several experts, testify that a particular

scientific technique is valid; *Frye* imposes a special burden--the technique must be generally accepted by the relevant scientific community.⁵¹ In this case, the DER expert's application of resistivity analysis would not have been accepted by the majority of geophysicists, and therefore the evidence did not meet the *Frye* criteria.⁵²

Another Pennsylvania environmental case that questioned the admissibility of scientific evidence was *Luzerne Coal Corp. v. Commonwealth of Pennsylvania Department of Environmental Resources*.⁵³ In that case the EHB rejected a coal company's submission of "leaching test"⁵⁴ data because the Board found that such data was not generally accepted by the scientific community and therefore did not meet the *Frye* standard.⁵⁵ The Board explained that although the DER's Overburden Sampling and Testing Manual stated that the leaching test is an accepted DER testing method, such acceptance, at least for the purpose of permit approval, does not necessarily satisfy the *Frye* test.⁵⁶ The Board also stated that the fact that leaching test evidence had been admitted in the past without facing a *Frye* objection did not mean that it was no longer subject to *Frye* scrutiny. The case was then postponed pending a determination of whether or not the leaching test had gained "general acceptance within the portion of the scientific community which utilizes overburden analysis."⁵⁷

An environmental case in which the plaintiff attempted to circumvent the *Frye* test was *Wyant v. Commonwealth of Pennsylvania Department of Environmental Resources*.⁵⁸ In *Wyant* the Board refused to take official notice of an engineering text which the appellant sought to introduce into evidence in support of his contention that the DER had not properly calculated discharge limitations.⁵⁹ The Board rejected the text as hearsay, since it was not sponsored by a witness subject to cross-examination, nor recognized by any other witness as an authoritative work in the field.⁶⁰ Furthermore, since the book had been copyrighted several years earlier, the veracity and reliability of the textbook were not established.⁶¹ Therefore, the text did not meet the *Frye* criteria and was not admitted.⁶²

Finally, in environmental cases in which

no available scientific measurement exists, elements of a charged offense can be established by observation. Such was the case in *Rushton Mining Co. v. Commonwealth*.⁶³ In *Rushton*, the testimony of the defendant mine's neighbors regarding the effects of defendant's emissions on their properties was sufficient to prove elements of the offense charged without the need of any additional scientific data.⁶⁴ The court held that such evidence was admissible because at the time, there was no available scientific measurement instrument which could gauge whether an atmospheric containment interferes with the comfortable enjoyment of life or property.⁶⁵ The court concluded that there was sufficient evidence to permit the lower court to properly conclude that the DER had proved the elements of the offense.

V. CONCLUSION

The *Frye* test poses several problems in today's ever-increasing litigation of environmental violations. Not only is it a strict and extremely difficult test to satisfy, but it is also vague. Although attempts have been made by several courts to define what is an appropriate "level of acceptance in the scientific community," it appears at least in Pennsylvania courts, that there is no set of determinable factors that allows one to conclude that a piece of given evidence has properly met the *Frye* test.⁶⁶

Nevertheless, Pennsylvania courts and administrative bodies, such as the Department of Environmental Resources and the Environmental Hearing Board, still maintain this stringent standard, with rare exceptions. Sooner or later, however, because of the deleterious effect that the standard has ultimately had on the prosecution of environmental crimes, legislators may be forced to adopt a more traditional standard, like that advocated by the Philadelphia Court of Common Pleas in *Quaker City Hide Co.*,⁶⁷ which weighs the probative value of scientific evidence against its prejudicial effect. As long as technology is developed quickly, it will be forever difficult to prove that a particular new method of gathering scientific evidence has received general acceptance by a given scientific community.

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ENDNOTES

1. 293 F. 1013 (D.C. Cir. 1923). In the course of a trial, counsel for the defendant offered an expert witness to testify to the result of a deception test, described as the systolic blood pressure deception test (an early form of the polygraph lie detector). The court found that the test had not gained such standing and scientific recognition among physiological and psychological authorities as would justify the court's admitting expert testimony from the discovery, development and experiments that were made. *Id.* at 1014.
2. Just when a scientific principle or discovery crosses the line between 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 *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 to which it belongs*.
Id. at 1014. (emphasis added).
3. The test allows evidence that has received "general acceptance" in the "particular field in which it belongs." One problem with the test is that *Frye* neither defines "general acceptance" nor the boundaries of the particular field. Nor does *Frye* suggest whether a judge should defer to the scientific community or employ a different standard to resolve these uncertainties. The other problem that the *Frye* test faces is that the general acceptance of new scientific theories occurs more slowly in those fields that impose rigorous testing of hypotheses before regarding results as conclusive. David Bernstein, *Out of the Fryeing Pan and into the Fire: The Expert Witness Problems in Toxic Tort Litigation*, 10 REV. LITIG. 117, 125 (Fall 1990).
4. Most courts have been gradually abandoning the *Frye* rule, turning instead to the relevancy test, which admits any evidence relevant to the facts at hand, liberalizing the admission of scientific evidence. *Id.* at 127.
5. CHARLES McCORMICK, *McCORMICK ON EVIDENCE*, §184-185, at 540-548 (3d ed. 1984).
6. Rule 401 of the Federal Rules of Evidence defines relevant evidence as "evidence having any tendency to make the existence of any fact that is of consequence to the determination of the action more or less probable than it would be without the evidence." FED. R. EVID. 401. Additionally, Rule 403 further states that although relevant, evidence may be excluded if its "...probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury." FED. R. EVID. 403.
7. *Barefoot v. Estelle*, 463 U.S. 880 (1983) (Blackmun, J., dissenting). Writing for a three member dissent, Justice Blackmun stated: "Unreliable scientific evidence is widely acknowledged to be prejudicial. The reasons for this are manifest. The major danger of scientific evidence is the potential to mislead the jury; an aura of scientific infallibility may shroud the evidence and thus lead the jury to accept it without critical scrutiny." *Id.* at 926.
8. *See Frye, supra* note 1.
9. *Id.* at 1014.
10. M. Thaddeus Murphy, *The Admissibility of Scientific Evidence in Illinois*, 21 LOYOLA U.L.J. 935, 942 (1990).
11. *Id.* at 943.
12. *Id.*
13. *Id.*
14. 753 F.2d 1224 (3rd Cir. 1985).
15. In *Downing*, the defendant was convicted of mail fraud, wire fraud, and interstate transportation of stolen property. He appealed under the claim that the district court erred when it refused to admit the testimony of a defense psychologist who reportedly could have commented on the reliability of an eyewitness's identification of the defendant. *Id.* at 1237.
16. *Id.* at 1236.

17. *Id.*

18. *Id.*

19. *In re Paoli Railroad Yard Litigation*, 916 F.2d 829 (3rd Cir. 1991). This case was the result of a tort action brought by some thirty eight persons who either worked at, or lived adjacent to the Paoli Railyard where extremely high concentrations of PCB's were found. The scientific evidence in question consisted of several studies performed on PCB's in an attempt to determine the probability that they were the cause of the plaintiff's damages. The Court of Appeals overturned the District Court's ruling that the evidence was inadmissible.

20. *Id.* at 857.

21. *United States v. Solomon*, 753 F.2d 1522,1526 (9th Cir. 1985). In *Solomon*, a convicted murderer questioned the admissibility of a witness' statement that was obtained while the witness was under the influence of sodium amytal. *Id.*

22. *Brock v. Merrel Dow Pharmaceuticals, Inc.* 874 F.2d 307,313 (5th Cir. 1989). In *Brock*, a suit was filed to recover damages for birth defects that allegedly resulted from the ingestion of the anti-nausea drug Bendectin during pregnancy. The court questioned the techniques that the plaintiff's expert used to establish causation. *Id.*

23. *State v. Bullard*, 322 S.E.2d 370, 382 (N.C. 1984).

24. 115 A.2d 865 (Pa.Super. 1955).

25. *Id.* at 866.

26. "We know of no recognized authority which has ventured to state that the polygraph test is judicially acceptable...subsequent cases in other jurisdictions have similarly so held." *Id.* at 866-867. The court went on to say that "the reliability of the polygraph or other psychological test must be more definitely established before our [Pennsylvania] courts will accept their results as credible." *Id.* at 867.

Another case in which the reliability of certain scientific equipment was found to be in question was *Commonwealth v. Topa*, 369 A.2d 1277 (Pa. 1977). In this case; a sound spectrograph was used to compare the defendant's voice to that of an anonymous person who had called a police station and admitted a murder. The Supreme Court of Pennsylvania found that the *Frye* test applied and that: "The reliability of the sound spectrograph and voiceprint identification has not, as yet, been generally accepted by the scientific community concerned with acoustical science." *Id.* at 1282. The Court went on to find that such evidence had been improperly admitted and reversed the conviction. *Id.*

27. 500 A.2d 832 (Pa.Super. 1985).

28. *Id.* at 832.

29. 436 A.2d 170 (Pa.Super. 1981).

30. In *Nazarovitch*, a defendant was tried for criminal homicide, kidnapping, and conspiracy, based on one witness' hypnotically-refreshed recollection. The lower court had decided at a pre-trial hearing that such evidence was unreliable, and therefore did not meet the *Frye* test. The Supreme Court of Pennsylvania upheld the suppression of the evidence. Chief Justice O'Brien examined at length the scientific state of hypnotism and found it wanting as a source of admissible evidence. While the court recognized that hypnosis had gained greater acceptance and less skepticism, the court still found that most authorities agreed that as a general rule of reliability, the veracity of statements elicited during hypnosis could not be formulated. *Id.* at 174-75. The court concluded that, "we do not believe that the process of refreshing recollection by hypnosis has gained sufficient acceptance in its field" to meet the *Frye* test of reliability. *Id.* at 177-78.

Another case that dealt with the question of admissibility of hypnotic evidence was *Commonwealth v. Reed*, 583 A.2d 459 (Pa.Super. 1990). Once again, such evidence was not admissible under the *Frye* test.

31. 550 A.2d 561 (Pa.Super. 1988).

32. An electrophoresis test tests the movement of suspended particles through fluid or gel under the action of an electromotive force applied to electrodes in contact with the suspension. WEBSTER'S NINTH NEW COLLEGIATE DICTIONARY 402 (9th ed. 1985).

33. 550 A.2d at 565. The defendant was subsequently convicted of first degree murder and sentenced to life in prison.
34. *Id.* The court also considered the fact that appellate courts throughout the country had found such testing to be admissible evidence under the standards enunciated in *Frye*. *Id.* at 566. Finally, the court considered the fact that the defendant failed to introduce evidence that tended to show unreliability or insufficient acceptance of the technique in the general science community. *Id.* at 567.
35. 588 A.2d 941 (Pa.Super. 1991).
36. *Id.* at 946.
37. The court also noted that various federal and state courts have also held that such evidence satisfies the *Frye* standard. *Id.* at 947. See *United States v. Cyphers*, 553 F.2d 1064 (7th Cir. 1977), *cert. denied* 434 U.S. 843, 98 S.Ct. 142, 54 L.Ed.2d 107 (1978); *United States v. Haskins*, 536 F.2d 775 (8th Cir. 1976), *cert. denied* 429 U.S. 898, 97 S.Ct. 263, 50 L.Ed.2d 182 (1976); *People v. Columbo*, 118 Ill.App.3d 882, 74 Ill.Dec. 304, 455 N.E.2d 733 (1983), *cert. denied* 467 U.S. 1208, 104 S.Ct. 2394, 81 L.Ed.2d 351 (1984); *Paxton v. State*, 159 Ga.App. 175, 282 S.E.2d 912 (1981); *State v. Pratt*, 306 N.C. 673, 295 S.E.2d 462 (1982).
38. The expert had 32 years of experience in microscopic hair examination. She had concentrated in this area for over 20 years, completing more than 2,000 comparisons. She had testified for both defense and prosecution in over 40 cases and was accepted therein as an expert in microscopic hair examination. In testifying in the instant case, she referred to the practice as a science, and made reference to her reliance on treatises and the FBI manual concerning microscopic hair examination. See *McCauley*, *supra* note 35, at 947.
- A recent case in which a Pennsylvania court found scientific evidence to have met the *Frye* standard was *Com. v. Rodgers*, 605 A.2d 1228 (Pa.Super. 1992). In *Rodgers*, the Superior Court admitted DNA/RFLP analysis in a first degree murder case. The court held that such analysis had gained general acceptance in the national scientific community. *Id.* at 1235.
39. *Quaker City Hide Company v. Atlantic Richfield Co.*, No. 4750, 10 Phila. 1, 1983 Phila. Cty. Rptr. Lexis 2 (1983).
40. The defendant company was charged with negligence in the fire at plaintiff's company. Evidence was introduced at trial that included results of a polygraph test which indicated that plaintiff company's employee was practicing deception when he denied starting the fire or knowing who started it. *Id.* at *6.
41. "This Court believes that the time has come either to abandon the *Frye* standard or to liberalize it greatly, because its burdens far outweigh its benefits." *Id.* at *7.
42. *Id.*
43. *Id.*
44. *Id.* The court concluded by finding that not only had polygraphy gained general acceptance in the field of criminology, but that polygraphy possessed sufficient reliability to merit admission if a traditional approach of weighing probative value against prejudice were adopted. *Id.* at *11.
45. The Environmental Hearing Board holds hearings, and issues opinions, orders and adjudications upon appeals on final action of the Department [of Environmental Resources - DER]. The board is composed of three members nominated by the Governor, and confirmed by majority vote of the State Senate. The Governor designates the chairman of the board. 109 PA MANUAL 350. It was established and given its authority to hear such cases pursuant to Section 1921-A of the act of April 9, 1929 (P.L. 177, No. 175), known as The Administrative Code of 1929, for the purposes set forth in that section. 35 P.S. §723.3.
46. 462 A.2d 969 (Pa.Cmwlth. 1983)
47. *Id.* The Commonwealth Court has exclusive jurisdiction of appeals from final orders of the EHB. DALA SHUGHART, PENNSYLVANIA CIVIL PRACTICE 13 (1988).
48. See *supra* note 46, at 972. Another case that deals with the issue of deference is *Harman Coal Company v. Com.*, Department of Environmental Resources, 384 A.2d 289 (Pa.Cmwlth. 1978). That case dealt with an appeal of an EHB decision regarding the denial of a permit. The court found that the members of the EHB and its staff have an expertise in the scientific and technical aspects of environmental protection not

possessed by the court. *Id.* at 292. "We will be especially wary of disturbing their findings in matters clearly within their special knowledge and competence." *Id.*

49. 1986 EHB 563 (1986).

50. The board found that although the use of such studies to gain information about subsurface strata is widely accepted by geophysicists, the DER expert's results were inconsistent with the basis assumptions from which those results are computed and therefore his results are not reliable. *Id.* at 595-597.

51. *Id.* at 594.

52. *Id.*

53. EHB Docket # 87-481-E, 1990 Pa. Environ. LEXIS 14 (1990) [hereinafter *Luzerne*].

54. A leaching test is also known as an artificial weathering test and is conducted on mine soil to determine the collection and discharge of acid mine drainings.

55. See *Luxerine Core Corp.*, *supra* note 53, at *2.

56. *Id.* at *4. In addition, depositions were offered from DER hydrogeologists that stated, in their opinions, that the leaching test is generally not considered highly reliable. *Id.*

57. *Id.* at *6.

58. 1988 EHB 986 (1988).

59. *Id.*

60. *Id.* at 997. The Board applied the *Frye* test and found that Pennsylvania courts have refused to take judicial notice of scientific facts where there was insufficient support in literature of a particular proposition. They have also been reluctant to give judicial notice to scientific facts in sources published some time before, given the rapid advances in knowledge and technology. *Id.* at 998.

61. *Id.* at 18. See also, *Hoffman v. Misericordia Hospital of Philadelphia*, 267 A.2d 867 (Pa. 1970).

62. See *Wyant*, *supra* note 58, at 999.

63. 328 A.2d 185 (Pa.Cmwlth. 1974).

64. *Id.* at 188-89.

65. *Id.* at 189. This analysis was affirmed in *Com., Dept. of Environ. Resources v. Locust*, 396 A.2d 1205 (Pa. 1979), where the court stated that if scientific tests are available, fairness requires that they be used to measure the rate of emissions from a source. Where no such tests are available, proof of violations depend on the weight of the evidence produced. *Id.* at 1210.

66. Some courts, in determining what constitutes "general acceptance by the scientific community," study cases and commentaries which address similar issues. See *Topa*, *supra* note 26, at 1282. Others require more than one expert's testimony to satisfy the standard. *Id.* Others require that "most" authorities in a given field accept a method's general reliability. See *Nazarovitch*, *supra* note 29, at 175. Still other courts find that one expert may be enough to establish reliability, if that expert possess academic and professional credentials that permit him to understand the scientific principals involved and any differing viewpoints regarding reliability. Such a single expert must be impartial - not so personally invested in establishing the technique's acceptance that he might not be objective about disagreements within the scientific community. See *Middleton*, *supra* note 31, at 566. Others require published scientific studies that accept such test as reliable. *Id.*, See also *Luzerne Coal Corp.*, *supra* note 53.

67. See *Quaker City Hide Company*, *supra* note 39.