916 F.2d 829
United States Court of Appeals,
Third Circuit.

In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Christopher S. and Brown, Jacqueline Michell, h/w
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("Conrail")
v.
CITY OF PHILADELPHIA, United States of America,
Christopher Brown, Appellant.
In re PAOLI RAILROAD, YARD PCB LITIGATION.
BROWN, Cathlene
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Cathlene Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Craig A. and Brown, Catherine D. h/w
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Craig Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BARBETTA, Margherita
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Margherita Barbetta, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
JOHNSON, Mary Retta
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Mary Retta Johnson, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Celeste
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Celeste Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Clemmon L.
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Clemmon L. Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Cloyd H.
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Cloyd H. Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Curtis

v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
CITY OF PHILADELPHIA, United States of America,
Curtis Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
REID, William Jr., and Reid, William Jr., Executor of the Estate of Reid, Minni, Deceased
v.
MONSANTO COMPANY, Southeastern Pennsylvania Transportation Authority ("SEPTA"), National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
UNITED STATES of America,
William Reid, Jr., Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BROWN, Mabel, Individually and on behalf of all others similarly situated
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); National Railroad Passenger Corporation ("Amtrak"); and Consolidated Rail Corporation ("CONRAIL")
v.
UNITED STATES of America, Roy F. Wester, Inc., General Electric Company, the Budd Company and Westinghouse Electric Corporation,
Mabel Brown, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
WILLIAMS, Andre, Sr., Individually and on behalf of all others similarly situated
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); National Railroad Passenger Corporation ("Amtrak"); Consolidated Rail Corporation ("CONRAIL"); Monsanto Company; General Electric Company; The City of Philadelphia,
Andre Williams, Sr., Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
NARCISE, Helen V., Administratrix of the Estate of Narcise, John G., deceased, Narcise, Helen V. as personal representative of Narcise, John G., Narcise, Helen V. in her own right
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); National Railroad Passenger Corporation ("Amtrak"); Consolidated Rail Corporation ("CONRAIL"); Monsanto Company ("Monsanto"); General Electric Company ("GE"); City of Philadelphia ("Philadelphia")
v.
UNITED STATES of America,
Helen V. Narcise, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
KNIGHT, Mary Alice
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); National Railroad Passenger Corporation ("Amtrak"); Consolidated Rail Corporation ("CONRAIL"); Monsanto Company ("Monsanto"); General Electric Company ("GE"); City of Philadelphia ("Philadelphia")
v.
UNITED STATES of America,
Mary Alice Knight, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
INGRAM, John Sr. and Ingram, Patricia in their own right and as parents and natural guardians of Ingram, John Jr., and Ingram, April in her own right
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); National Railroad Passenger Corporation ("Amtrak"); Consolidated Rail Corporation ("CONRAIL"); Monsanto Company ("Monsanto"); General Electric Company ("GE"); City of Philadelphia ("Philadelphia")
v.
UNITED STATES of America,
John Ingram, Sr. and Patricia Ingram, Appellants.
In re PAOLI RAILROAD YARD PCB LITIGATION.
CUNNINGHAM, Matthew and Cunningham, Bessie
v.
MONSANTO COMPANY and Southeastern Pennsylvania Transportation Authority ("SEPTA") and National Railroad Passenger Corporation ("Amtrak") and Consolidated Rail Corporation ("CONRAIL"),
Matthew and Bessie Cunningham, Appellants.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BURRELL, George Albert and Priscilla Etheridge, in their own right, and Burrell, George Albert and Burrell, Priscilla Etheridge, as parents and natural guardian of Burrell, Amber Shardai, a minor, and Burrell, George Albert, as parent and natural guardian of Walker, Andrew, a minor, and Burrell, Priscilla Etheridge, as parent and natural guardian

of Burrell, Bobby George Albert Christian, a minor,
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"), and National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
UNITED STATES of America,
George Albert Burrell and Priscilla Etheridge Burrell, Appellants.
In re PAOLI RAILROAD YARD PCB LITIGATION.
CUMMINS, Wallace Darryl
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); and National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL")
v.
UNITED STATES of America,
Wallace Darryl Cummins, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
JONES, K. Louise, Administratrix of the Estate of Jones, Harvey N. Jr., Deceased and Jones, K. Louise as Personal Representative of Jones, Harvey N. Jr., and Jones, K. Louise in Her Own Right
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"), National Railroad Passenger Corporation ("Amtrak") and Consolidated Rail Corporation ("CONRAIL")
v.
UNITED STATES of America, City of Philadelphia, K. Louise Jones, Appellant.
In re PAOLI RAILROAD YARD PCB LITIGATION.
STANBACH, Charles W., Executor of the Estate of Stanbach, Charles, Jr., deceased and Stanbach, Charles W., as a personal representative of Stanbach, Charles W. in his own right and Stanbach, Susanna
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"), and National Railroad Passenger Corporation ("Amtrak"), and Consolidated Rail Corporation ("CONRAIL") and Monsanto Company ("Monsanto")
v.
CITY OF PHILADELPHIA,
Charles and Susanna Stanbach, Appellants.
In re PAOLI RAILROAD YARD PCB LITIGATION.
BUTLER, William; Butler, Theresa; Simpson, Marvin L.; Simpson, Allen K.; Simpson, Karen R.; Simpson, Donald E.; and Jackson, Bryan M.
v.
SOUTHEASTERN PENNSYLVANIA TRANSPORTATION AUTHORITY ("SEPTA"); National Railroad Passenger Corporation ("Amtrak"); and Consolidated Rail Corporation ("CONRAIL")
v.
UNITED STATES of America, City of Philadelphia, William Butler, Theresa Butler, Marvin L. Simpson, Allen K. Simpson, Karen R. Simpson, Donald E. Simpson and Bryan M. Jackson, Appellants.

Nos. 88–1973 to 88–1992, 89–1070 to 89–1079 and 89–1097.
|
Argued Sept. 8, 1989.
|
Decided Sept. 20, 1990.
|
As Amended Oct. 29, 1990.
|
As Amended Nov. 23, 1990.
|
Rehearing and Rehearing In Banc Denied Nov. 23, 1990.

Synopsis
Suits were brought by 38 persons who had either worked in or lived adjacent to railyard seeking damages resulting from exposure to PCBs. Following consolidation, the United States District Court for the Eastern District of Pennsylvania, Robert F. Kelly, J., 706 F.Supp. 358, granted summary judgment in favor of the defendants on all claims except for those for property damage and response costs under CERCLA, and the plaintiffs appealed. The Court of Appeals, Becker, Circuit Judge, held that: (1) cause of action for medical monitoring is cognizable in Pennsylvania to cover cost of periodic medical examinations needed to protect against exacerbation of latent diseases brought about by exposure to hazardous substances; (2) exclusion of plaintiffs' expert opinion evidence in toxic tort case on ground that it was not based on facts or data reasonably relied upon by experts in the field would be set aside where trial court failed to adequately articulate what facts it relied on in making its legal determination; and (3) genuine issues of material fact existed as to whether plaintiffs had been exposed to PCBs to a greater extent than others, whether plaintiffs had an injury and whether PCBs were cause of

that injury, precluding summary judgment in favor of defendants.

Reversed and remanded.

West Headnotes (12)

[1] **Federal Courts**
Requisites and sufficiency; defects

Notice of appeal in ten toxic tort cases did not fail to identify the appealing parties with the specificity required by *Torres* ; original notice mentioned the docket numbers and surnames of the cases then before district court and subsequent letter from counsel identified in detail the parties to the appeal. F.R.A.P.Rules 3(c), 3 note, 28 U.S.C.A.

3 Cases that cite this headnote

[2] **Damages**
Medical treatment and care of person injured

Cause of action for medical monitoring is cognizable in Pennsylvania to cover cost of periodic medical examinations needed to protect against exacerbation of latent diseases brought about by exposure to hazardous substances; to recover, a plaintiff must prove that he was significantly exposed to a proven hazardous substance through the negligent actions of the defendant, that he suffers an increased risk if contracting a serious latent disease as a proximate result of exposure, that increased risk makes periodic diagnostic medical examinations reasonably necessary and that monitoring and testing procedures exist which make the early detection and treatment of the disease possible and beneficial.

113 Cases that cite this headnote

[3] **Federal Civil Procedure**
Opinion, adoption of

Exclusion of plaintiffs' expert opinion evidence in toxic tort case on ground that it was not based on facts or data reasonably relied upon by experts in the field would be set aside where trial court failed to adequately articulate what facts it relied on in making its legal determination. Fed.Rules Evid.Rule 703, 28 U.S.C.A.

35 Cases that cite this headnote

[4] **Federal Civil Procedure**
Reception of Evidence

Trial court, which denied plaintiffs' request for an in limine hearing and denied oral argument on evidentiary issues and related summary judgment motion in toxic tort case and which issued a case management order which arguably did not give plaintiffs an adequate opportunity to discover defendants' experts' positions, did not provide plaintiffs with sufficient process for defending their evidentiary submissions.

29 Cases that cite this headnote

[5] **Evidence**
Knowledge, experience, and skill in general

In toxic tort case, trial court abused its discretion in excluding portions of testimony of experts with doctorates in pathology, microbiology and physics simply because the experts did not have the degree or training which the trial court apparently thought would be most appropriate. Fed.Rules Evid.Rule 702, 28 U.S.C.A.

65 Cases that cite this headnote

[6] **Federal Civil Procedure**
Opinion, adoption of

Exclusion, on grounds that scientific technique was unreliable, of expert's opinion based on meta-analysis would be set aside in toxic tort case where trial court did not comply with requirement that there be a developed record and specific findings on reliability issues and where there was a connection between the research and the factual issues in the case. Fed.Rules Evid.Rule 702, 28 U.S.C.A.

31 Cases that cite this headnote

[7] **Evidence**
Unofficial writings in general

Expert's report could not be excluded on reliability grounds on basis that it had not been represented for peer-review or accepted by anyone in particular. Fed.Rules Evid.Rule 702, 28 U.S.C.A.

6 Cases that cite this headnote

[8] **Federal Civil Procedure**
Reception of Evidence

In order to exclude evidence at the pretrial stage under rule authorizing exclusion if its probative value is substantially outweighed by danger of unfair prejudice, a court must have a record complete enough on the point at issue to be considered a virtual surrogate for a trial record. Fed.Rules Evid.Rule 403, 28 U.S.C.A.

86 Cases that cite this headnote

[9] **Federal Civil Procedure**
Tort cases in general

Genuine issues of material fact existed as to whether plaintiffs had been exposed to PCBs to a greater extent than others, whether plaintiffs had an injury and whether PCBs were cause of that injury, precluding summary judgment in favor of defendants in toxic tort case.

54 Cases that cite this headnote

[10] **Federal Civil Procedure**
Theory or form of action

Seven of 38 plaintiffs in toxic tort case, who did not currently suffer from any adverse health effects as result of their exposure to PCBs, were entitled to leave to amend their complaint to eliminate their personal injury claims where defendants would not be prejudiced by the elimination of those claims. Fed.Rules Civ.Proc.Rule 41, 28 U.S.C.A.

65 Cases that cite this headnote

[11] **States**
Excuses for, and relief from, delay or failure

Southeastern Pennsylvania Transit Authority, as an agency of the Commonwealth, was a part of the Commonwealth government and therefore plaintiffs' failure to comply with statute requiring notice of injury within six months could not be excused on ground that a government unit other than Commonwealth government had actual or constructive notice of the incident or the condition giving rise to the claim. 42 Pa.C.S.A. §§ 102, 5522(a)(3)(iii).

6 Cases that cite this headnote

[12] **Municipal Corporations**
Excuses For, and Relief From, Delay or Failure
States
Excuses for, and relief from, delay or failure

Failure to comply with statute requiring notice of injury within six months prior to commencing suit against Commonwealth of Pennsylvania or

a government unit could be excused if government unit failed to show prejudice resulting from the noncompliance. 42 Pa.C.S.A. § 5522(a)(2).

5 Cases that cite this headnote

Attorneys and Law Firms

***834** D. Bruce Hanes, Friedman and Hanes, Philadelphia, Pa., for Christopher Brown, Cathlene Brown, Craig Brown, Margherita Barbetta, Mary Retta Johnson, Celeste Brown, Clemmon L. Brown, Cloyd Brown, Curtis Brown, appellants.

James C. Sargent, Jr., Lamb, Windle & McErlane, P.C., West Chester, Pa., for William Reid, Jr., appellant.

Geoffrey L. Beauchamp, Wisler, Pearlstine, Talone, Craig & Garrity, Norristown, Pa., Kenneth Roos (argued), Joseph Donley, Kittredge, Kaufman & Donley, Philadelphia, Pa., for William Butler, Theresa Butler, Marvin L. Simpson, Allen K. Simpson, Karen R. Simpson, Donald E. Simpson and Bryan M. Jackson, appellants.

Charlotte E. Thomas, Arnold E. Cohen (argued), John H. Spelman, Andrew O. Schiff, Klehr, Harrison, Harvey, Branzburg, Ellers & Weir, and Harold E. Kohn, Joseph C. Kohn, Kohn, Savett, Klein & Graf, Philadelphia, Pa., for Mabel Brown, Andre Williams, Sr., Helen V. Narcise, Mary Alice Knight, John and Patricia Ingram, Matthew and Bessie Cunningham, George Albert Burrell, Priscilla Etheridge, Wallace Darryl Cummins, K. Louise Jones, Charles W. Stanbach, appellants.

Michael H. Malin (argued), James D. Shomper, Jeanne Proko–Elkins, White and Williams, Philadelphia, Pa., for Monsanto Co., appellee.

Roger F. Cox (argued), Jerome R. Richter, George J. Krueger, Jay W. Eisenhofer, Blank, Rome, Comisky & McCauley, Philadelphia, Pa., for Southeastern Pennsylvania Transp. Authority ("SEPTA"), appellee.

John G. Kester (argued), John W. Vardaman, Jr., Mark A. Srere, Diana L. Schacht, Williams & Connolly, Washington, D.C., Harry A. Short, Jr., Stephen M. McManus, Liebert, Short, Fitzpatrick & Hirshland, Philadelphia, Pa., for General Elec. Co., appellee.

Richard J. Gold, First Deputy City Sol., Joy J. Bernstein, Deputy City Sol., City Solicitor's Office, Philadelphia, Pa., for City of Philadelphia, appellee.

David Richman, Katherine Kramer Laird, Pepper, Hamilton & Scheetz, Philadelphia, Pa., for Consolidated Rail Corp. ("CONRAIL"), appellee.

Richard A. Kraemer, Nancy H. Resnick, Margolis, Edelstein, Scherlis, Sarowitz & Kraemer, Philadelphia, Pa., for National Rail Passenger Corp. ("AMTRAK"), appellee.

Richard F. Kingham, Bruce N. Kuhlik, Marjorie E. Powell, Covington & Burling, Washington, D.C., for American Tort Reform Ass'n, amicus curiae.

Denis V. Brenan, Morgan, Lewis & Bockius, Philadelphia, Pa., for American Council on Science and Health, Inc., amicus curiae.

C. James Zeszutek, Michael R. Bucci, Jr., Thorp, Reed & Armstrong, Pittsburgh, Pa., ***835** for The Pennsylvania Defense Institute, amicus curiae.

Shephen M. Shapiro, John E. Muench, Kathleen M. Hennessey, Mayer, Brown & Platt, Chicago, Ill., for The Chamber Of Commerce of The U.S., The Chemical Mfrs. Ass'n, The Nat. Ass'n of Mfrs., The Business Roundtable, and The Product Liability Advisory Council, Inc., amicus curiae.

Robert C. Barnard, Sara D. Schotland, Cleary, Gottlieb, Steen & Hamilton, Washington, D.C., for American Industrial Health Council, amicus curiae.

Thomas W. Brunner, Laura A. Foggan, Frederick S. Ansell, Wiley, Rein & Fielding, Washington, D.C., for American Ins. Ass'n, amicus curiae.

Leonard W. Schroeter, Schroeter, Goldmark & Bender, Seattle, Wash., Jerry S. Cohen, Anthony Z. Roisman, Richard S. Lewis, Cohen, Milstein & Hausfeld, Washington, D.C., for Trial Lawyers for Public Justice.

Arthur H. Bryant, Trial Lawyers for Public Justice, Washington, D.C., for American Public Health Ass'n, et al., amicus curiae.

Arnold Levin, David J. Perlman, Levin, Fishbein, Sedran & Berman, Philadelphia, Pa., Lee C. Swartz, Hepford, Swartz, Menaker & Morgan, Harrisburg, Pa., for James D. Carrigan, amicus curiae.

Before BECKER, MANSMANN and NYGAARD, Circuit Judges.

Opinion

OPINION OF THE COURT

BECKER, Circuit Judge.

This is a toxic tort case brought by some thirty-eight persons who have either worked in or lived adjacent to the Paoli railyard, an electric railcar maintenance facility at the western terminus of the noted Paoli Local, which serves the Philadelphia Main Line. The plaintiffs' primary claim is that they have contracted a variety of illnesses as the result of exposure to poly-chlorinated biphenyls, better known as PCBs. PCBs are toxic substances which, as the result of decades of PCB use in the Paoli railcar transformers, can be found in extremely high concentration at the railyard and in the ambient air and soil. The defendants are Monsanto Corporation, the nation's leading manufacturer of PCBs (marketed under the trade name "Aroclor"); General Electric Company, manufacturer of the transformers; Amtrak, owner of the railyard site since 1976; Conrail, which operated the facility between 1976 and 1983; the Southeastern Pennsylvania Transit Authority (SEPTA), which has operated the facility since 1983; and the City of Philadelphia, which owns some of the railroad cars at the facility.[1]

This opinion addresses an appeal by all plaintiffs from the grant of summary judgment by the district court in favor of all defendants on all claims except those for property damage and response costs under CERCLA.[2] 706 F.Supp. 358. We direct our attention principally to a series of pretrial evidentiary rulings by which the district court apparently excluded[3] the bulk of the expert reports and testimony upon which plaintiffs relied to establish (1) that they were subject to an abnormally high level of PCB exposure, and (2) that this exposure caused them harm. Because the grant of summary judgment inexorably flowed from these evidentiary rulings, if they are set aside, so must be the summary judgment. Our scrutiny of the rulings will ***836** focus not only upon their legal foundations, but also on the procedures by which they were made and the adequacy of their articulation.

We conclude that the district court's evidentiary rulings must be set aside for a number of reasons. One problem with the district court's rulings is procedural. The court not only failed to give plaintiffs an adequate opportunity to present their factual and legal contentions on evidentiary issues, but it also ruled on an inadequate factual record and it failed adequately to articulate the bases for its rulings. It also failed to follow the protocols established by the jurisprudence of this court for evidentiary rulings governed by Fed.R.Evid. 702 and 703.

Other problems with the district court opinion are substantive. The court applied too stringent a standard to the qualification of experts under Rule 702. The court also erred in its application of the *Downing* test for the admissibility of novel scientific evidence (under Rule 702). Given these improper evidentiary exclusions, we cannot affirm the district court's summary judgment ruling. If the improperly excluded evidence is considered, the record contains genuine issues of material fact on the toxic tort issues.

A number of other discrete legal issues are also before us on appeal. These include the viability of plaintiffs' claims to recover the costs of periodic medical examinations necessary to protect against the development of latent diseases caused by their exposure to PCBs ("medical monitoring") under Pennsylvania law; the propriety of the district court's refusal to permit certain plaintiffs voluntarily to dismiss their complaint so as to proceed at a later time when their apparently sub-clinical injuries manifest themselves; and the availability to SEPTA of a lack of notice defense under 42 Pa.Cons.Stat.Ann. § 5522. We find that the district court abused its discretion in refusing to permit the voluntary dismissal without prejudice of certain plaintiffs' claims, and that the court erred as a matter of law in its analysis of both the medical monitoring and SEPTA notice issues. For all these reasons, we must reverse the grant of summary judgment and remand for further proceedings.

I. PROCEDURAL HISTORY

Plaintiffs filed their complaints in the district court for the Eastern District of Pennsylvania beginning in April 1986. The complaints alleged a variety of theories of recovery, including claims based upon CERCLA, common law tort, and the medical monitoring doctrine. The twenty-one actions before us on this appeal were consolidated. On September 24, 1987, in response to a motion by defendants, the district court filed a case management order which provided a schedule for conducting further discovery and filing summary judgment motions.[4]

The defendants filed a joint motion for summary judgment.[5] After plaintiffs answered the motion, attorneys on both sides ***837** requested oral argument. In a letter dated October 28, 1988, the court denied these requests, stating that oral argument would be unnecessary

"[b]ecause the issues contained in those motions have been thoroughly and extensively briefed and because I have been working with this case for over a year...." The court also failed to conduct *in limine* hearings regarding the admissibility of the plaintiffs' expert testimony, notwithstanding defendants' summary judgment strategy that depended largely on exclusion of that testimony under Fed.R.Evid. 702, 703 and 403.

On November 28, 1988, the district court granted defendants' joint motion for summary judgment against all plaintiffs on the personal injury claims. The court's order was accompanied by an opinion, discussed below in Part IV, concentrating on the exclusion of plaintiffs' expert testimony. These appeals followed.

II. APPELLATE JURISDICTION

[1] Defendants make a number of attacks upon our appellate jurisdiction, all of which we find without merit, and only one of which warrants extended discussion: did the original notice of appeal in ten of the cases fail to identify the appealing parties with the specificity required by *Torres v. Oakland Scavenger Co.*, 487 U.S. 312, 108 S.Ct. 2405, 101 L.Ed.2d 285 (1988)?[6] In *Torres*, the notice of appeal was captioned, "Joaquin Moreles Bonilla, et al., Plaintiffs in intervention." The body of the notice named fifteen of the sixteen putative appellants, but not Torres. The Court concluded that the notice was insufficient to specify Torres as an appellant, and that he was therefore barred from pursuing his appeal for failing to comply with the requirements of Fed.R.App.P. 3(c). *See* 487 U.S. at 317–18, 108 S.Ct. at 2409–10.

We recently had the opportunity to construe *Torres* in *Dura Systems, Inc. v. Rothbury Investments, Ltd.*, 886 F.2d 551 (3d Cir.1989), *cert. denied*, 493 U.S. 1046, 110 S.Ct. 844, 107 L.Ed.2d 838 (1990), in which we held that a consent order, entered after a notice of appeal but within the period required for timely notice of appeal, could confer jurisdiction over parties not explicitly named in the notice of appeal. *See id.* at 555. We summarized the applicable principles as follows:

> In formulating its holding, the *[Torres]* Court made clear that Rules 3 and 4 of the Federal Rules of Appellate Procedure create a jurisdictional threshold, and that the requirements of the two rules may not be abrogated for "good cause shown" under Fed.R.App.P. 2. Moreover, the fact that Rule 3 excuses "informality of form or title" in a notice of appeal does not forgive compliance with the Rule's requirements: "[p]ermitting imperfect but substantial compliance with a technical requirement is not the same as waiving the requirement altogether as a jurisdictional threshold." Although the *Torres* court mandated compliance with the specificity requirement of Fed.R.App.P. 3(c), it recognized that:
>
> > the requirements of the rules of procedure should be liberally construed and that 'mere technicalities' should not stand in the way of consideration of a case on the merits. Thus, if a litigant files papers in a fashion that is technically at variance with the letter of a procedural rule, a court may nonetheless find that the litigant has complied with the rule if the litigant's action is the functional equivalent of what the rule requires.
>
> This approach mirrors the practice sanctioned in the Advisory Committee Notes to the 1979 amendment to Fed.R.App.P. 3(c), which cites with approval cases holding ***838** that, "so long as the function of notice is met by the filing of a paper indicating an intention to appeal, the substance of the rule has been complied with."

Id. at 554–55 (footnote and citations omitted).

Applying those principles here, it is not clear that plaintiffs' notice of appeal in the ten referenced cases, in its original form, was insufficient. For example, the original notice appears to have served as a "functional equivalent" of the requirements of Rule 3(c) because it mentions the docket numbers and surnames of the cases then before the district court. Indeed, correspondence from defense counsel confirms that no party was misled by the notice, and that all parties presumed it to include all plaintiffs referenced under the relevant docket numbers.

At all events, any impediment that might have existed was removed by a January 6, 1989, letter, just two days after the Rule 54(b) certification, from counsel for the subject plaintiffs to the clerk of this court, with copies to all counsel, identifying in detail the parties to the appeal. The letter is analogous to the consent order in *Dura Systems* in that the letter was filed within the period allowed for appeal. The "Court's directive to construe the rule 'liberally,' and to avoid a construction that would allow 'mere technicalities' to bar consideration of a case on the merits" *id.* (quoting *Torres*, 108 S.Ct. at 2408) compels this result.[7] *Accord Masquerade Novelty, Inc. v. Unique Industries, Inc.*, 912 F.2d 663 (3d Cir.1990) (attorney appearance form and civil appeal information statement filed within time limit constitute adequate notice).

III. THE SUMMARY JUDGMENT RECORD

A. *The Plaintiffs' Submissions*

Plaintiffs set out to prove that their personal injuries were proximately caused by their exposure to the PCBs that defendants permitted to contaminate the area surrounding the Paoli Railyard. Their case depends upon expert testimony pertaining to exposure and causation. The attorneys for different plaintiffs employed different expert witnesses, and it is therefore convenient, in discussing the record before us, to categorize plaintiffs according to which counsel represents them.

Of the ten cases in which plaintiffs are represented by Kohn, Savett, Klein & Graf, P.C., or Klehr, Harrison, Harvey, Branzburg, Ellers & Weir, (the "Kohn/Klehr plaintiffs"), nine answered discovery with the opinions of three experts: Dr. Herbert Allen, Dr. Deborah Barsotti, and Dr. Arthur Zahalsky. In the tenth Kohn/Klehr case, *Cunningham*, and in the *Reid* case,[8] Dr. Harry Shubin submitted an opinion on the question of causation. In the nine cases in which plaintiffs are represented by D. Bruce Hanes, expert testimony was offered solely by Dr. G. John DiGregorio. The remaining plaintiffs offered no expert testimony.

Dr. Herbert Allen received his doctorate in environmental chemistry from the University of Michigan in 1974. He is currently employed as a professor of chemistry at Drexel University, where he serves as the director of Drexel's Environmental Studies Institute. Allen has published numerous scholarly articles. His primary role was to testify to the Kohn/Klehr plaintiffs' exposure to the Paoli Railyard's elevated PCB levels.

Initially, Allen noted the "extremely high levels" of PCBs in soil samples taken from the neighborhood adjacent to the yard. He explained that runoff from the railyard caused contamination in the soil on Central Avenue, with the highest concentrations of PCBs being found in residential yards adjacent to the railyard. Central Avenue samples ***839** contained concentrations as high as 577 mg/kg, while some residential yard concentrations were as high as 1000 mg/kg. Dr. Allen opined that the high concentrations of PCBs found deep in the soil indicated a discharge of extremely high amounts of PCBs. He also noted specifically that certain "heat-producing" operations, such as the welding and cutting of contaminated equipment and the burning of contaminated railroad ties, which employees testified had occurred at the yard, could have converted PCBs into other toxins such as PCDD's (dioxins) and PCDF's (furans). This testimony is particularly significant in view of the conclusion of certain of plaintiffs' proffered studies that exposure to PCDFs can cause numerous adverse health effects, *see infra* at 843.

Relying on his knowledge of the scientific literature, his own testing, the testimony of employees, and a scientific formula which he had devised, Dr. Allen calculated the amount of PCBs in plaintiffs' bodies based on the amount of PCBs in the soil. Among other things, he relied on the affidavit of an employee named Kraljevich who stated that the use of heat-producing tools caused PCBs to "hang in the air like a fog," and that leaking transformers caused foul PCB odors to permeate the air. Allen then concluded that neighborhood residents had been exposed to elevated PCB concentrations since approximately 1940. Although unable to quantify the extent of plaintiffs' exposure, Allen opined that the residential plaintiffs may have been exposed to air containing more than 10^{7} g/m3 of PCBs, while railyard employees may have suffered even greater exposure.

Deborah A. Barsotti, Ph.D., offered expert opinions on both exposure and causation for the Kohn/Klehr plaintiffs. Dr. Barsotti, a toxicologist, received her doctorate in pathology from the University of Wisconsin Medical School in 1980, and is qualified to interpret human clinical tests. She has published a number of articles on the toxicity of PCBs, and her work has been cited in the Congressional Record and in legislative debates on the Toxic Substances Control Act. She is currently employed as the Chief of the Research Analysis Branch of the Agency for Toxic Substance and Disease Registry (ATSDR) of the United States Government.

Barsotti based her opinions regarding exposure on her review of the relevant scientific literature and on her own gas chromatography testing. She explained that PCBs may be absorbed into the body by oral ingestion, through the skin, or by inhalation, and that PCBs are transported through the body in blood, and eventually redistributed to fat and organs containing fat. She concluded that the plaintiffs had in fact ingested PCBs. A major part of Dr. Barsotti's exposure testimony consisted of her attempt to show, through gas chromatography tracing, that the PCBs to which plaintiffs were exposed came specifically from the Paoli Railyard. She did this by comparing chromatographic tracings of plaintiffs' blood to similar tracings from soil at Paoli. She then attempted to match certain "early emerging peaks," (in plaintiffs' blood tests which she testified related) to particular PCB isomers.

Barsotti used the results of these tests, along with medical and clinical records from the plaintiffs, to buttress her testimony regarding causation. In determining causation, she also personally inspected the railyard, and reviewed,

inter alia, the Kraljevich affidavit, published reports and studies, and soil samples taken from the yard. She concluded that plaintiffs' exposure to PCBs at Paoli was a substantial factor in causing their particular injuries, including elevations in triglyceride, cholesterol, and liver enzyme levels.

Also testifying with respect to causation for the Kohn/Klehr plaintiffs was Arthur C. Zahalsky, Ph.D., who received his doctorate in microbiology from New York University in 1967. Dr. Zahalsky is a professor at Southern Illinois University, where he teaches courses in immunology and human diseases. However, he has spent the majority of his time in the past few years in his consulting business, which specializes in providing scientific consultation for litigation.

***840** Dr. Zahalsky offered his opinion that plaintiffs have suffered immune system injuries as a result of their exposure to PCBs at Paoli. He testified that as a general proposition, PCBs damage the immune systems of humans and animals because they alter the cell production and replenishment rate of immune cells, and impair the survivability of those cells. Basing his opinion on a personal inspection of the railyard and surrounding area, a review of plaintiffs' medical records and PCB exposure history, and various laboratory test results and published reports, Dr. Zahalsky concluded that plaintiffs have sustained immune system damage, and that exposure to PCBs at Paoli was a substantial factor in causing such damage. Zahalsky submitted a list of 82 studies upon which he relied in formulating his opinion. A number of these studies discussed two notorious incidents of human beings ingesting contaminated rice oil. These incidents, which took place in Japan in 1968 and Taiwan in 1979, are referred to as the "Yusho" and "Yu Cheng" incidents. The oil was tainted with large quantities of Kaneclor, a Japanese analog of Aroclor that contains significant amounts of PCDFs, as well as PCBs.

Harry Shubin, M.D., an internist, offered opinions on the issue of causation in the *Cunningham* and *Reid* cases. In formulating his opinion, Dr. Shubin examined the plaintiffs and reviewed medical records and lab test results. He cited numerous published studies and reports on which he claims to have relied. Shubin was also informed that the EPA had removed PCB-contaminated soil from the Cunninghams' residence. He diagnosed plaintiffs as suffering from a variety of illnesses and harmful conditions, and concluded that these conditions were caused by exposure to PCBs.

The nine plaintiffs represented by D. Bruce Hanes relied on the testimony of G. John DiGregorio, M.D., Ph.D. Dr. DiGregorio is a clinical pharmacologist who received a degree from Hahnemann University. The Hanes plaintiffs, residents of properties adjacent to the railyard, claim to have been injured because defendants permitted PCBs to flow onto these properties, thereby causing plaintiffs to inhale PCB dust and ingest fruits and vegetables grown in the soil of their PCB-contaminated gardens. In formulating his opinions as to these plaintiffs, Dr. DiGregorio relied on medical history questionnaires filled out by plaintiffs themselves, laboratory tests revealing abnormal PCB blood levels in certain plaintiffs,[9] and scientific literature on the harmful effects of PCBs to both humans and animals. He performed no physical examinations. He opined that five of the nine Hanes plaintiffs suffered from specific injuries caused by PCBs; that all nine suffered from anxiety of contracting diseases in the future based on their exposure to PCBs; and that all nine were at increased risk of contracting future diseases because of their exposure. DiGregorio's testimony as to exposure was based largely on the statements of plaintiffs themselves and the results of laboratory tests revealing abnormal blood burdens of PCBs in various plaintiffs.

Although these expert witnesses were the only ones whose opinions were discovered pursuant to the case management order, they are not the only experts upon whom the plaintiffs rely. In response to the defendants' joint motion for summary judgment, plaintiffs submitted the affidavits of four additional experts: Ian C.T. Nisbet, Ph.D.; Robert K. Simon, Ph.D.; Benjamin Calesnick, M.D.; and William J. Nicholson, Ph.D.

Dr. Nisbet, who received his Ph.D. in physics from Cambridge University in 1958, currently serves as the president of a scientific consulting firm. He has published ***841** numerous articles in the fields of human exposure to chemicals and the assessment of associated health risks. Dr. Nisbet submitted an affidavit containing his opinions that (1) the defendants' estimates of the background PCB exposure level in the United States, as well as the studies upon which these estimates were based, are mistaken; (2) the correct background level, which should be determined by an adipose to blood ratio calculation, is much lower;[10] (3) many plaintiffs' exposures exceed the lower level; and (4) there are serious health hazards posed by exposure to PCBs.

Dr. Simon, who describes himself as "a professional industrial hygienist, toxicologist, and forensic analytical chemist," received his Ph.D. from the University of Maryland. The opinions contained in Dr. Simon's affidavit closely parallel those expressed by Dr. Nisbet, with varying degrees of emphasis.

Dr. Calesnick is a pharmacologist who received his medical degree in 1944 from Hahnemann Medical College, where he currently serves as a professor of medicine and as the director of Hahnemann's Division of Human Pharmacology. His resume lists one hundred published articles, as well as numerous academic and professional honors. Dr. Calesnick performed physical examinations and several laboratory tests on the Kohn/Klehr plaintiffs. He concluded summarily in his affidavit that these plaintiffs require medical surveillance as a consequence of their exposure to PCBs at Paoli.

The final affidavit offered in response to the summary judgment motion was that of Dr. Nicholson, a physicist who received his Ph.D. from the University of Washington in 1960 and is currently employed as a professor of community medicine at Mount Sinai School of Medicine in New York City. He has published over seventy articles and has served on various professional and governmental committees. Nicholson's affidavit advances two major theses: (1) contrary to the assertions of defendants and their experts, the epidemiologic studies conducted to date *do* support a conclusion that PCBs are causally associated with adverse health effects to humans; and (2) defendants and their experts are incorrect in asserting that animal carcinogenicity studies have little relevance for estimating carcinogenicity in humans.

In order to support his first thesis, Dr. Nicholson conducted a "meta-analysis," in which he combined the results of numerous epidemiologic surveys in order to achieve a larger sample size, adjusted the results for differences in testing techniques, and drew his own scientific conclusions. Specifically, he concluded that the results of the various surveys, considered as a whole, show that exposure to PCBs can cause liver, gall bladder and biliary tract disorders. Nicholson maintains that this is true even though none of the individual surveys supports such a conclusion when considered in isolation.

B. *The Defendants' Submissions*

Defendants' view of the case, as encapsulated in their joint motion for summary judgment, is that plaintiffs "failed to submit competent evidence creating a genuine issue of material fact concerning either of two essential elements on which plaintiffs bore the burden of proof: abnormal exposure, and causation." Appellees' Br. at 36. In support of this assertion, defendants adopted a two-pronged approach. First, they vigorously attacked plaintiffs' expert testimony and sought to have it excluded under Fed.R.Evid. 702, 703, and 403. Second, defendants submitted studies and expert testimony of their own on both exposure and causation issues. Because the case was resolved at the summary judgment stage, where credibility determinations are inappropriate, the latter evidence is significant only insofar as it relates, ***842** within the contours of our Rule 703 jurisprudence, to whether certain of plaintiffs' expert opinions should have been excluded because they were not based on facts or data reasonably relied on by experts in the field.

On the question of exposure, defendants attack the opinions of both Dr. Allen and Dr. Barsotti. Defendants submit that Dr. Allen's testimony should not be considered because his data and methodology were unreliable. They assert that Dr. Allen ignored the actual measured body samples of PCB exposure, and instead attempted to calculate exposure levels from levels of PCBs in the soil by using a formula "of his own devising." Dr. Allen's opinion is unhelpful, defendants say, because he was unable to provide "an exact calculation of the PCB dose received by the inhabitants." Further, defendants submitted the affidavit of a physical chemist and chemical hazard control specialist, Neil Jurinski, Ph.D., who expressed the view that Dr. Allen's soil-to-air migration hypotheses were "pure speculation unsupported by the data available or by scientific principles," and that they "were not arrived at by using accepted scientific methods."

Dr. Barsotti, who sought to show that plaintiffs were exposed to PCBs that came specifically from the Paoli Railyard, was subjected to similar methodological criticism for her "fingerprinting" method of gas chromatography. Defendants contend that Dr. Barsotti lacked experience in reviewing chromatographic tracings of human blood for evidence of PCBs, pointing out that Barsotti had never before attempted to compare soil chromatograms with human blood chromatograms. They further criticize Barsotti for having claimed to be able to match "early emerging peaks" in certain PCB isomers, because she later conceded that it was impossible for her to do so, having failed to use the proper equipment. Defendants also attack Barsotti's procedures as impossible to replicate, because she kept virtually no record of either her procedures or the basis for her conclusions. She was, they note, unable to identify any particular soil sample which was compared with any particular plaintiff; neither could she produce the specific chromatograms she used to compare plaintiffs' PCB blood levels to those of the unexposed population or at the railyard.

Defendants further attack Dr. Barsotti's opinions because, although she could not "think of anybody" who had ever done the analysis she purported to do in this case, she pursued her own methods, and ignored the body of

existing data, "including the Public Health Service's *Paoli Study*, which concluded that it was scientifically impossible to determine that the Paoli Yard rather than the environment in general was the source of the residents' exposure." Appellee's Br. at 19. In addition, defendants presented their own expert, Dr. Raymond Harbison, a professor of toxicology and pharmacology, who concluded that "Dr. Barsotti lacks the requisite experience in reading and interpreting human and soil chromatograms to be able to perform the type of analysis that she purported to perform," and that "if in fact Dr. Barsotti did what she claims, she would be the first person to do this." With regard to the validity of Barsotti's experimental procedures, Dr. Harbison opined that it is impossible to identify the source of such low PCB levels, that the equipment used could not support Barsotti's analysis, and that the experiments lacked control and have not been replicated. He therefore dismissed Barsotti's results as being scientifically invalid.

Defendants also attacked Barsotti's opinions on causation, claiming that because she is not a physician, she is unqualified to make the differential medical diagnoses that defendants assert are critical to a finding of causation. Further, they argue that it was inappropriate for Dr. Barsotti to offer opinions on causation without ever having physically examined a single plaintiff. They point out that each of her nineteen scientific reports, which represent her conclusions on nineteen plaintiffs, is identical for the first fourteen pages. Barsotti described this as "boiler plate background information" on PCBs. Each report then contains only one or two additional paragraphs, which list the alleged injuries of ***843** the individual plaintiff and conclude "to a reasonable scientific certainty" that they were caused by PCBs.

In support of their challenge to Dr. Barsotti's expertise and conclusions, defendants offered the affidavits of their own experts.[11] These experts concluded generally that Dr. Barsotti is not qualified to form opinions on medical causation, that the opinions she did form lack evidentiary support and would not withstand review by experts in the field, and that her opinions are therefore not based upon known science or medicine. Defendants also assail Dr. Barsotti's opinion that plaintiffs, including one two-year-old child, suffer from increased fear of illness and are emotionally distressed. They note that she offered this opinion, having spoken only to one plaintiff over the telephone, and without having met or examined any of the plaintiffs. Further, defendants contend that she performed no psychiatric evaluations or tests, and that she is unqualified to do so.[12]

Defendants took a similar tack in attempting to discredit the opinions of Dr. Zahalsky, attacking first his qualifications as an expert, and then challenging the bases for his scientific opinions that plaintiffs had suffered immune system damage as a result of having been exposed to PCBs. Insofar as Dr. Zahalsky's credentials are concerned, defendants point out that he claimed a specialty in immunology, but had completed only one graduate-level course that included immunology. Zahalsky conceded his lack of expertise in epidemiology, toxicology, and medicine, and admitted that because he is not a medical doctor, he is not qualified to examine patients, perform clinical tests, or render differential diagnoses.

At his deposition, Dr. Zahalsky offered diagnoses of immune system damage in a number of plaintiffs, even though he had not tested any of the plaintiffs, and instead simply assumed that plaintiffs had elevated PCB exposure. He admitted that his opinions could be validated only by a series of tests that he designed, and further noted that these tests had not yet been performed. In attempting to show the lack of scientific approval for the proposition that PCBs damage the immune system, defendants point to Zahalsky's own somewhat cryptic statement that if his tests should support such a conclusion, "then I will have done something with the clinical immunologists that has not yet been done."

Defendants also noted that all of the studies relied upon by Zahalsky were either animal studies or human studies arising from the Yusho and Yu Cheng incidents. Defendants argue that reliance upon the Yusho and Yu Cheng studies is scientifically inappropriate because the PCB contamination in those incidents was intermingled with exposure to and ingestion of PCDFs, which defendants characterize as a far more toxic chemical. Indeed, even one of plaintiffs' experts opined that the toxicity of PCDFs is "500 to 2000 times greater" than that of PCBs. Further, they rely on a Public Health Service comment that there appears to be general agreement in the scientific community that PCDFs "contributed significantly" to the adverse health effects analyzed in the Yusho and Yu Cheng studies. Moreover, Zahalsky was ***844** generally unable to specify supporting authorities for his opinions, and often simply assumed that the existence of symptoms in plaintiffs evidenced exposure to PCBs. Zahalsky himself characterized his opinion as a "hypothesis" or "statement of expectation."

Defendants also submitted an affidavit signed by twelve physicians and scientists who had reviewed all existing medical and scientific knowledge regarding PCBs. The affidavit criticized Zahalsky's results, noting that "one may not conclude to a reasonable degree of medical and

scientific certainty that PCBs can cause immune system disorders." Several of the individual defense experts then criticized Zahalsky's work directly. One expert stated that because Zahalsky is neither an immunologist nor a medical doctor, he is not qualified to diagnose human illness. Another expert decried as false the claim that the scientific literature supported Zahalsky's position, and asserted that Zahalsky's attempted extrapolations from the existing literature were "scientifically improper." Zahalsky's methodology was described as "scientifically inadmissible" because of its failure to obtain basic data, its lack of control groups, and its inadequate histories. And one expert opined that "[n]o doctor would rely on the tests described in the Zahalsky affidavit for any purpose whatsoever."

Defendants likewise criticized the opinions of Dr. Shubin, who offered causation testimony in the *Cunningham* and *Reid* cases. Defendants objected to Shubin's conclusions that plaintiffs' injuries were caused by PCBs because: (1) his diagnosis conflicted with diagnoses of other physicians who had previously examined plaintiffs, and (2) his diagnosis was based on a method that improperly assumed the injuries to be caused by PCBs. As with Dr. Barsotti, defendants also registered more particular complaints regarding the individual diagnoses. When Shubin cited PCBs as the cause of Matthew Cunningham's hypertension, defendants argued that he had failed to consider other factors, including Cunningham's family history of hypertension, his obesity, and his high blood sugars. In addition, Shubin was unable to point to any studies showing a direct causal relationship between PCB exposure and hypertension. Shubin attributed Cunningham's Parkinson's Disease and eventual death to PCB exposure, even though previous doctors had determined the Parkinson's Disease to have been caused by the use of psychotropic drugs, and even though Shubin did not know the circumstances of Cunningham's death.

Defendants cited similar flaws in Shubin's diagnoses of Bessie Cunningham and William Reid. Shubin concluded that Ms. Cunningham's four spontaneous abortions were related to PCB exposure, although he knew neither the circumstances surrounding the abortions, nor even when in the past forty years they had occurred. Shubin opined that a host of illnesses allegedly suffered by William Reid were the result of PCB exposure, although he found no PCBs in Mr. Reid's blood, and did not rule out other possible causes, such as smoking. Defendants also objected to Shubin's reliance on animal studies and the Yusho and Yu Cheng incidents.

Some of the same experts who criticized Dr. Barsotti's work also criticized Dr. Shubin's. They characterized his opinions as "conjectural guesses," which "fail adequately to consider multiple etiologic factors, as well as obvious differential diagnoses," and "would not withstand review by a qualified panel of his peers." One expert stated that because Shubin's opinions "have no basis in factual observation or in a plausible hypothesis, [they are] devoid of scientific justification."

Similarly suspect, according to defendants, are the opinions of Dr. DiGregorio, whom defendants criticize for offering a "certain" opinion that plaintiffs suffered from anxiety and fear of future harm as a result of PCB exposure, even though he never conducted a mental status examination, took a psychiatric history, or reviewed any medical records. Indeed, DiGregorio acknowledged that his diagnoses were only preliminary, and that further testing would have to be conducted. In his own words, DiGregorio saw each plaintiff only "for a brief period of time," "never reviewed any ***845** medical records of anyone," and was unable "to establish any physical findings yet." He nevertheless offered the opinion, with respect to five of the plaintiffs, that "until otherwise proven," whatever ailments they had were caused by PCBs. Defendants argue strenuously that these opinions are improper, not only because they are based on insufficient information, but also because, in every case, the doctor failed to rule out other possible causes for the injuries. They view the failure to conduct a conclusive differential diagnosis as a fatal flaw in DiGregorio's opinion.

Defendants also objected to the opinions set forth in each of the four supplemental affidavits offered by plaintiffs in response to the joint motion for summary judgment. Defendants criticized Dr. Nisbet as being unqualified to offer an opinion that was, in any event, unsupported. Nisbet's attempt to use a conversion factor to determine PCB blood level from adipose tissue levels was, defendants argue, indefensible because it was based on no published or peer-reviewed studies, and is in fact contradicted by both the Public Health Service's *Toxicological Profile*, and plaintiffs' own expert, Dr. DiGregorio. Defendants characterize Nisbet's method as "assumptions plus arithmetic," and assert that his conversion factor is proven wrong by physical evidence that plaintiffs whose blood levels and adipose tissue levels were measured did not reflect the blood levels that would have been expected using Nisbet's ratio to extrapolate from tissue burden. *See* Appellees' Br. at 88–89 n. 88. Defendants also apply these criticisms to the opinions of Dr. Simon, whose testimony overlapped with that of Dr. Nisbet.

Defendants roundly criticize Dr. Calesnick's opinion on medical monitoring as an "eleventh-hour" affidavit that was no more than a "one-sentence conclusion asserting simply, with no reasons whatsoever, that 'these Plaintiffs have been exposed to PCBs,' and that there was 'a potential for them to sustain injuries from PCB exposure.' " *Id.* at 93 n. 93, 39. Defendants object to the admission of this testimony as (1) conclusory and unsupported; (2) improper opinion testimony because Calesnick was not formally offered as an expert; and (3) irrelevant because Pennsylvania law does not recognize a cause of action for the cost of medical monitoring. *Id.* at 94.

Finally, defendants challenge the affidavit of Dr. Nicholson, who claimed that the results of his "meta-analysis" established a causal connection between PCB exposure and various of the plaintiffs' injuries. Defendants submit that Nicholson's submission is irrelevant because none of the plaintiffs alleges injuries for which Nicholson proffered a causal connection. More importantly, defendants argue that Nicholson's entire concept of meta-analysis, for which the only cited support is a non-peer-reviewed pamphlet written by Nicholson himself, is scientifically flawed. Nicholson's study found a causal connection between PCB exposure and human illness even though none of the studies he reviewed in compiling the meta-analysis revealed such a connection.[13] Defendants offered a counteraffidavit stating that by omitting from his review data that was inconsistent with his conclusions, Nicholson had produced a scientifically invalid study.

IV. THE DISTRICT COURT'S OPINION

The district court's opinion is devoted primarily to a discussion of the opinions of plaintiffs' experts. The court seems to have envisioned plaintiffs' experts as relying on three primary sources for their testimony: (1) animal studies purporting to show the deleterious health effects of PCBs; (2) studies employing data from the Yusho and Yu Cheng studies; and (3) their own opinions and research. With one or two exceptions explained below, the court analyzed this evidence pursuant to Fed.R.Evid. 703, which provides that facts or data not otherwise admissible in evidence may nevertheless serve as the basis for an expert ***846** opinion if the information is "of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject." The court appears to have excluded the bulk of the expert opinion under Rule 703.

With regard to the animal studies, the court's analysis was bifurcated, discussing first whether it could look beyond an expert's assertion that his opinion is reasonably relied upon by experts in the field, and second whether animal studies are a proper basis for an opinion about causation. The court answered the first question readily, concluding that an expert's opinion on the reasonableness of his or her own data could not be dispositive or Rule 703's limitation would be meaningless. In reaching this conclusion, the court distinguished this court's opinion in *In re Japanese Electronic Products Antitrust Litigation*, 723 F.2d 238 (3d Cir.1983), *rev'd on other grounds sub nom.*, *Matsushita Elec. Ind. Co., Ltd. v. Zenith Radio Corp.*, 475 U.S. 574, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986), which held, *inter alia*, that a court may not ignore an expert's uncontradicted testimony that his opinions are "of a type reasonably relied upon by experts in the field." *Id.* at 276. The court reasoned that, unlike *Japanese Electronics*, in the present case "we have very convincing evidence on the record that says that these studies are irrelevant." Apparently relying on that evidence, the court proceeded to exclude the animal studies. However, the court neither detailed the "very convincing evidence" indicating that the studies are "irrelevant," nor explained why the relevancy of the studies pertains to their reliability under Rule 703. The opinion is similarly silent as to precisely which expert opinions it meant to exclude in this manner.

The court's consideration of the Yusho and Yu Cheng studies as possible bases for expert opinions as to causation is similarly abbreviated. The court's holding is found in the following two sentences:

> It does seem clear that the consensus conclusion from the scientific literature is that the diseases that occurred in the victims of these incidents were caused by the ingestion of highly toxic PCDFs with their food and is not evidence of the effects of PCBs. Therefore, for the same reasons as addressed above regarding animal studies, I will exclude from evidence any expert opinion based on studies of the Yusho or Yu Cheng incidents.

Again, the court did not state which of the expert opinions were tainted by reliance on these studies or which opinions offered in rebuttal suggested a "consensus conclusion" indicating unreliability.

After excluding these two significant sources of evidence,

the court turned to its third category, plaintiffs' experts' own research results not based on animal studies or the Yusho and Yu Cheng incidents. Before analyzing in a particularized manner the opinions of the individual experts, it noted that:

> Even if I found that plaintiffs' experts['] testimony reached the level of being probative, I would rule to exclude it on the basis of Rule 703 and 403 as "unhelpful" and more prejudicial than probative.

Nonetheless, the opinion considered each of the individual expert opinions, beginning with that of Dr. Barsotti.

The court noted that Dr. Barsotti:

> finds PCB caused hypertension and asthma even in people who have family histories of hypertension and asthma. She finds that PCBs caused the plaintiffs' emotional distress, despite the fact that her area of expertise has nothing to do with emotional diseases and she has only talked to one of the plaintiffs. She claims that, by studying the plaintiffs' medical histories, she has excluded other causes of these diseases, but she is not a medical doctor and is not trained in differential diagnosis.

Although certain factual findings may be implicit in the court's discussion (for example, that some plaintiffs have family histories of hypertension and asthma, and that Barsotti talked with only one plaintiff), the court never explained the basis for its decision ***847** to exclude Barsotti's opinion.[14]

The court's analysis of other experts, including doctors Zahalsky, DiGregorio, Shubin and Allen, was comparable in that it elucidated the potential flaws in the doctors' testimony but failed to make definitive admissibility findings. However, the court gave more detailed consideration to the affidavits filed by plaintiffs in response to the summary judgment motion, including the opinions of Dr. Nisbet and Dr. Simon. The court provided a summary of both doctors' attacks on the ATSDR study, and criticized their opinions as follows:

> Dr. Simon does not give a basis for his statement that the background PCB blood burden can be calculated from the [National Human Adipose Tissue Survey]. Drs. Simon and Nisbet evidently believe that their blood to adipose tissue formula is over the number of studies that defendants cite that indicate a PCB blood background amount directly by measuring it. However, the only reason they give for not believing them is that the NHATS is more recent. However, the NHATS ended in 1983 and some of the defendants' studies are more recent than that. Neither doctor cites any study that measures PCBs in the blood directly or cites a basis for calculating blood burden from adipose tissue burden. Further, there are some plaintiffs in our case who have had both blood tests and adipose tissue tests and they do not reflect the 20 to 250 times relationship that these experts claim.

Nonetheless, the court did not declare these observations to be grounds for excluding the opinions, and did not even state whether it excluded these opinions.[15]

The court next addressed the affidavit of Dr. Nicholson, whose "meta-analysis" it analyzed under the "novel scientific evidence" standards of *United States v. Downing*, 753 F.2d 1224 (3d Cir.1985). *Downing* requires that admissible scientific techniques be reliable, be of a sort that will not mislead juries, and have a sufficient connection to the particular factual issues in the case.[16] In the court's view, all three *Downing* factors weighed against admission of the affidavit. The court reasoned that:

> [t]he reports of defendants' experts advance convincing reasons why meta-analysis as a technique, and this meta-analysis in particular, is not reliable. Dr. Nicholson's report has not been peer-reviewed or accepted by anybody in particular, even the Ontario Ministry of Labor [for whom the report was compiled]. There is a possibility that Dr. Nicholson's testimony would confuse the jury because of its scientific nature and his credentials so they would make more of it than it actually deserved.

> The third factor is the most influential in this determination. The conclusion of Dr. Nicholson's report is that there was "substantial evidence for a causal association between excess risk of death from cancer of the liver, biliary tract and gall bladder and exposure to PCBs." Dr. Nicholson's report could not be the basis for anyone to say with reasonable degree of scientific certainty that some particular person's disease, not cancer of the liver, biliary tract or gall bladder, was caused by PCBs.

It would thus appear that the district court intended to exclude Nicholson's affidavit as ***848** based upon an inadmissible scientific technique.[17]

The last expert the court considered is Dr. Calesnick, who testified that the plaintiffs he examined have the potential to suffer harm from PCB exposure, and should therefore be monitored regularly to protect their health. The court characterized Calesnick's testimony as being "strikingly similar to the opinion offered in *Martin v. Johns–Manville Corp.* and ruled inadmissible by the Pennsylvania Supreme Court."[18] It then noted that because *Martin* "was an asbestos case, and it has been epidemiologically proved that asbestos exposure can cause cancer, that doctor might have had more of a basis for his opinion." However, the court did not explicitly state that it was excluding Calesnick's testimony, much less why it might be excluding it. Indeed, later in the opinion, the court barred the entire medical monitoring claim, stating that "the testimony of Dr. Calesnick and the other plaintiffs' experts who testif[ied] regarding the risk of future injury is insufficient to support it under Pennsylvania law." This comment suggests that Calesnick's opinion was admitted, but did not raise a genuine issue of fact deemed "material," Fed.R.Civ.P. 56(c), under Pennsylvania law.

Thus, the court appears to have excluded almost all of plaintiffs' expert testimony. The Yu Cheng, Yusho and animal studies appear to have been excluded as not reasonably relied on by experts in the field under Rule 703, and the opinions of various experts appear to have been excluded either on the same grounds or because the district court found them to be unqualified under Rule 702. Dr. Nicholson's testimony was excluded as based upon an unreliable scientific technique under Rule 702.

Having concluded its discussion of the evidentiary issues, the court turned its attention to the summary judgment motion itself, positing that in order to survive a motion for summary judgment, plaintiffs must establish a genuine issue of fact with respect to their prima facie case, which the court defined as including the following four elements:

> 1) that defendants released PCBs into the environment; 2) that plaintiffs somehow ingested these PCBs into their bodies; 3) that plaintiffs have an injury; 4) that PCBs are the cause of that injury.

The first element was uncontested. Observing that the second question depends on whether the plaintiffs have been exposed to PCBs to a greater degree than has the general population, the court analyzed the issue as follows:

> Either plaintiffs are right and they have more PCBs in their bodies than the rest of us, or defendants are right and they do not. If they do have an unusually high amount of PCBs, circumstantial evidence indicates where they came from.
>
> However, the only legally admissible evidence in this case is that they do not. The plaintiffs have certainly failed to carry their burden to prove that they do. For the reasons discussed above, plaintiffs evidence to the contrary is inadmissible. Since the plaintiffs cannot demonstrate that they have been more heavily exposed to PCBs than the general population, they cannot recover.

With respect to the third issue, whether plaintiffs have an injury, the court concluded that "plaintiffs must point to some health problem that they have or they are out of court under Pennsylvania law. If the best they can do is possibility of future harm, emotional distress, or the mere fact ***849** that they have PCBs in their body, then those plaintiffs cannot recover."

Finally, the opinion divided the fourth issue, causation, into three separate considerations. First, the court stated, without particularization, that plaintiffs' expert opinions on causation were inadmissible because they lacked a sufficient scientific foundation. It is unclear whether the court meant to exclude all of the plaintiffs' experts on this basis. Second, the court noted that many of these experts "seem to have very little formal academic training in the areas in which they testify," thereby raising the question whether these experts "really are experts." However, the court concluded that because defendants failed to attack the experts systematically and neglected to brief the question, the issue would not be considered.[19] Third, the court pointed out that plaintiffs' experts, for the most part, did not provide testimony eliminating other possible causes of the various afflictions, i.e. differential diagnoses. None of the plaintiffs' medical doctors rendered differential diagnoses, and plaintiffs' experts who did were Ph.D.'s, who, the court declared, are not trained or qualified to conduct differential diagnoses.

Again, it is unclear whether the court was excluding this evidence, and if so, for lack of qualification or on some other ground.

After dealing briefly with a number of miscellaneous issues (discussed below in Parts VIII and IX), the court concluded the opinion with a series of short paragraphs specifying the injury claims of each individual plaintiff, but granting summary judgment to defendants on all claims. In sum, the district court opinion appears to have excluded almost all of the plaintiffs' evidence and determined whether plaintiffs, with almost none of their evidence left in the record, met their burden on the contested issues of exposure to PCBs, injury, and causation. Not surprisingly, given the consequent lack of evidence, the court found that the plaintiffs have not met their burden on any of these issues. It therefore granted summary judgment for defendants.

V. MEDICAL MONITORING

[2] Because it bears on the question of what evidence is admissible, we turn first to the viability of certain plaintiffs' "medical surveillance," or "medical monitoring," claims, by which plaintiffs sought to recover the costs of periodic medical examinations that they contend are medically necessary to protect against the exacerbation of latent diseases brought about by exposure to PCBs. Neither the Pennsylvania Supreme Court nor the Pennsylvania Superior Court has decided whether a demonstrated need for medical monitoring creates a valid cause of action.[20] Therefore, sitting in diversity, we must predict whether the Pennsylvania Supreme Court would recognize a claim for medical monitoring under the substantive law of Pennsylvania and, if so, what its elements are. *See Erie R.R. Co. v. Tompkins*, 304 U.S. 64, 58 S.Ct. 817, 82 L.Ed. 1188 (1938).

Medical monitoring is one of a growing number of non-traditional torts that have developed in the common law to compensate plaintiffs who have been exposed to various toxic substances.[21] Often, the diseases ***850** or injuries caused by this exposure are latent. This latency leads to problems when the claims are analyzed under traditional common law tort doctrine because, traditionally, injury needed to be manifest before it could be compensable. Thus, plaintiffs have encountered barriers to recovery which "arise from the failure of toxic torts to conform with the common law conception of an injury." Note, *Medical Surveillance Damages*, *supra* note 21, at 852.

Nonetheless, in an effort to accommodate a society with an increasing awareness of the danger and potential injury caused by the widespread use of toxic substances,[22] courts have begun to recognize claims like medical monitoring, which can allow plaintiffs some relief even absent present manifestations of physical injury. More specifically, in the toxic tort context, courts have allowed plaintiffs to recover for emotional distress suffered because of the fear of contracting a toxic exposure disease, *see, e.g.*, *Sterling v. Velsicol Chemical Corp.*, 855 F.2d 1188, 1206 (6th Cir.1988) (applying Tennessee law), the increased risk of future harm, *see generally* Note, *Decreasing the Risks Inherent in Claims for Increased Risk of Future Disease*, 43 U.Miami L.Rev. 1081 (1989), and the reasonable costs of medical monitoring or surveillance, *see, e.g.*, *Ayers v. Township of Jackson*, 106 N.J. 557, 525 A.2d 287 (1987); *Burns v. Jaquays Mining Corp.*, 156 Ariz. 375, 752 P.2d 28 (Ct.App.1988); *Merry v. Westinghouse Electric Corp.*, 684 F.Supp. 847 (M.D.Pa.1988); *Villari v. Terminix International, Inc.*, 663 F.Supp. 727 (E.D.Pa.1987).[23]

It is easy to confuse the distinctions between these various non-traditional torts. However, the torts just mentioned involve fundamentally different kinds of injury and compensation. Thus, an action for medical monitoring seeks to recover only the quantifiable costs of periodic medical examinations necessary to detect the onset of physical harm, whereas an enhanced risk claim seeks compensation for the anticipated harm itself, proportionately reduced to reflect the chance that it will not occur. We think that this distinction is particularly important because the Pennsylvania Supreme Court has expressed some reluctance to recognize claims for enhanced risk of harm. In *Martin v. Johns–Manville Corp.*, 508 Pa. 154, 494 A.2d 1088 (1985), the Court made clear that a plaintiff in an enhanced risk suit must prove that future consequences of an injury are reasonably probable, not just possible. *Id.* at 165 n. 5, 494 A.2d at 1094 n. 5.

Martin does not lead us to believe that Pennsylvania would not recognize a claim for medical monitoring, however. First, the injury that the Court was worried about finding with reasonable probability in *Martin* is different from the injury involved here. The injury in an enhanced risk claim is the anticipated harm itself. The injury in a medical monitoring claim is the cost of the medical care that will, one hopes, detect that injury.[24] The former is inherently speculative because courts are forced to anticipate the probability of future injury. ***851** The latter is much less speculative because the issue for the jury is the less conjectural question of whether the plaintiff needs medical surveillance. Second, the Pennsylvania Supreme Court's concerns about the degree

of certainty required can easily be accommodated by requiring that a jury be able reasonably to determine that medical monitoring is probably, not just possibly, necessary.

Defining injury in this way is not novel. In *Friends for All Children, Inc. v. Lockheed Aircraft Corp.*, 746 F.2d 816 (D.C.Cir.1984), the court, in recognizing a claim for medical monitoring damages for children exposed to the depressurization of an airplane cabin, noted that "[i]t is difficult to dispute that an individual has an interest in avoiding expensive diagnostic examinations just as he or she has an interest in avoiding physical injury." *Id.* at 826. *See also Laxton v. Orkin Exterminating Co.*, 639 S.W.2d 431 (Tenn.1982) (ingestion of contaminated water requiring testing held to be injury in itself, even though ingestion found to be harmless).

Similarly, in *Askey v. Occidental Chemical Corp.*, 102 A.D.2d 130, 477 N.Y.S.2d 242 (1984), the court analyzed the issue as follows:

> Damages for the prospective consequences of a tortious injury are recoverable only if the prospective consequences may with reasonable probability be expected to flow from the past harm. Consequences which are contingent, speculative, or merely possible are not properly considered in ascertaining damages. If a plaintiff seeks future medical expenses as an element of consequential damage, he must establish with a degree of reasonable medical certainty through expert testimony that such expenses will be incurred.
>
> In light of the foregoing, it would appear that under the proof offered here persons exposed to toxic chemicals emanating from the landfill have an increased risk of invisible genetic damage and a present cause of action for their injury, and may recover all "reasonably anticipated" consequential damages. The future expense of medical monitoring could be a recoverable consequential damage provided that plaintiffs can establish with a reasonable degree of medical certainty that such expenditures are "reasonably anticipated" to be incurred by reason of their exposure.

Id. at 136–37, 477 N.Y.S.2d at 247 (citations omitted). Thus, the appropriate inquiry is not whether it is reasonably probable that plaintiffs will suffer harm in the future, but rather whether medical monitoring is, to a reasonable degree of medical certainty, necessary in order to diagnose properly the warning signs of disease.[25]

Federal district courts, sitting in diversity, have addressed the medical monitoring ***852** issue under Pennsylvania law. In *Villari v. Terminix International, Inc.*, 663 F.Supp. 727 (E.D.Pa.1987), the court allowed plaintiffs, who had presented sufficient medical evidence of present physical injuries resulting from exposure to an allegedly carcinogenic pesticide, to recover the costs of future medical surveillance. *Id.* at 735. The court required a showing of present physical injury and expressly refused to follow *Ayers*, which it characterized as holding that "the cost of future medical monitoring is a proper element of damages whenever medical testimony establishes the need for future monitoring." *Id.* at 735 n. 5. However, because the plaintiffs in *Villari* had demonstrated sufficient physical injury, the question whether the cause of action could be sustained without it was not squarely raised.

Villari 's putative physical injury requirement was rejected in *Merry v. Westinghouse Electric Corp.*, 684 F.Supp. 847 (M.D.Pa.1988). In *Merry*, property owners whose wells had been contaminated by toxic substances sought recovery for, *inter alia*, the cost of medical surveillance. In denying defendant's motion for summary judgment, the court agreed with *Villari* that "a plaintiff need not exhibit symptoms of a disease before medical surveillance is sought," *id.* at 849, but disagreed to the extent that *Villari* required "*physical* injury before a claim for future medical monitoring can be maintained." *Id.* (emphasis in original). Consequently, *Merry* suggested that a medical monitoring action could be premised upon proof of exposure to hazardous substances resulting in the potential for injury and the need for early detection and treatment. *Id.* at 850.

We agree with *Merry*, and predict that the Supreme Court of Pennsylvania would follow the weight of authority and recognize a cause of action for medical monitoring established by proving that:

> 1. Plaintiff was significantly exposed to a proven hazardous substance through the negligent actions of the defendant.
>
> 2. As a proximate result of exposure, plaintiff suffers a significantly increased risk of contracting a serious latent disease.
>
> 3. That increased risk makes periodic diagnostic medical examinations reasonably necessary.
>
> 4. Monitoring and testing procedures exist which make the early detection and treatment of the disease possible and beneficial.

These factors would, of course, be proven by competent expert testimony, *see Ayers*, 106 N.J. at 606, 525 A.2d at 312.

The policy reasons for recognizing this tort are obvious. Medical monitoring claims acknowledge that, in a toxic age, significant harm can be done to an individual by a tortfeasor, notwithstanding latent manifestation of that harm. Moreover, as we have explained, recognizing this tort does not require courts to speculate about the probability of future injury. It merely requires courts to ascertain the probability that the far less costly remedy of medical supervision is appropriate. Allowing plaintiffs to recover the cost of this care deters irresponsible discharge of toxic chemicals by defendants and encourages plaintiffs to detect and treat their injuries as soon as possible. These are conventional goals of the tort system as it has long existed in Pennsylvania.[25a]

Having established the applicable standard, we discuss below, in Part VII, whether summary judgment was properly granted for the defendants on the medical monitoring claim.

VI. EVIDENTIARY ISSUES

A. *Introduction*

To the extent that the district court actually excluded the bulk of plaintiffs' expert opinion evidence, our threshold question is whether it did so properly. As we have explained *supra*, at times, the text of the district court opinion, which attacks many ***853** of plaintiffs' expert opinions without formally excluding them, suggests that the court was merely describing, not excluding, the testimony. However, at other times, the court appears to have excluded most if not all of the testimony. In view of the court's "bottom line," we will assume that the court excluded the challenged evidence. If these exclusions were proper, summary judgment would doubtless be appropriate because exclusion of the opinions would effectively eviscerate plaintiffs' case. However, whether that evidence was properly excluded at this stage of the proceedings is quite another question. We address first the adequacy of the district court's Fed.R.Evid. 703 analysis. We then turn to the district court's Rule 702 determinations, and then to its rather abbreviated reliance on Rule 403.

B. *Evidence Excluded under Rule 703*

1. Factual Inquiry

[3] Although it stops short of giving the basis for a number of its rulings, the district court appears to have found that much of plaintiffs' expert opinion evidence, including the animal studies and the Yusho and Yu Cheng incidents, was unreliable and excludable under Rule 703.[26] However, its analysis did not track the Rule 703 protocols established by this court in *In re Japanese Electronic Products*, 723 F.2d 238 (3d Cir.1983), *rev'd on other grounds sub nom., Matsushita Electrical Industrial Co., Ltd. v. Zenith Radio Corp.*, 475 U.S. 574, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986).

In *Japanese Electronics*, the district court had excluded expert testimony under both Rules 702 and 703, and granted summary judgment in favor of defendants. Reversing those rulings, this court took the opportunity to provide the district courts with guidance in approaching such situations. Of specific relevance here is its holding that, in determining for purposes of Rule 703 whether the informational basis of an expert opinion is of a type reasonably relied upon by experts in the field, "[t]he proper inquiry is not what the court deems reliable, but what experts in the relevant discipline deem it to be." *Id.* at 276. Further, the court noted emphatically that "as a matter of law, the district court must make a factual inquiry and finding as to what data experts in the field find reliable. There is no discretion to forbear from making this inquiry and finding." *Id.* at 277. "[A] factual determination under Rule 104(a) . . . must be made when there is a factual dispute over such reliance." *Id.* at 276.

Japanese Electronics does not require that the "factual inquiry" take the form of an *in limine* or other hearing. It does make clear, however, that the district court must have a proper and reviewable foundation for making its admissibility findings. We can identify no such foundation here. With respect to the animal studies, the court seems to have excluded the expert testimony because it had "very convincing evidence on the record that says that these studies are irrelevant." However, the court did not make specific reference to the evidence in the voluminous record it has chosen to credit, did not reveal the theory on which it has rejected opinions to the contrary, and did not identify which opinions it means to exclude in this manner. Thus, we have no way of evaluating the district court's legal conclusion that the evidence was inadmissible under Rule 703, because we do not know what facts it relied on in making its legal determination. Moreover, it is not clear that the court was not merely choosing between opinions as opposed to excluding plaintiff's opinion on evidentiary grounds.[27]

***854** The court's treatment of the Yusho and Yu Cheng incidents as a basis for expert testimony was similarly

flawed. It stated that its decision to exclude opinions based on these incidents was compelled by a "finding" that "the consensus conclusion from the scientific literature is that the diseases that occurred in the victims of these incidents were caused by the ingestion of highly toxic PCDFs with their food and is not evidence of the effects of PCBs."[28] The court did not, however, specify what scientific literature or which consensus conclusion it was referring to, nor did it say which opinion it was excluding as inconsistent with the consensus conclusion. Moreover, the court did not even consider the record evidence that certain plaintiffs may have been exposed to PCDFs as well as PCBs.

For the foregoing reasons, the district court's evidentiary exclusions under Rule 703 cannot pass muster and must be set aside. Those rulings that do implicate facts or data which are the basis for expert opinion may be reconsidered in the remanded proceedings pursuant to the *Japanese Electronics* methodology.[29]

2. Process

[4] Closely related to the question whether the district court conducted an appropriate and adequate factual inquiry is the question whether the court provided the plaintiffs with sufficient process for defending their evidentiary submissions. The adversarial process upon which our legal system is based assumes that a fact finder will give the parties an adequate opportunity to be heard; if it does not, it cannot find facts reliably. Thus, the detailed factual record requirement, firmly entrenched in our jurisprudence, *Japanese Electronics*, 723 F.2d at 238; *Indian Coffee Corp. v. Procter & Gamble*, 752 F.2d 891, 895 (3d Cir.), *cert. denied*, 474 U.S. 863, 106 S.Ct. 180, 88 L.Ed.2d 150 (1985); *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911 F.2d 941 (3d Cir.1990), requires adequate process at the evidentiary stage, particularly when a summary judgment may flow from it. The district court did not afford that process here.

More precisely, notwithstanding the complexity of the matter, and the voluminous nature of the expert opinions, the district court did not give the plaintiffs sufficient opportunity to explore the issues upon which they were ultimately denied relief. First, the court failed to conduct an *in limine* hearing.[29a] Second, it denied oral argument on the evidentiary issues and on the related summary judgment motion. Compounding these restrictions was a case management order which arguably did not give plaintiffs an adequate opportunity to discover defendants' experts' positions.[30] Of particular significance is the plaintiffs' inability to contest the reasonableness of ***855** the data and techniques relied on by defendants' experts. Having no foreknowledge of the direction that the district court's opinion might take, the plaintiffs should have been given an opportunity to be heard on the critical issues before being effectively dispatched from court. An *in limine* hearing would have been quite manageable. At least some process should have been devised to afford plaintiffs a surrogate for that trial scenario where the equivalent evidentiary exclusion and adverse judgment might occur. On this ground alone, the summary judgment would have to be set aside.

C. *Evidence Excluded under Federal Rule of Evidence 702*

As noted, the district court apparently made the bulk of its exclusionary rulings under Rule 703. However, the court did, on several occasions, invoke Rule 702 either explicitly or implicitly. We deal now with those exclusions.

The court's Rule 702 exclusions can generally be divided into two categories: (1) rejection of the witness as unqualified to give expert testimony in the relevant field;[31] and (2) rejection of the expert because, however qualified, he or she was relying on an unreliable scientific technique. The district court here made both kinds of Rule 702 exclusions.

1. Expert Witness Qualifications

[5] The court appears to have excluded much of Dr. Barsotti's testimony on the grounds that she is neither a chemist qualified to present an opinion based on gas chromatography tracing nor a medical doctor qualified to present her opinion on what caused the plaintiffs' emotional and physical injuries. Similarly, the court appears to have excluded much of Dr. Zahalsky's testimony regarding the effect of PCBs on human beings because "he is not trained in differential diagnosis."[32] The court also noted that "Dr. Nisbet's curriculum vita [did not] qualify him to testify as an expert" in the area of whether the ATSDR study (which indicated that the level of PCBs in the plaintiff's body was typical of the American population) was accurate.

The district court's insistence on a certain kind of degree or background is inconsistent with our jurisprudence in this area. The language of Rule 702 and the accompanying advisory committee notes make clear that

various kinds of "knowledge, skill, experience, training, or education," Fed.R.Evid. 702, qualify an expert as such. Interpreting the rule liberally, we recently held that a safety specialist who had received a master's degree in safety education and a doctorate in human factors and product safety design, could testify on whether the failure of the forklift manufacturer to put seatbelts in the forklift caused the death of the operator of a forklift which overturned, notwithstanding the fact that the expert was not an engineer. *Habecker v. Copperloy Corp.*, 893 F.2d 49 (3d Cir.1990). *See also Knight v. Otis Elevator Co.*, 596 F.2d 84 (3d Cir.1979) (expert may testify that unguarded elevator buttons constitute a design defect despite that expert's lack of a specific background in the design and manufacture of elevators); *Hammond v. International Harvester Co.*, 691 F.2d 646 (3d Cir.1982) (engineer, whose only qualifications were sales experience in the field of automotive and agricultural equipment and teaching high school automobile repair, was nevertheless permitted to testify in products liability action involving tractors).

Dr. Barsotti, a toxicologist with a Ph.D. in Pathology, has conducted extensive research in the toxicology of PCBs, and currently serves as the Chief of the Research Analysis Branch of the Agency for Toxic Substance and Disease Registry of the United States. Dr. Zahalsky has a Ph.D. in Microbiology from New York University and teaches courses in immunology and ***856** human diseases. Dr. Nisbet has a Ph.D. in Physics from Cambridge University and has published numerous articles in the field of human exposure and the health risks attendant upon that exposure. In light of the liberal Rule 702 expert qualification standard, we hold that the district court abused its discretion[33] in excluding portions of Drs. Barsotti, Zahalsky and Nisbet's testimony simply because the experts did not have the degree or training which the district court apparently thought would be most appropriate.

2. Meta–Analysis

[6] As noted, the district court also used Rule 702 to exclude the testimony of Dr. Nicholson because the court found that Dr. Nicholson's "meta-analysis" was an inadmissible novel scientific technique. Meta-analysis involves combining the results of different epidemiological studies done by other scientists, and re-analyzing the combined data to see if the data, *in toto*, renders different results than the individual studies done with a smaller data sample. Dr. Nicholson's meta-analysis is particularly important in this case because it is one of the few pieces of direct evidence indicating that PCBs actually cause disease. If there is no evidence of causation in the record, then the plaintiffs cannot survive a motion for summary judgment.

Because the defendants challenge the technique of meta-analysis itself, in evaluating Dr. Nicholson's testimony the court properly invoked the standard announced by this court in *United States v. Downing*, 753 F.2d 1224 (3d Cir.1985), for analyzing expert testimony based on novel scientific techniques.[34] However, the court's analysis under the *Downing* standard was inadequate.[35]

We begin our *Downing* analysis with the frank recognition that the determination whether expert testimony depends on a reliable "scientific technique," to be analyzed under Rule 702, or whether the basis for testimony is "facts or data ... of a type reasonably relied upon by experts in the particular field," to be analyzed under Rule 703, *see supra*, is ofttimes subtle if not strained. It can be difficult to determine whether the putative problem with scientific evidence lies in the underlying data itself or the method by which the data is analyzed. Non-scientifically trained courts are at a disadvantage in trying to categorize sophisticated scientific data.

Though our recent decision in *DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911 F.2d 941 (3d Cir.1990), does not lay the problem to rest, and the courts must grapple with it on a case-by-case basis, *DeLuca* announces an important rule by making clear that when it is a scientist's methodology that is being attacked, in contrast to the data relied on, the court must analyze the reliability of that methodology under ***857** *Downing* (and Rule 702). As Judge Stapleton explained: "Rule 703 is satisfied once there is a showing that an expert's testimony is based on the type of data a reasonable expert in the field would use in rendering an opinion on the subject at issue; it does not address the reliability or general acceptance of an expert's methodology." *Id.* at 953.

For purposes of this case, we agree with the district court that Dr. Nicholson's "meta-analysis" should be analyzed as a scientific technique under *Downing*. Defendants do not assert that the data that Dr. Nicholson used is not "relied upon by experts in the particular field," Fed.R.Evid. 703. Indeed, the human epidemiological studies which Dr. Nicholson used in his meta-analysis are the same studies that defendants' experts use to show that PCBs do not cause human disease. Instead, defendants charge that meta-analysis is too unreliable to be accepted by a court. Thus, it is the reliability analysis that is critical

here.

As we explained in *Downing*, the "helpfulness" requirement in Rule 702 "implies a quantum of reliability beyond that required to meet a standard of bare logical relevance," *Downing*, 753 F.2d at 1235. *See also DeLuca*, 911 F.2d at 957 (quoting 3 *Weinstein's Evidence*, ¶ 702[03], at 702–35) ("helpfulness turns on whether the expert's 'technique or principle [is] sufficiently reliable so that it will aid the jury in reaching accurate results' "). However, the reliability requirement must not be used as a tool by which the court excludes all questionably reliable evidence. The Federal Rules of Evidence "embody a strong and undeniable preference for admitting any evidence having some potential for assisting the trier of fact and for dealing with the risk of error through the adversary process." *DeLuca*, 911 F.2d at 956 (citing *Barefoot v. Estelle*, 463 U.S. 880, 899 & 901 n. 7, 103 S.Ct. 3383, 3397 & 3398 n. 7, 77 L.Ed.2d 1090 (1983); *Downing*, 753 F.2d at 1241; and 3 *Weinstein's Evidence* ¶ 702[02]–[03]). Therefore, in making reliability determinations, courts must err on the side of admission rather than exclusion.

At some point, however, even with the balance weighted as it is towards admissibility, courts must determine at what level evidence becomes "reliable enough." We think that the fact that the Rules Committee did not draft rules which provide that evidence need be 95% or 85% or even 51% accurate is significant. Instead, Congress seems to have understood, as the cases and the commentators reflect, that "[t]he reliability inquiry ... [must be] flexible and may turn on a number of factors." *Downing*, 753 F.2d at 1238. Applying that logic to this case, it is clear that if there were evidence in this record that meta-analysis is inaccurate as a mode of analysis—that the concept of combining raw data from different independent studies and re-analyzing it in total does not render accurate results—then there might be grounds for excluding meta-analysis.

There is no such evidence, however. As plaintiffs point out, hundreds of meta-analyses are done each year, Appellant's Br. at 92. Indeed, notwithstanding the principle thrust of defendants' reliability argument before this court, defendants' own experts do not question the reliability of all meta-analyses; they question "the way in which Dr. Nicholson applied 'meta-analysis.' " There is some evidence that "half the time you shouldn't believe meta-analysis," Naylor, *Two Cheers for Meta–Analysis: Problems and Opportunities in Aggregating Results of Clinical Trials*, 138 Can.Med.Ass'n J. 891, 894 (1988), quoted in Appellee's Br. at 64 and n. 55, but that does not mean that meta-analyses are necessarily in error. It means that they are, at times, used in circumstances in which they should not be.

[7] The district court excluded Dr. Nicholson's report under the reliability prong of *Downing* because "Dr. Nicholson's report has not been peer-reviewed or accepted by anybody in particular, even the Ontario Ministry of Labor" (for whom it was done). In reaching this conclusion, the district court relied on an affidavit by one of the defense experts which stated that

> Dr. Nicholson's claim that his report has been peer-reviewed is inaccurate in the sense that the term 'peer review' is used by the scientific community. In fact, I am unaware that the report has ever ***858** been subjected to pre-publication review, and the report has never been published in the scientific literature.

This is an inadequate ground for excluding the testimony. First, "the Federal Rules of Evidence contain no requirement that an expert's testimony be based upon reasoning subjected to peer-review and published in the professional literature." *DeLuca*, 911 F.2d at 954. *See also Brock v. Merrell Dow Pharmaceuticals, Inc.*, 874 F.2d 307, 313, *modified per curiam* 884 F.2d 166 (5th Cir.1989), *cert. denied*, 494 U.S. 1046, 110 S.Ct. 1511, 108 L.Ed.2d 646 (1990). Second, Dr. Nicholson's own affidavit states that his report was reviewed by cooperating researchers and the Industrial Diseases Standards Panel. Moreover, Dr. Nisbet's affidavit demonstrates that he reviewed Dr. Nicholson's work and found it to be "a balanced assessment."

What we have, therefore, is a record that shows significant disagreement about whether this particular meta-analysis is reliable. But that too may implicate the *Downing* standard. If the allegation is that a reliable methodology was so altered as to skew the methodology itself, *Downing* would be the appropriate vehicle for evaluation. However, if the challenged procedure is more accurately described as an application of an accepted methodology, it is not the proper subject of a Rule 702–based exclusion, but is rather the subject of cross-examination of the expert and resolution by the jury. *See DeLuca*, 911 F.2d at 955 n. 15.

Assuming that Dr. Nicholson's meta-analysis is the proper subject of *Downing* scrutiny, the district court's decision is wanting, because it did not make explicit enough findings on the reliability of Dr. Nicholson's

meta-analysis to satisfy *Downing.* We decline to define the exact level at which a district court can exclude a technique as sufficiently unreliable. Reliability indicia vary so much from case to case that any attempt to define such a level would most likely be pointless. *Downing* itself lays down a flexible rule. What is not flexible under *Downing* is the requirement that there be a developed record and specific findings on reliability issues. Those are absent here. Thus, even if it may be possible to exclude Dr. Nicholson's testimony under *Downing,* as an unreliable, skewed meta-analysis, we cannot make such a determination on the record as it now stands. Not only was there no hearing, *in limine* or otherwise, at which the bases for the opinions of the contesting experts could be evaluated, but the experts were also not even deposed. All of the expert evidence was based on affidavits.

Assuming that the district court excluded what it thought to be an application of an accepted methodology, it did so on the basis of a credibility judgment—i.e., it believed defendants' experts that Dr. Nicholson's meta-analysis was not reliable, and disbelieved plaintiffs' experts who said that it was. This approach runs afoul of *DeLuca,* 911 F.2d at 955 n. 15, because credibility determinations are normally the province of the jury. If no reasonable person could believe Dr. Nicholson's brand of meta-analysis, it would presumably be excludable, but we doubt that to be the case here. Under all of these circumstances, we cannot uphold, on this record, the exclusion of Dr. Nicholson's testimony.

We turn to the court's exclusion of the testimony under the third *Downing* factor (the connection or "fit" between the research and the factual issues in the case). Dr. Nicholson's research suggests an increased risk of cancer of the liver, biliary tract and gall bladder. Because none of the plaintiffs have any of those ailments yet, the district court found Dr. Nicholson's research immaterial. We reject this reasoning, because Dr. Nicholson's affidavit suggests that proof of an increased risk of liver cancer is probative of an increased risk of other forms of cancer. Furthermore, as we explain *infra,* the district court's rejection of the medical monitoring claim must be reversed, and therefore the increased risk of the cancers that Dr. Nicholson documents is material to the factual dispute in this case. If plaintiffs can prove that they are at an increased risk for these cancers, because of exposure to defendants' products, then they may be able to prove that they are entitled to have defendants bear the increased medical monitoring ***859** costs incurred by those who are at an increased risk of cancer. Thus, the third *Downing* factor (the "fit") is also met, further supporting our conclusion that the district court's exclusion of Dr. Nicholson's expert opinion, on the present record, must be set aside.

3. Scientific Techniques of Other Experts

Defendants criticize the scientific data and/or method of most of plaintiffs' other experts, including Drs. Allen, Barsotti, Zahalasky, Shubin, and DiGregorio. *See supra* at 840–841. These attacks are forceful, and we cannot say, at this point, that they are without merit. However, neither can we at this point accept those contentions, because to the extent that the attacks are grounded on Rule 703, there has not been adequate process under *Japanese Electronics,* and to the extent that they are grounded on Rule 702, there has not been adequate record development and factfinding under *Downing.* That effort was not expended here. We cannot affirm what we cannot review; hence, to the extent that the summary judgment was based upon putative but unspoken exclusionary rulings, we must reverse and remand.

D. *Exclusion under Rule 403*

[8] As noted *supra* Section VA2, it is not clear that the court actually excluded any opinions under Rule 403. The court at one point suggests that it is excluding all of the plaintiffs' expert opinions under Rules 703 and 403, but it is not clear how or why. What is apparent is that the district court did not conduct the careful balancing required by Rule 403 and the jurisprudence of this court. *See, e.g., United States v. Downing,* 753 F.2d 1224, 1243 (3d Cir.1985) (declining to decide the Rule 403 question where the district court neither mentioned Rule 403 on the record nor "conducted the balancing required by that rule"); *United States v. Long,* 574 F.2d 761, 770 (3d Cir.) (Adams, J., concurring), *cert. denied,* 439 U.S. 985, 99 S.Ct. 577, 58 L.Ed.2d 657 (1978).

In *Downing,* although declining to prescribe any mandatory procedures for trial courts to follow in making preliminary admissibility determinations, we recognized that "the most efficient procedure that the district court can use . . . is an *in limine* hearing." *Downing,* 753 F.2d at 1241. We again decline to set forth mandatory rules for the trial court. However, we suggest that in complex litigation such as this, where there are numerous experts presenting voluminous testimony on the cutting edge of scientific research, an *in limine* hearing may be a very useful tool in conducting both the inquiry and the factfinding and balancing, which are the hallmarks of Rules 703 and 403 respectively.

Moreover, we stress that *pretrial* Rule 403 exclusions should rarely be granted. As we recently noted in *DeLuca*, "if . . . testimony survives the rigors of Rule 702 and 703 . . . , Rule 403 is an unlikely basis for exclusion." 911 F.2d at 957. Excluding evidence as being more prejudicial than probative at the pretrial stage is an extreme measure that is rarely necessary, because no harm is done by admitting it at that stage. If a court believes evidence is irrelevant, it need only say so and discount it accordingly when it makes its summary judgment determination. However, a court cannot fairly ascertain the potential relevance of evidence for Rule 403 purposes until it has a full record relevant to the putatively objectionable evidence. We believe that Rule 403[36] is a trial-oriented rule. Precipitous Rule 403 determinations, before the challenging party has had an opportunity to develop the record, are therefore unfair and improper.

In sum, we hold that in order to exclude evidence under Rule 403 at the pretrial stage, a court must have a record complete enough on the point at issue to be considered a virtual surrogate for a trial ***860** record. The record in this case clearly does not meet that standard, and hence the district court's exclusion of evidence under Rule 403 must be reversed.

VII. WAS SUMMARY JUDGMENT PROPERLY GRANTED?

[9] Because the district court excluded the bulk of plaintiffs' proffered evidence on causation, it had no difficulty concluding that plaintiffs had failed to produce sufficient evidence to survive summary judgment under the standards announced in the Supreme Court's noted trilogy, *Celotex Corp. v. Catrett*, 477 U.S. 317, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986); *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986); and *Matsushita Electric Industrial Co. v. Zenith Radio Corp.*, 475 U.S. 574, 106 S.Ct. 1348, 89 L.Ed.2d 538 (1986). As we have explained, the district court erred in its exclusion of this evidence. However, defendants argue that even if we were to admit all of the evidence excluded by the district court, summary judgment would nonetheless be appropriate because plaintiffs are unable to create a genuine issue of material fact as to the required elements of the *prima facie* case on causation. Consequently, we must presume the admissibility of all of plaintiffs' proffered evidence, and determine sufficiency under the prevailing standards for summary judgment.

Under *Celotex*, a court must enter summary judgment when the nonmoving party "after adequate time for discovery ... fails to make a showing sufficient to establish the existence of an element essential to that party's case, and on which that party will bear the burden of proof at trial."[37] 477 U.S. at 322, 106 S.Ct. at 2552. A party cannot survive summary judgment simply by presenting conclusory allegations or denials; the existence of specific material evidentiary facts must be shown. *Liberty Lobby*, 477 U.S. at 256, 106 S.Ct. at 2514. Moreover, the *Liberty Lobby* Court points out that

> there is no issue for trial unless there is sufficient evidence favoring the nonmoving party for a jury to return a verdict for that party. If the evidence is merely colorable or is not significantly probative summary judgment may be granted.
>
> *Id.* at 249–50, 106 S.Ct. at 2510–11 (citations omitted).

Consequently, the court must ask whether, on the summary judgment record, reasonable jurors could find facts that demonstrated, by a preponderance of the evidence, that the nonmoving party is entitled to a verdict.

As noted above, the district court defined the *prima facie* case as consisting of four elements:

> 1) that defendants released PCBs into the environment; 2) that plaintiffs somehow ingested these PCBs into their bodies; 3) that plaintiffs have an injury; 4) that PCBs are the cause of that injury.[38]

The first element (release of PCBs) was not disputed, but the district court found against the plaintiffs on the other three elements. We, however, believe that the evidence described in Part IIA, if admissible, creates a genuine issue of material fact on all three contested elements.

With regard to exposure, prong two of the district court's *prima facie* case, defendants assert that plaintiffs have not adduced sufficient evidence indicating that they have been exposed to PCBs to a greater extent than anyone else. More specifically, defendants maintain that plaintiffs' ***861** exposure does not exceed the normal "background" level of PCB exposure in the United States. However, whether plaintiffs have proffered sufficient evidence to show that their exposure level exceeds the normal background level depends on what that normal background level is. There is conflicting evidence on this point. Defendants' evidence suggests that PCB levels in the general United States population range up to 40 parts per billion (ppb) as measured in the bloodstream, while plaintiffs' evidence suggests that the level is "well below 3 ppb," and that a 5 ppb level falls within the 90th percentile in the United States. *See supra* notes 9 and 10. This conflict creates a genuine issue of material fact

sufficient to withstand summary judgment on the exposure question, because if a jury could reasonably believe plaintiffs' background level statistics, then there is ample evidence from which to conclude that the plaintiffs, who lived adjacent to the railyard, had a higher PCB level than usual due to their exposure to defendants' PCBs.

There are also genuine issues of material fact with regard to the third element of the *prima facie* case, i.e., injury. Although most of the plaintiffs presented evidence of physical injury, defendants point out that several plaintiffs failed to allege or submit any evidence demonstrating physical injury. This appears to be an accurate observation, but regardless of whether all plaintiffs alleged demonstrable physical injury, they all clearly alleged monetary injury. The medical monitoring claim is a claim for monetary damages. Plaintiffs are asking for money because, allegedly, their exposure to PCBs requires them to bear the costs associated with increased medical surveillance. This is an economic injury, which, according to the plaintiffs, is attributable to the defendants.

The court dismissed the medical monitoring claim as follows:

> Dr. Calesnick provides a two page affidavit which states that he has experience in treating persons exposed to PCB's, that he has performed physical examinations on some of the plaintiffs and concludes: "To a reasonable degree of medical certainty, these plaintiffs have been exposed to PCBs, there is a potential for them to sustain injuries from PCB exposure, if they have not already sustained these injuries, and there is a need for early detection and treatment of these PCB induced injuries for plaintiffs." This seems to be strikingly similar to the opinion offered in *Martin v. Johns Manville Corp.* [, 508 Pa. 154, 494 A.2d 1088 (1985),] and ruled inadmissible by the Pennsylvania Supreme Court. Because that was an asbestos case, and it has been epidemiologically proven that asbestos exposure can cause cancer, that doctor might have had more of a basis for his opinion.

* * * * * *

> [Dr. Calesnick] is unwilling to say that any particular disease the plaintiffs have is caused by PCBs, just that they should be regularly checked because of the possibility of future harm. The plaintiffs call this a "medical monitoring claim." However, the claim is barred because the testimony of Dr. Calesnick and the other plaintiffs' experts who testify regarding the risk of future injury is insufficient to support it under Pennsylvania law.

This language strongly suggests that the court, rather than measuring sufficiency of plaintiffs' evidence regarding a medical monitoring claim, evaluated plaintiffs' evidence as if it were offered to prove an action for enhanced risk of future harm, and "barred" the action, following its interpretation of *Martin*, as a matter of law. As we have explained, *supra* Part V, medical monitoring and enhanced risk claims are distinct causes of action. The question on the medical monitoring claim is whether the jury could reasonably believe Dr. Calesnick's assertion that there is a reasonable "need" for medical surveillance. Because the district court appears to have applied the standards for enhanced risk claims in an action for medical monitoring, we find error, and we will therefore reverse the grant of summary judgment on this point.

On the fourth prong of the *prima facie* case, causation, defendants submit that plaintiffs have not offered any admissible ***862** toxicological or epidemiological evidence showing a correlation between PCBs and adverse health effects in humans. Appellants' Br. at 97. However, if we assume all proffered evidence is admissible, this is not so. Both Drs. Barsotti and Nicholson testified to a positive correlation between PCB exposure and human illness. Drs. Barsotti, Nicholson, Zahalsky, Shubin and DiGregorio gave testimony, with reference to scientific studies, from which a jury could infer that there is a causal relationship between PCB exposure and the various illnesses contracted by plaintiffs. *See DeLuca v. Merrell Dow Pharmaceuticals, Inc.*, 911F.2d 941 (3d Cir.1990). The principles of *DeLuca* respecting statistical significance are also, of course, applicable to any studies relied on. The defendants' experts offer evidence to the contrary, but that makes the issue suitable for a jury, not dismissible.

Defendants also argue that plaintiffs cannot possibly meet their burden on causation because no qualified expert submitted the differential diagnoses required to prove causation. Although defendants make this argument in terms of causation, we believe it is really an evidentiary contention, and it is a contention that we have dealt with *supra* in Part VIC1. Admittedly, plaintiffs did not submit differential diagnoses performed by medical doctors, but they did submit differential diagnoses from non-medical doctors. We do not believe that the diagnoses are invalid simply because they were performed by non-physician experts.

As our discussion, *supra* Part VIC1, makes clear, our Rule 702 expert qualification jurisprudence rejects rigid formalism. The decision to qualify someone as an expert rests not on the specific academic degree held, but on the

presence of sufficient knowledge, skill, experience, training or education. It would make little sense to exalt the opinion of a medical doctor with no experience in toxic exposure over the opinion of, for example, an eminently qualified toxicologist with a Ph.D. and years of experience and training. As Judge Pollak noted in denying a defendant's motion to exclude medical testimony by a non-medical doctor:

> [w]hile it is true that an expert must demonstrate special competence to present expert testimony there is no *per se* rule that non-physicians are unqualified to testify about the medical condition of individuals exposed to chemicals.

Villari v. Terminix International, Inc., 692 F.Supp. 568, 573 (E.D.Pa.1986) (citation omitted). Therefore, we must consider the diagnoses of plaintiffs' experts. In light of that evidence, we are left with a genuine issue of material fact on the issue of causation.

In sum, if we consider all of the evidence improperly excluded by the district court, plaintiffs have submitted sufficient evidence to survive summary judgment on each element of the *prima facie* case. A jury could believe plaintiffs' evidence regarding normal PCB background levels and from there could conclude that these plaintiffs were exposed to a larger than average dose of PCBs. Plaintiffs' evidence regarding the likelihood of latent disease could lead a reasonable jury to conclude that plaintiffs needed to be monitored by medical experts. Finally, if the opinions of plaintiffs' experts are admissible, a jury could conclude that the defendants' PCBs caused plaintiffs' injuries. Hence, the grant of summary judgment must be reversed. Needless to say, if, after further proceedings consistent with this opinion, the district court were to exclude enough of plaintiffs' expert's evidence on causation (or other critical issues) such that no genuine issue of material fact remained, it would be free to grant summary judgment for the defendants.[39]

***863** VI. THE BUTLER PLAINTIFFS' MOTION TO AMEND

[10] The seven Butler plaintiffs, having filed a complaint alleging both personal injury and property damage, later admitted, in response to defendants' discovery requests, that they do not currently suffer from any adverse health effects as a result of their exposure to PCBs. Defendants moved for summary judgment based on the Butler plaintiffs' failure to produce evidence in support of their personal injury claims. In their response to this motion, the Butler plaintiffs sought leave to amend their complaint to eliminate the personal injury claims, pursuant to Fed.R.Civ.P. 41. The theory of this motion was that, although the Butlers were not then afflicted with injuries, the long latency periods often associated with toxic exposure could cause them to suffer injury in the future, thus making it advisable to preserve their personal injury claims until such time as any harm becomes manifest. Defendants, having already made significant investments in the instant litigation, opposed this motion, arguing that they would be prejudiced by the possibility of having to defend against these actions in the future. The court, without explanation, summarily denied plaintiffs' motion for leave to amend, and granted summary judgment in favor of defendants.

In *Howze v. Jones & Laughlin Steel Corp.*, 750 F.2d 1208 (3d Cir.1984), addressing the propriety of a similarly unexplained denial of a motion to amend, we noted that:

> [a]lthough the grant or denial of a motion to amend is within the sound discretion of the district court, *Lewis v. Curtis*, 671 F.2d 779, 783 (3d Cir.), *cert. denied*, 459 U.S. 880 [103 S.Ct. 176, 74 L.Ed.2d 144] ... (1982), the general rule is that leave to amend "shall be freely given when justice so requires." Fed.R.Civ.P. 15(a).

Id. at 1212. Unable to find either a compelling reason for denial or any evidence of prejudice to the non-moving party in *Howze*, we concluded that the denial of the motion to amend was "not consistent with the sound exercise of discretion." *Id.* The *Howze* holding was rooted in the well established rule that amendments should be granted liberally. A similar liberal policy has been adopted in the voluntary dismissal context. Rule 41 motions "should be allowed unless defendant will suffer some prejudice other than the mere prospect of a second lawsuit." 5 J. Moore, *Moore's Federal Practice* ¶ 41.05[1], at 41–62 (1988).

Defendants will not be significantly prejudiced by granting plaintiffs' amendment. Although defendants have invested a good deal of time in this suit, the vast majority of their argument attacks the plaintiffs' theories of causation, exposure and non-physical injury. There is no indication that defendants invested significant amounts of time in the specific issue germane to the amendment, i.e., the Butler plaintiffs' physical injuries, and that they will therefore be prejudiced if the Butler plaintiffs eliminate their physical personal injury claims from their complaint. We therefore hold that the district court's denial of plaintiffs' motion for leave to amend was an

abuse of discretion. Thus, we will reverse the district court's order denying plaintiffs' motion, and remand for further proceedings.

IX. SEPTA NOTICE

SEPTA moved separately for summary judgment against a number of plaintiffs based on those plaintiffs' failure to comply with the requirements of subsection (a)(1) of section 5522 of Pennsylvania's Judicial Code, 42 Pa.Cons.Stat.Ann. § 5522(a)(1).[40] ***864** That section provides, in relevant part, as follows:

> (a)(1) Within six months from the date that any injury was sustained or any cause of action accrued, any person who is about to commence any civil action or proceeding within this Commonwealth or elsewhere against a government unit for damages on account of any injury to his person or property under Chapter 85 ... shall file in the office of the government unit, and if the action is against a Commonwealth agency for damages, then also file in the office of the Attorney General, a statement in writing ... setting forth ... [the particulars of the case]....
>
> (2) If the statement provided for by this subsection is not filed, any civil action or proceeding commenced against the government unit more than six months after the date of injury shall be dismissed and the person to whom any such cause of action accrued for any injury to person of property shall be forever barred from proceeding further thereon within this Commonwealth or elsewhere. *The court shall excuse failure to comply with this requirement upon a showing of reasonable excuse for failure to file such statement.*
>
> (3) In the case of a civil action or proceeding against a government unit *other than the Commonwealth government:*
>
> * * *
>
> (iii) *Failure to comply with this subsection shall not be a bar if the government unit had actual or constructive notice of the incident or condition giving rise to the claim of a person.*

(Emphases added.) Plaintiffs, despite their noncompliance with this statute, argue that summary judgment in favor of SEPTA on this issue is improper because (1) SEPTA had actual or constructive notice of the conditions giving rise to plaintiffs' injuries, and (2) SEPTA suffered no prejudice from the failure to give notice.

[11] Plaintiffs' first argument invokes the protection of subsection (a)(3)(iii), which by its terms extends only to actions against a government unit "other than the Commonwealth government." Thus, if SEPTA is part of the Commonwealth government, plaintiffs' first argument must fail. The term "Commonwealth government" is defined as including, *inter alia*, "the departments, boards, commissions, authorities and officers and agencies of the Commonwealth." 42 Pa.Cons.Stat.Ann. § 102. In a recent decision, the Pennsylvania Supreme Court held, in the context of determining sovereign immunity, that the Port Authority of Allegheny County is an " 'agency of the Commonwealth,' rather than one of the types of local agencies excluded from the definition of 'Commonwealth government.' " *Marshall v. Port Authority of Allegheny County*, 524 Pa. 1, 5–6, 568 A.2d 931, 933–34 (1990). The Court based its decision on the express statutory language creating the Port Authority, which empowered the Authority to "exercis[e] the public powers of the Commonwealth as an agency thereof." 55 Pa.Cons.Stat.Ann. § 553(a).

SEPTA's authorizing statute includes a similar mandate that SEPTA "exercise the public powers of the Commonwealth as an agency and instrumentality thereof." 55 Pa.Cons.Stat.Ann. § 600.303(a). Consequently, we believe that the Pennsylvania Supreme Court would rule that SEPTA, as an agency of the Commonwealth, is part of the Commonwealth government as defined in 42 Pa.Cons.Stat.Ann. § 102. Therefore, the provisions of subsection (a)(3)(iii) cannot be applied to excuse the plaintiffs' failure to give actual notice to SEPTA.[41]

[12] Plaintiffs' second contention is that they should be excused from noncompliance under subsection (a)(2) because, although they were negligent in not realizing that SEPTA is a governmental unit for the purposes of the notice statute, SEPTA has not shown that it was prejudiced. SEPTA concedes that it has not shown prejudice, ***865** but argues that the statute does not require a showing of prejudice. The language of subsection (a)(2) itself makes no reference to a showing of prejudice, and notes only that the court "shall excuse noncompliance ... upon a showing of reasonable excuse." However, a Pennsylvania Supreme Court case, interpreting a substantially similar predecessor to the notice statute, held that a "reasonable excuse" was established "[w]here the ignorance of a claimant or the negligence of his counsel is coupled with a determination that no undue hardship resulted to the municipality from the failure to file." *Yurechko v. County of Allegheny*, 430 Pa. 325, 331, 243

A.2d 372, 376–77 (1968).

Litigation under the current statute has yielded divergent results on this issue in the Commonwealth Court but no opinion by a higher court. In *Graffigna v. City of Philadelphia*, 98 Pa.Commw. 624, 512 A.2d 91 (1986), the court affirmed SEPTA's invocation of the notice statute, stating as follows:

> [T]he appellant argues that SEPTA failed to demonstrate that the appellant's noncompliance with the notice prerequisite prejudiced SEPTA. However, a government unit need not show that it was prejudiced by lack of timely notice. The statute imports no such requirement.

Id. at 630, 512 A.2d at 94. However, a later decision of the same court concluded that "the holding of the Supreme Court in *Yurechko* ... control[s] a case where a plaintiff has failed to comply with the notice requirement established by subsection (a)(1) ..., and then contends that his noncompliance should be excused pursuant to the final sentence of subsection (a)(2)." *Ramon v. Department of Transportation*, 124 Pa.Commw. 416, 423, 556 A.2d 919, 923 (1989), *aff'd without opinion,* 524 Pa. 464, 573 A.2d 1025 (1990) (per curiam). The *Ramon* court distinguished *Graffigna* by limiting *Graffigna* 's holding that no prejudice need be shown to those situations in which "noncompliance should have been excused pursuant to . . . subsection (a)(3)(iii) (actual or constructive notice)" and not in situations where the "reasonable excuse" provisions of subsection (a)(2) are invoked. *Id.*

Although the Supreme Court's affirmance of the panel decision in *Ramon* took the form of a summary, *per curiam* order, it nonetheless constitutes "a binding decision of precedential authority" under the law of Pennsylvania. *Commonwealth v. Gretz*, 520 Pa. 324, 325, 554 A.2d 19, 20 (1989). Therefore, we must reject SEPTA's attempt to have us apply *Graffigna* in this case because plaintiffs are invoking the "reasonable excuse" provisions of subsection (a)(2). In short, *Ramon* stands for the proposition that SEPTA must show prejudice in this context. Because SEPTA has not shown prejudice, the summary judgment on that ground must be set aside.

VII. CONCLUSION

For all of the foregoing reasons, the summary judgment will be reversed, and the case remanded to the district court for further proceedings consistent with this opinion.

All Citations

916 F.2d 829, 21 Envtl. L. Rep. 20,184, 31 Fed. R. Evid. Serv. 486, 17 A.L.R.5th 997

Footnotes

1 The district court's subject matter jurisdiction was founded primarily upon 28 U.S.C. § 1331 (federal question) because of the inclusion of claims under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. §§ 9601–75, and the Federal Employers' Liability Act (FELA), 45 U.S.C. § 51–60. The court also exercised pendent jurisdiction over various state law claims. Several plaintiffs initially filed their claims in Pennsylvania courts, but these claims were removed under 28 U.S.C. § 1441(c).

2 The district court certified the matters before us as final judgments. *See* Fed.R.Civ.P. 54(b).

3 In a number of instances, the district court did not articulate whether it was excluding expert opinion as an evidentiary matter or was merely ascribing little weight to it in its summary judgment analysis.

4 The order contained the following four mandates:
1. Defendants will answer discovery efforts by the Plaintiffs directed to reveal the quantity and nature of PCBs used at the Paoli Railyard and the health effects on Defendants' employees of exposure to PCBs. This Discovery is to be completed by December 23, 1987.
2. Plaintiffs will then answer discovery efforts by the Defendants directed to reveal whether the Plaintiffs have suffered personal injury and whether the injury is caused by exposure to PCBs caused by the Defendants. This Discovery is to be completed by March 22, 1988.
3. All other discovery is to be stayed meanwhile.
4. Any Summary Judgment Motions, to be made by the Defendants, are to be filed by April 21, 1988.

5 Throughout the course of discovery, individual parties filed numerous motions for summary judgment or dismissal with respect to discrete issues. However, for purposes of this appeal, our discussion will center on the joint motion for summary judgment. Other motions will be discussed where they are directly relevant to issues on appeal—for example, the *Butler* plaintiffs' motion for dismissal without prejudice, and defendant SEPTA's separate motion for summary judgment under a governmental notice statute.

6 Although a number of the appeals were premature, Fed.R.Civ.P. 54(b), the prematurity was cured by the subsequent Rule 54(b) certification. *See Dowling v. City of Philadelphia,* 855 F.2d 136, 158 (3d Cir.1988); *Cape May Greene, Inc. v. Warren,* 698 F.2d 179, 184–85 (3d Cir.1983); *Richerson v. Jones,* 551 F.2d 918, 922 (3d Cir.1977). We reject defendants' claim that this holding is inconsistent with *Griggs v. Provident Consumer Discount Co.,* 459 U.S. 56, 103 S.Ct. 400, 74 L.Ed.2d 225 (1982) (per curiam), which held that the filing of a post-judgment motion under Fed.R.Civ.P. 50(b), 52(b), or 59 destroys an otherwise effective notice of appeal. Unlike *Griggs,* this case involves no such post-judgment motion.

7 Our recent decision in *Cruz v. Melendez,* 902 F.2d 232 (3d Cir.1990), is not to the contrary. That case, like *Torres,* stands only for the proposition that, without further explanation proffered in a timely fashion, the designation, "et al.," is insufficient to provide the required notice.

8 Appellant William Reid, Jr., is separately represented by James C. Sargent, Jr.

9 The issue of what constitutes a "normal" or "background" PCB exposure level is sharply contested. The district court adopted the findings of a study conducted by the Agency for Toxic Substance and Disease Registry (ATSDR), concluding that "the geometric mean serum concentration of populations having no known unusual source of PCB exposure range between 4.2 ppb (parts per billion) and 6.4 ppb." The Hanes plaintiffs point out that at least four of its number have tests showing a body burden of PCBs higher than the court-accepted background level. Hanes Br. at 16 n. 2.

10 This method of calculating blood levels of PCB exposure from measured levels of exposure in human adipose tissue was employed in the National Human Adipose Tissue Survey (NHATS study). The NHATS study concluded that only 10% of the United States population has blood levels greater than 5 ppb. Thus, the plaintiffs submit, a blood level greater than 5 ppb should be considered high. Dr. Simon also opined that the NHATS study employed the proper method of measuring the background level.

11 The experts were Anthony J. Triolo, Ph.D., professor of pharmacology at Jefferson Medical College; Dr. Gio Batta Gori, an epidemiologist and toxicologist who directs the National Health Policy Center; Eddy A. Bresnitz, M.D., a professor of medicine and epidemiology at the Medical College of Pennsylvania; and Arnold L. Brown, M.D., Dean of the University of Wisconsin Medical School.

12 Defendants also attacked with specificity the opinions that Dr. Barsotti offered with respect to each individual plaintiff. For instance, they observed that she attributed plaintiff Patricia Ingram's asthma to PCB exposure, even though no one else has ever claimed that PCBs can cause asthma, and even though Ingram has a family history of asthma. They point out that Barsotti lists PCBs as a substantial factor in causing Charles Stanbach's stomach cancer, although Stanbach died at age 66, leaving no medical records indicative of PCB exposure. They also criticize her for not attempting to rule out the many genetic, dietary, and socioeconomic risk factors which could have contributed to his disease. Finally, defendants contend that this failure to rule out alternative causes renders useless Barsotti's testimony that PCBs caused certain ailments of seven other plaintiffs.

13 One of the studies did suggest a possibility that PCB exposure in high doses may cause skin irritation.

14 An exception to this observation is the court's exclusion of Dr. Barsotti's opinion "tracing" the PCBs in the plaintiffs' bodies to the Paoli railyard through gas chromatography. In that instance, the court made clear that Barsotti's testimony would be excluded because she "is not a chemist," and such conclusions are therefore "beyond the scope of her expertise." *But see infra* note 19.

15 The quoted passage is immediately followed by the court's reflection that "I feel compelled to note further that I see nothing in Dr. Nisbet's curriculum vita that would qualify him to testify as an expert in this area." It is not clear from the opinion whether this statement is mere dicta, or is intended to exclude the testimony under Rule 702. The district court made similarly cryptic indictments of Dr. Barsotti's qualifications to make psychiatric diagnosis and Dr. Zahalsky's

qualifications to perform differential diagnoses.

16 For a more complete discussion of *Downing, see* Part VI.C2 below.

17 The court added that "even if Dr. Nicholson's testimony was admissible despite being a novel scientific technique, it would be difficult to understand how it was relevant." Whether the court intended a Rule 402 relevancy exclusion is unclear.

18 In *Martin,* 508 Pa. 154, 164–65, 494 A.2d 1088, 1094 (1985), the court excluded a doctor's testimony that, based on the plaintiff's "history of exposure to asbestos together with his one bloodspitting episode" the plaintiff might have had cancer at the time the doctor examined him. That testimony, the court ruled, was "not probative of the fact for which appellee now says it is offered, *i.e.,* that appellee faced a substantially increased risk of contracting cancer." *Id.* at 165, 494 A.2d at 1094.

19 This holding seems in tension with the explicit exclusion of Dr. Barsotti's testimony on these same grounds, *see supra* note 14 and accompanying text, and the comments about the qualifications of Drs. Nisbet and Zahalsky, *see supra* note 15.

20 The one Pennsylvania trial court to have considered this type of claim allowed it to proceed. *See Habitants Against Landfill Toxicants v. City of York,* No. 84–S–3820 (Pa. York Co. May 20, 1985), 15 Envtl.L.Rep. 20,937 (allowing an action seeking relief in the form of a medical surveillance trust fund). For the reasons expressed below in note 22, we believe that *Peterman v. Techalloy Co., Inc.,* 29 Pa.D. & C.3d 104 (Mont.Co.1982), a Pennsylvania trial court decision, which denied relief, is distinguishable because plaintiffs in that case requested relief in the form of a trust fund for future medical expenses, including, presumably, medical treatment, not just medical surveillance.

21 *See generally* Note, *The Inapplicability of Traditional Tort Analysis to Environmental Risks: The Example of Toxic Waste Pollution Victim Compensation,* 35 Stan.L.Rev. 575, 576–78 (1983) (collecting cases); Note, *Medical Surveillance Damages: A Solution to the Inadequate Compensation of Toxic Tort Victims,* 63 Ind.L.J. 849 (1988) (same).

22 The necessity of addressing problems of toxic exposure become particularly important with the continued widespread use of chemicals in American industrial and agricultural development. One commentator has pointed out that:

> there are approximately 50,000 hazardous waste sites nationwide. In all, over 65,000 chemicals are in commercial use today which have not been tested for their effects on human health or the environment. According to varying estimates, workplace exposure to hazardous substances alone accounts for from five percent to as much as thirty-eight percent of all cancers.

Note, *Medical Surveillance Damages: Using Common Sense and the Common Law to Mitigate the Dangers Posed by Environmental Hazards,* 12 Harv.Envtl.L.Rev. 265, 265 (1988) (footnote omitted).

23 In addition, several courts have modified the traditional rules discussed above to better serve in the toxic tort context. *See, e.g., Ayers,* 106 N.J. at 584, 525 A.2d at 300 (stating that "neither the statute of limitations nor the single controversy rule should bar timely causes of action in toxic-tort cases instituted after discovery of a disease or injury related to tortious conduct, although there has been prior litigation between the parties of different claims based on the same tortious conduct").

24 Once the injury is detected, the plaintiff may or may not have a cause of action against the same defendant for the injury itself. *See generally* Note, *Claim Preclusion in Modern Latent Disease Cases: A Proposal for Allowing Second Suits,* 103 Harv.L.Rev. 1989 (1990). Because that situation is not before us, we do not reach it.

25 Our research has yielded only two cases in which courts have purported to disallow recovery based on a medical monitoring theory. Both cases are distinguishable. In *Rheingold v. E.R. Squibb & Sons,* No. 74 Civ. 3420 (S.D.N.Y. Oct. 8, 1975), the court rejected a class action claim for what might more accurately be called "medical management" damages. Plaintiffs, who had used DES during pregnancy, sought to establish a fund to finance the periodic examinations of plaintiffs' affected female offspring, as well as, *inter alia,* the medical *treatment* of "such girls as develop or show any propensity toward development of [vaginal cancer or other related conditions]." *Id.* at 7. This remedy is far broader than a mere claim for medical monitoring as we have defined it. Moreover, to the extent that the *Rheingold* court interpreted New York law as requiring actual injury as a prerequisite to recovery, such reasoning is seriously called into question by subsequent New York state appellate court decisions to the contrary, *see Askey,* 102 A.D.2d at 130, 477 N.Y.S.2d at 242.

In *Morrissy v. Eli Lilly & Co.,* 76 Ill.App.3d 753, 32 Ill.Dec. 30, 394 N.E.2d 1369 (1979), the plaintiffs explicitly

> characterized their claims as requesting, *inter alia,* that defendants "establish and maintain a fund of money reasonably calculated to compensate all class members for such medical expenses which have been and will continue to be incurred due to the physiological damage done by DES," *id.* at 757, 32 Ill.Dec. at 34, 394 N.E.2d at 1373. The court held that "[t]he nexus thus suggested between exposure to DES in utero and the possibility of developing cancer or other injurious conditions in the future is an insufficient basis upon which to recognize a present injury." *Id.* at 761, 32 Ill.Dec. at 37, 394 N.E.2d at 1376. However, as in *Rheingold,* the plaintiffs' request in *Morrissy* was for treatment as well as monitoring. Thus, it is inapposite to the case at bar.

25a In light of the statute of limitations problems caused by Pennsylvania law against splitting causes of action, we intimate no view as to whether a plaintiff who sues for medical monitoring must forego his or her claim for damages if and when the disease ultimately manifests itself.

26 Fed.R.Evid. 703 states:

> The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

27 As noted, the court may have meant to exclude the animal studies as irrelevant under Rule 402 because, even if they showed correlation between PCBs and animal disease, they were not probative of a connection between PCB exposure and human disease. However, it made no such definitive ruling.

28 As just noted with regard to the animal studies, the court's reasoning with regard to these two incidents seems to follow a relevancy rationale, not a Rule 703 unreliability rationale. There is no indication that the data from Yusho and Yu Cheng is unreliable. The court's concern appears to be more grounded in whether a study regarding the effect of PCDFs is relevant to this proceeding.

29 Although, for the reasons explained, factfinding is a prerequisite to definite conclusions, it appears to this court that most of the data upon which plaintiffs' experts rely is "of a type reasonably relied upon by experts in the particular field," Fed.R.Evid. 703, and thus admissible under Rule 703. However, even if admissible under Rule 703, plaintiffs' experts may be using their data in an unreliable manner. As we explain *infra,* that is a Rule 702 question and much of plaintiffs' evidence may be excludable on that basis.

29a The plaintiffs did not request an *in limine* hearing and in fact opposed it on the grounds that it was premature, i.e., they did not want to be forced into it before their discovery was complete. We emphasize, however, that the management of complex litigation may not be relegated to the lawyers but at all times remains the responsibility of the court. *See* Manual for Complex Litigation 2d § 20.1.

30 By its terms, the case management order granted plaintiffs three months within which to conduct discovery limited to "the quantity and nature of the PCBs used at the Paoli Railyard and the health effects on Defendants' employees of exposure to PCBs." This was to be followed by defendants' discovery of the evidence comprising plaintiffs' *prima facie* case on causation. All other discovery, including discovery by plaintiffs of defendants' experts, was stayed, and plaintiffs' motions to compel such discovery were denied.

31 As pointed out, *supra* note 19, these exclusionary holdings cannot be reconciled with the court's later statement that the question of plaintiffs' witnesses' qualification as experts would not be addressed by the opinion.

32 We note that most, if not all, of the evidence supporting Dr. Zahalsky's conclusions regarding causation are based on the Yusho and Yu Cheng studies. If those studies are excluded under Rule 703, then Dr. Zahalsky's qualifications as an expert may not be important.

33 Decisions to exclude expert opinion evidence under Rule 702 are reviewed for abuse of discretion. *Knight,* 596 F.2d at 87.

34 As we explained in *Downing,* a technique should be considered "novel" for purposes of Rule 702 whenever its reliability is not so well established as to warrant recognition by judicial notice. *Id.* at 1234.

35 *Downing* requires a court that is

> ruling upon the admission of (novel) scientific evidence, i.e. evidence whose scientific fundaments are not suitable candidates for judicial notice, [to] conduct a preliminary inquiry focusing on (1) the soundness and reliability of the process or technique used in generating the evidence, (2) the possibility that admitting the evidence [will]

> overwhelm, confuse, or mislead the jury, and (3) the proffered connection between the scientific research or test result to be presented, and particular disputed factual issues in the case.
>
> *Id.* at 1237 (footnote omitted).

We dismiss out of hand the district court's finding, under the second prong of *Downing,* that "Dr. Nicholson's testimony would confuse the jury because of its scientific nature and his credentials so they would make more of it than it actually deserved." What the second prong of *Downing* flags for concern is "a technique which has 'assume[d] a posture of mythic infallibility.' " *Downing,* 753 F.2d at 1239 (quoting *United States v. Addison,* 498 F.2d 741, 744 (D.C.Cir.1974)). In other words, a technique that the jury will automatically assume, either because of its notoriety or its elaborate presentation, to be completely reliable, needs to be scrutinized by the court. Dr. Nicholson's meta-analysis does not fall into that category. His scientific presentation is not notably different than that of any other of the experts offered in this case—by either side. If Dr. Nicholson can be excluded under the second prong of *Downing,* then so could most of the experts in the case.

36 Fed.R.Evid. 403 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, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

37 As we have already noted, *see supra* note 30 and accompanying text, appellants make a forceful argument that the case management order has prevented them from conducting full discovery, and that summary judgment was improperly granted because of the incompleteness of the record. *See Al Khazraji v. Saint Francis College,* 784 F.2d 505, 517 (3d Cir.1986) (record incomplete for summary judgment purposes where plaintiff was unable to conduct full discovery), *aff'd on other grounds,* 481 U.S. 604, 107 S.Ct. 2022, 95 L.Ed.2d 582 (1987); *Arnold Pontiac–GMC, Inc. v. General Motors Corp.,* 786 F.2d 564, 568 (3d Cir.1986) (error for district court to enter summary judgment where discovery is limited to non-moving party). Because of our resolution of the merits of the grant of summary judgment, we do not address the propriety of the case management order here.

38 The parties accept this formulation of Pennsylvania law.

39 Our decision in *Vadino v. A. Valey Engineers,* 903 F.2d 253 (3d Cir.1990), compels remand in the four instances in which the district court granted summary judgment on the separate ground that plaintiffs refused to comply or delayed in complying with discovery orders. This issue affects the cases of Cloyd Brown (No. 88–1980), William Reid (No. 88–1982), and Andre Walker and Bobby Burrell (Nos. 88–1989 and 89–1071). The district court's purely conclusory treatment of the issue leaves us without an effective basis for review, and we therefore reverse and remand for "an explanation of the legal basis for the district court's order." *Id.* at 259.

40 On appeal, SEPTA argues that the district court's grant of summary judgment in its favor in five such cases should be affirmed. These cases are: No. 88–1975 (Craig Brown), Nos. 88–1987 and 89–1074 (Ingram), No. 88–1977 (Johnson), Nos. 88–1988 and 89–1079 (Cunningham), and No. 88–1982 (Reid). In addition, SEPTA argues that summary judgment should have been granted in its favor in two additional cases where the issue was raised, but not addressed by the district court. These cases are: Nos. 88–1986 and 89–1075 (Knight) and Nos. 88–1991 and 89–1073 (Jones).

41 This holding is consistent with the Pennsylvania Supreme Court's decision in *Feingold v. Southeastern Pennsylvania Transportation Authority,* 512 Pa. 567, 517 A.2d 1270 (1986), which held that SEPTA is an agency of the Commonwealth for liability purposes.

End of Document