

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF PENNSYLVANIA

Michelle Stecyk et al.,	:	
Plaintiffs,	:	
	:	
v.	:	CIVIL ACTION
	:	NO. 94-CV-1818
Bell Helicopter	:	
Textron., Inc. et al.	:	
Defendants.	:	
	:	
	:	

MEMORANDUM OF DECISION

McGlynn, J. **January** , 1998

This case arises out of the crash of an experimental V-22 Osprey aircraft during a ferry flight near Quantico, Virginia on July 20, 1992. The accident killed seven people, including plaintiffs' decedents, who worked for Boeing Vertol Company ("Boeing"). The defendants are: (1) Bell Helicopter Textron, Inc. ("Bell"), the contractor which worked with Boeing and the United States Government on the development of the V-22; (2) the Allison Gas Turbine Division of General Motors, Inc. ("GM"), which contracted with the Government to develop and build the V-22 engine and its related parts; and (3) Macrotech Fluid Sealing ("Macrotech"), the manufacturer of a seal which is alleged to have been installed incorrectly on the plane that crashed.

Before the court is defendant GM's motion in limine to exclude the expert testimony of Robert L. Dega and Warren Lieberman to the extent those witnesses intend to express any opinions concerning GM's liability in the crash. GM has

requested a Daubert hearing on the admissibility of Mr. Dega's and Mr. Lieberman's testimony if the court denies GM's motion. Plaintiffs have submitted a joint response contending that the methodologies employed by their experts were sound. They also argue that the test for scientific reliability set forth in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579 (1993), does not apply to the testimony of their experts. For the reasons that follow, the court finds that Daubert analysis of plaintiffs' proposed expert testimony is appropriate in this case. GM's alternative request for a Daubert hearing is also granted. Accordingly, the court will reserve judgment on the admissibility of plaintiffs' experts testimony until after the Daubert hearing.

I. Discussion

Defendant GM argues that Mr. Dega's and Mr. Lieberman's opinions lack the necessary scientific validation required by the Supreme Court in Daubert, and should therefore be excluded under Federal Rule of Evidence 702. GM also contends that the probative value of those experts' opinions would be substantially outweighed by their prejudicial effect, requiring exclusion under Federal Rule of Evidence 403. In response, plaintiffs maintain that the factors set forth by the Supreme Court in Daubert do not apply here because Mr. Dega and Mr. Lieberman rely only upon general engineering principles and experience in reaching their conclusions, rather than particular methodologies or techniques. They further argue that the methods employed by their experts

withstand Daubert analysis.

A. Fed. R. Evid. 702

1. Daubert Analysis of Technical Testimony

Before admitting scientific testimony, the district court must first assess "whether the reasoning or methodology underlying the testimony is scientifically valid." Daubert, 509 U.S. at 592-93. Plaintiffs contend that the test for validity of scientific evidence promulgated by the Supreme Court in Daubert, id. at 593-94, is inappropriate here for two reasons: (1) because Mr. Dega and Mr. Lieberman rely only upon their experience and training -- rather than a methodology or technique -- in arriving at their conclusions; and (2) because this case involves engineering rather than scientific testimony. The Court of Appeals has not directly addressed Daubert's applicability in such cases, and the Circuits are split on the issue, with some refusing to utilize the Daubert reliability test,¹ and others subjecting technical testimony to the same Daubert analysis as scientific testimony.² Notably, the district courts within the Third Circuit have generally found that "Daubert applies to the

¹ See Compton v. Subaru of America, Inc., 82 F.3d 1513, 1519 (10th Cir.), cert. denied, 117 S. Ct. 611 (1996); McKendall v. Crown Control Corp., 122 F.3d 803 (9th Cir. 1997); Lappe v. American Honda Motor Co., 857 F. Supp. 222, 226 (N.D.N.Y.), aff'd, 101 F.3d 682 (2d Cir. 1996).

² See Watkins v. Telsmith, Inc., 121 F.3d 984 (5th Cir. 1997); Tyus v. Urban Search Management, 102 F.3d 256 (7th Cir. 1996), cert. denied, 117 S. Ct. 2409 (1997); Peitzmeyer v. Hennessy Indus., 97 F.3d 293 (8th Cir. 1995), cert. denied, 117 S. Ct. 1552 (1997).

admissibility of technical but not purely scientific expert testimony governed by Rule 702." Padillas v. Stork-Gamco, Inc., No. Civ. A. 95-7090, 1997 WL 597655, at *6 (E.D. Pa. Sept. 19, 1997); see also Finley v. NCR Corp., 964 F. Supp. 882, 886-87 (D.N.J. 1996); Dennis v. Pertec Computer Corp., 927 F. Supp. 156, 160-61 (D.N.J. 1996).

The better-reasoned approach to assessing the reliability of technical testimony under Rule 702 is to apply the Daubert factors, taking into account any relevant differences between an examination of scientific evidence and an examination of technical evidence of the kind offered by plaintiffs' experts. Plaintiffs may not evade scrutiny of Mr. Dega's and Mr. Lieberman's techniques merely by stating that their experts relied only upon training and experience to reach their conclusions. Expert testimony based upon unreliable techniques or methodologies can pose only a hindrance to factfinders. See Paoli II, 35 F.3d at 744 (expert's testimony is sufficiently grounded only if it will help the trier of fact reach accurate results). Thus, admitting expert testimony without scrutinizing its reliability would run counter to the trial judge's duty under Rule 702 "to admit expert testimony that is helpful to the trier of fact." Linkstrom v. Golden T. Farms, 883 F.2d 269 (3d Cir. 1989). Further, "Rule 702 is designed to ensure that, when expert witnesses testify in court, they adhere to the same standards of intellectual rigor that are demanded in their professional work." Cummins v. Lyle Indus., 93 F.3d 362, 369

(7th Cir. 1996). GM has raised serious questions about the reliability of the techniques utilized by Mr. Dega to measure the surface roughness and machine lead of GM's allegedly defective torque-meter shaft, and by Mr. Lieberman in performing his aviation accident analysis. A Daubert-style analysis of those techniques is therefore appropriate. See Hopkins v. NCR Corp., Civ. A. No. 93-188-B-M2, 1994 WL 757510 (M.D. La. Nov. 17, 1994)(finding that "the factors set out in Daubert with respect to 'scientific' testimony can be readily adapted to 'technical' testimony" of professional engineer), aff'd, 53 F.3d 1281 (5th Cir. 1995). Accordingly, Mr. Dega's and Mr. Lieberman's techniques will be scrutinized in light of the factors set forth by the Supreme Court in Daubert, 508 U.S. at 593-94, and the Court of Appeals in United States v. Downing, 753 F.2d 1224, 1238-39 (3d Cir. 1995), as well as any other relevant factors.

2. Legal Standard

In a case where expert scientific testimony is proffered, the court must make a preliminary determination as to whether the expert proposing to testify is in fact qualified to do so and whether the evidence being offered is admissible. Daubert, 509 U.S. at 592-93; Fed. R. Evid. 104(a). That determination is made under Federal Rule of Evidence 702,³ which has three major

³ Fed. R. Evid. 702 provides:

If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness

requirements: (1) the proffered witness must be an expert; (2) the expert must testify to scientific, technical or specialized knowledge; and (3) the expert's testimony must assist the trier of fact. United States v. Velasquez, 64 F.3d 844, 848 (3d Cir. 1995).

The first requirement of Rule 702 -- that the proposed witness be an expert -- has been liberally construed in the Third Circuit. Velasquez, 64 F.3d at 849. A broad range of knowledge, skills, and training can qualify an expert as such, and the court should not impose overly rigorous requirements on expertise. Id.; see also Hammond v. Int'l Harvester Co., 691 F.2d 646, 653 (3d Cir. 1982)(permitting engineer with sales experience in automotive and agricultural equipment, who also taught high school automobile repair, to testify in products liability action involving tractors).

The second requirement focuses on the scientific validity of the method in dispute. Under Daubert, 509 U.S. at 593-94, and United States v. Downing, 753 F.2d 1224, 1238-39 (3d Cir. 1995), eight factors have been deemed important to a court's evaluation of a scientific method's validity: (1) whether the method consists of a testable hypothesis; (2) whether the method has been subject to peer review; (3) the known or potential rate of error; (4) the existence and maintenance of standards controlling

qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.

the technique's operation; (5) whether the method is generally accepted; (6) the relationship of the technique to methods which have been established to be reliable; (7) the qualifications of the expert witness testifying based on the methodology; and (8) the non-judicial uses to which the method has been put. In re Paoli R.R. Yard PCB Litig. ("Paoli II"), 35 F.3d 717, 742 n.8 (3d Cir. 1994). A court should also consider any other applicable factors in making its reliability determination. Velasquez, 64 F.3d at 849 n.8.

"The third requirement of Rule 702 is to ensure that the evidence is relevant or 'fits' under the facts of the case." United States v. Velasquez, 64 F.3d 844, 850 (3d Cir. 1995)(quoting Daubert, 509 U.S. 591 (1993)). There must be a valid connection between the expertise in question and the inquiry being made in the case. Paoli II, 35 F.3d at 743. "When dealing with 'scientific' evidence, this element is satisfied if there is a 'connection between the scientific research or test result to be presented, and particular disputed factual issues in the case.'" Velasquez, 64 F.3d at 850.

The party offering the expert testimony has the burden to establish the reliability of its expert opinion by a preponderance of the evidence. Id. at 592 n.10. A prima facie showing will not suffice. See Downing, 753 F.2d at 1240 n. 21. However, the burden of proving by a preponderance that expert testimony is reliable is not meant to be an onerous one. Paoli II, 35 F.3d at 743-45.

3. Robert L. Dega

Plaintiffs offer Robert L. Dega to testify about the design, manufacturing, and testing defects of the 617 seal and the defects in the groove into which 617 seal was placed. This groove was on the engine torquemeter shaft manufactured by GM. Plaintiffs' theory is that the amount of surface roughness and machine lead present on the torquemeter shaft exceeded industry standards and design specifications, contributing to a leak of combustible fluids from the allegedly defective seals and causing the crash. GM challenges Mr. Dega's capacity to testify on several counts.

i. Facsimile Measurement of Surface Roughness

First, GM argues that Mr. Dega measured the surface roughness of the torquemeter shaft with a plastic facsimile product, called "Facsimile Measure-Image," which resulted in an inaccurate measurement. According to GM's expert, Dr. Leslie A. Horve, the facsimile measurement method is less accurate than a direct measurement because the facsimile material may not properly flow into the marks on the surface being measured, the facsimile may be damaged during removal from the surface, and tiny bubbles may form on the facsimile during curing. Dr. Horve does not report the source of this information. Additionally, GM asserts that Mr. Dega made his measurements over too small an evaluation length to comply with the national standard for measuring surface finish, and that the facsimile measurements taken by Dr. Horve himself proved to be less accurate than direct

measurements. As a result, GM claims that Mr. Dega's measurement of surface roughness is a poor "fit" under the facts of the case.

Because GM's argument addresses the facsimile measurement technique's reliability rather than its "fit," the court will examine that method under the Daubert and Downing factors. See infra part I.A. GM's argument is unpersuasive for several reasons. First, plaintiffs have submitted an "Application and Instructions Catalog" for Mr. Dega's facsimile product which states, "[l]aboratory reports on FACSIMILE specimens show surface roughness measurements of 0.1 to 2,000 microinches are exact duplicates of the material tested, measurable on surface testing instruments of both electronic and optical types." Pls. Ex. 4 at Figure 2. This adequately addresses the testability and margin of error of Mr. Dega's facsimile measurement. The document also states that "Facsimile is used all over the world by small as well as large firms. Almost all major airlines use it to check aircraft engines and parts -- nuclear, aerospace and automotive hardware; Military [sic] inspection usage is extensive." Id. Here, plaintiffs establish the general acceptance of this method, as well as its non-judicial usage. In addition, Mr. Dega attests, "I have made hundreds of Facsimile molds during my career under a variety of conditions. I have compared the Facsimile product's accuracy to calibration standard pieces and have found the Facsimile to be extremely accurate within a few microinches." Dega Aff., Pls. Ex. 2 at 3. Plaintiffs have sufficiently addressed the testability, margin of error, general

acceptance, and non-judicial usage of Mr. Dega's facsimile measurement technique. Other than the contrary, unsupported opinion of its own expert, GM has not presented any credible evidence to rebut Mr. Dega's and the manufacturer's representations of accuracy.

Secondly, Dr. Horve derives his national standard for measurement evaluation lengths from "Table 4-2, page 35 of ASME B46.1-1995," "Surface Texture (Surface Roughness, Waviness and Lay)--An American National Standard." Horve Report, GM Ex. C at 6. This document has not been submitted to the court for a determination of whether it in fact sets forth a recognized national standard for the length necessary to measure surface roughness. Furthermore, Dr. Horve discusses this national standard in reference to direct measurements of the torquemeter shaft, Id. at 6, and does not indicate whether it applies equally to the facsimile measurements taken by Mr. Dega. Id. at 7-8. That leap of logic is made by GM in its brief, GM Br. at 11, and cannot be credited as scientific or technical opinion.

Finally, with regard to Dr. Horve's own facsimile measurements, Dr. Horve states, "[a] facsimile of the #617 seal gland was made using a two part hard rubber material." Horve Report, GM Ex. C at 7. He does not report whether his facsimile measurements were made with "Facsimile Measure-Image," the product used by Mr. Dega. However, the catalog for "Facsimile Measure-Image" explicitly states that it is a "plastic formula," Pls. Ex. 4 at fig. 2 (emphasis added), suggesting that GM's

plastic facsimile was composed of a material different from Dr. Horve's "hard rubber" facsimile. In addition, Mr. Dega testified that "GM/Allison representatives purchased an inferior dental-type plaster and attempted to obtain a similar mold Their mold, however, adhered to the groove surface and broke into pieces when they attempted to remove it. . . . GM took another mold of the subject shaft at its plant" Dega Aff., Pls. Ex. 2 at 4. Dr. Horve does not identify which, if any, of the molds referred to by Mr. Dega was used for his facsimile measurements. In any case, the court cannot conclude that because a "hard rubber" facsimile's measurements were inaccurate that a plastic facsimile's measurements are similarly flawed.

GM's attempt to discredit the reliability of Mr. Dega's facsimile measurement technique has fallen far short of the mark. However, because the court must have a proper factual foundation before ruling on admissibility, Hines v. Consolidated Rail Corp., 926 F.2d 262, 269 (3d Cir. 1991), GM may attempt to remedy the substantial shortcomings in its arguments regarding Mr. Dega's facsimile measurement technique at the Daubert hearing.

ii. Machine Lead

Next, GM asserts that Mr. Dega's testimony regarding the presence of machine lead on the torquemeter shaft should be excluded because his measurements were not performed in accordance with industry standards.⁴ Dr. Horve reports that the

⁴ Dr. Horve defines shaft lead (i.e., machine lead) as the "continuous spiral grooves on a shaft surface that can be

industrial method of measuring shaft lead is to "chuck" the shaft in a lathe, lightly coat it in silicone "with a viscosity of 5 to 10 cps," drape a loop of quilting thread over the surface of the shaft with a one ounce weight suspended from it, and rotate the shaft at 60 RPM. Horve Report, GM Ex. C at 9. "If lead exists, the thread will traverse across the shaft." Id. He cites two documents which recommend this technique, Rubber Manufacturer publication OS-1, "Shaft Finishing Techniques For Radial Lip Type Shaft Seals," and the Society of Automotive Engineers recommended practice SAE J946, "Application guide to Radial Lip Seals." Id. He states that "[t]his document has been accepted as an American National Standard." Id.

In contrast, Mr. Dega measured the torquemeter shaft's lead by visually examining a magnified (5X size) photograph. He thus determined that a "lathe turning lead" was present, and concluded that "a turning lead in a sealed surface will almost always cause leakage, . . . [especially when] the seal design does not provide sufficient compressive loading of the compound." Dega Report, GM Ex. D. at unnumbered page 1. In response, Dr. Horve opines that "[i]t is not appropriate to assume lead is present by visual examination, analysis of photographs and no knowledge of the manufacturing process. Shaft lead measurements and a complete

generated by the relative axial motion of the finishing tool during the manufacture of the sealing surface." Horve Report, GM Ex. C at 8. Plaintiffs contend that excess machine lead present on the torquemeter shaft formed a leak path from the fluid to the air side of the defectively installed seal lip, causing leakage of combustible gear box fluid.

review of the manufacturing procedures is recommended." Horve Report, GM Ex. C at 11. GM also argues that because the torque-meter shaft was manufactured using a "plunge grind" technique, Mr. Dega's assumption that the shaft was manufactured using a lathe technique invalidates his entire conclusion that excessive machine lead was present.

Plaintiffs do not directly address GM's contention that Mr. Dega's visual examination of magnified photographs to evaluate the presence of lead was inappropriate. They have, however, submitted documents from GM's Research Laboratories which discuss the detection of lead on "'C' Pinion Flanges"⁵ using "photomicrographs," as well as the failure to detect lead on other shafts where lead was known to be present using a copper wire method similar to that which Dr. Horve espouses. See Pls. Ex. 5 & 6.

GM's argument attacks the reliability of Mr. Dega's method of detecting and measuring machine lead. Thus, the admissibility of Mr. Dega's testimony regarding this method should be scrutinized in light of the eight factors supplied under Daubert and Downing. See infra part I.A. The parties, however, have not significantly addressed those criteria in discussing Mr. Dega's photographic and visual examinations. In favor of GM, Dr. Horve has stated that his "weighted thread" technique is a national

⁵ Plaintiffs have not described what "C Pinion Flanges" are, nor have plaintiffs stated whether "C Pinion Flanges" have any relation to the type of torque-meter shaft at issue in this case.

standard for detecting machine lead (although he did not state that it is the only reliable means of doing so). However, Dr. Horve's conclusory statement regarding the inappropriateness of Mr. Dega's visual and photographic examination is unsupported by either objective evidence or reasoned criticism. Further, plaintiffs have submitted documents from General Motors' Research Laboratories which discuss the use of "photomicrographs" in studying the presence of lead. Plaintiffs have not explained whether Mr. Dega's magnified photographs are equivalent to the photomicrographs utilized by GM.

Because the court lacks an adequate factual record upon which to decide this issue, the parties will address the validity of Mr. Dega's lead detection technique at the Daubert hearing. See Hines v. Consolidated Rail Corp., 926 F.2d 262, 272 (3d Cir. 1991) ("A detailed factual record is required at the evidentiary stage, particularly when a summary judgment may result"). In doing so, they should take into consideration the eight Daubert and Downing factors, as well as any other factors the parties believe to be relevant. Paoli II, 35 F.3d at 742 n.8.

iii. Volume of Fluid Leaked

GM also challenges Mr. Dega's proffered testimony as speculative because he did not calculate the volume of fluid that leaked as a result of the allegedly defective surface finish and machine lead. GM contends that this failure is fatal to plaintiffs' argument because without determining volume, Mr. Dega "can only speculate that the surface finish [and machine lead]

contributed somehow to the leakage." GM Br. at 13. Why this measurement is crucial has not been explained by GM, nor has GM made clear why Mr. Dega's failure to analyze the amount of fluid which leaked negates his conclusion that leakage in fact occurred. GM cites several cases in support of its argument, all of which are inapposite to the issue of Mr. Dega's failure to determine leakage volume.⁶ In each of the cited cases, the experts either lacked a reliable scientific theory to support their opinions, or testified without any evidence to support their scientific theory. That is not true here, where Mr. Dega relies on two purportedly well-established principles relating to surface roughness and machine lead as grounds for his conclusion

⁶ Daubert II, 43 F.3d 1311, 1319 (9th Cir. 1995)(excluding expert who testified without any scientific theory -- either tested or untested -- regarding the cause of the plaintiffs' birth defects); Stibbs v. Mapco, Inc., 945 F. Supp. 1220, 1224-25 (S.D. Iowa 1996)(excluding expert witnesses because their theory posited existence of particle not known to be present at time of accident and not located afterwards, and because there was no way experts' theory could be proven or disproven); Sanderson v. IFF, 950 F. Supp. 981, 994 (C.D. Cal. 1996)(excluding expert testimony as unreliable for failure to conduct independent research, rely on published and reviewed research, or point to any objective source showing that they followed scientific method as practiced by at least a minority of scientists in the field); Diviero v. Uniroyal Goodrich Tire Co., 919 F. Supp. 1353, 1363 (D. Ariz. 1996)(excluding expert who lacked credentials in the manufacture of steel-belted radial tires and who "offered no reasonable explanation why he concluded that there was a defect" in the tires), aff'd, 114 F.3d 851 (1997); In re Hanford Nuclear Reservation Litig., 894 F. Supp. 1436, 1447, 1448-49 (E.D. Wash. 1995)(rejecting expert's theory on why salmon failed to spawn normally as "utterly speculative" because it was not independently researched, tested or subjected to peer review).

that fluid leakage occurred.⁷ Given the general acceptance of these two principles, which GM has not seriously contested, the primary dispute remains over whether Mr. Dega's methods of computing those characteristics were reliable and accurate. GM argues that Mr. Dega's failure to measure the amount of fluid leakage makes his conclusion speculative and inadmissible. That is not necessarily true. "Daubert does not set up a test of which opinion has the best foundation, but rather whether any particular opinion is based on valid reasoning and reliable methodology." Kannankeril v. Terminix Int'l, Inc., No. 96-5818, 1997 WL 638795, at *3 (3d Cir. Oct. 17, 1997); see also Paoli II, 35 F.3d at 744 ("The grounds for the expert's opinion merely have to be good, they do not have to be perfect."). The cases cited by GM do not indicate that Mr. Dega must calculate the exact amount of fluid leakage, especially when GM has offered no explanation as to why that calculation is necessary to provide an adequate basis for his conclusions. See General Elec. Co. v.

⁷ The first principle is that "the greater the roughness on the metal surface or a groove meant for sealing, the greater the leak potential." Dega Aff., Pls. Ex. 2 at 4. GM has not contested this statement. The second principle holds that "machining lead in the surfaces of the shaft will form a leak path from the fluid to the air side of the seal lip and cause leakage." Id. Dr. Horve agrees that machine lead can cause leakage, although not in all cases. Horve Report, GM Ex. C at 8. He describes seal designs known as "Hydrodynamic Seals" which enhance sealing performance by deliberately incorporating grooves on unirotational shafts and spirals, or helices on seal lips. Because Dr. Horve does not state that the torque-meter shaft at issue here utilized such a design, that observation does nothing to refute Mr. Dega's statement that the presence of machine lead causes leakage.

Joiner, No. 96-188, 1997 WL 764563, at *6 (U.S. Dec. 15, 1997)(allowing exclusion of expert opinion where there is "too great an analytical gap between the data and the opinion proffered").

GM's criticism of Mr. Dega's failure to calculate leakage volume goes more appropriately to weight than admissibility. See In re TMI Litig. Cases Consolidated III, 922 F. Supp. 1038, 1044 (M.D. Pa. 1996)(holding that medical expert's use of some standards controlling his technique and not others goes to weight of evidence and not admissibility). Furthermore, a judge should only exclude evidence if the flaw in an expert's investigative process is large enough that the expert lacks "good grounds" for his or her conclusion. Paoli II, 35 F.3d at 746. That does not appear to be true here. At the Daubert hearing, however, GM may present evidence as to why the calculation of the amount of fluid which may have leaked as a result of surface roughness and machine lead is essential to plaintiffs' case.

GM further maintains that even if the amount of machine lead found by Mr. Dega was in fact present, that amount "is within industry standards and would not have caused sufficient leakage to cause the accident in this case." GM Br. at 14. Here, GM essentially argues that Mr. Dega's conclusion (that fluid leakage from excessive surface roughness and machine lead caused the accident) is incorrect.⁸ "The focus, [however], must be solely

⁸ The court questions the accuracy of Dr. Horve's calculations. For instance, Dr. Horve "assumes" pressure drop to

on principles and methodology, not on the conclusions they generate." Daubert, 509 U.S. at 595. Although "[a] court may conclude that there is simply too great an analytical gap between the data and the opinion proffered," General Elec. Co. v. Joiner, No. 96-188, 1997 WL 764563, at *5 (U.S. Dec. 15, 1997), Mr. Dega's conclusions do not appear to lack the requisite evidentiary basis. Moreover, in cases "in which a party argues that an expert's testimony is unreliable because the conclusions of an expert's study are different from those of other experts . . . there is no basis for holding the expert's testimony inadmissible." Paoli II, 35 F.3d 717, 746 n.15 (3d Cir. 1994). So long as Mr. Dega's techniques are valid, the court will not exclude his opinion merely because GM's expert arrives at a different conclusion.

4. Warren Lieberman

Warren Lieberman is offered as an expert in aviation accident investigations. Mr. Lieberman opines that a combustible fluid leaked past the defective 617 seal in the Osprey's right nacelle and entered an air inlet in the right engine, causing the engine to surge and "flame out." Lieberman Report, GM Ex. I at 10. He concludes that "[t]he events contributing to the crash of the aircraft were a result of negligence on the part of the

be 100 pounds per square inch for purposes of calculating fluid leakage. He also uses the viscosity measurement of "typical gear box oils" in the same equation. Without using figures derived from the actual materials and conditions present in the Osprey at the time of the accident, or based upon reasonable estimates of those conditions, Dr. Horve's calculations are speculative.

defendants for failure to take corrective action to fix known problems affecting safety of flight components." Id. GM attacks Mr. Lieberman's qualifications to express opinions concerning fluid sealing and the allegedly defective parts manufactured by GM, and argues that his testimony impermissibly parrots or mischaracterizes documents exchanged in this litigation. GM further argues that Mr. Lieberman lacks "good grounds" for his conclusions on four specific points.

i. Mr. Lieberman's Qualifications

GM contends that Mr. Lieberman is a metallurgical engineer with a masters degree in "engineering science" who has no experience in seal design and only limited experience in engine design.⁹ As a result, argues GM, Mr. Lieberman is unqualified to testify regarding the implications of surface roughness on the torquemeter shaft, design pressure in the torquemeter housing, three prior engine surges allegedly caused by the ingestion of combustible fluid, and the failure to utilize an instrumentation rake to test for inlet distortion in the engine.

GM cites Diviero v. Uniroyal Goodrich Tire Co. for the proposition that Mr. Lieberman should be excluded because his expertise is not particular to the science involved here. 919 F. Supp. 1353 (D. Ariz. 1996). Diviero was a products liability

⁹ Mr. Lieberman's experience in engine design dates back to 1956 to 1961, when he participated in "engineering support of fabrication of metallic components" and "high temperature testing of materials for nuclear aircraft engine applications." GM Br. at 16.

case involving steel-belted radial tires. Id. The plaintiff's expert had extensive experience with bias-belted tires, but no significant experience with steel-belted radials. Id. at 1356. The district court excluded the plaintiff's expert because the nature of the two types of tires differed greatly and because the expert's methodology was conclusory and unreliable. Id. at 1360.

That is not so here. Mr. Lieberman has a B.S. in Metallurgical Engineering from the University of Missouri and a masters in Engineering Science from Renssalaer Polytechnic Institute. He testified that he has "participated in dozens of accident investigations for Boeing in the United States, Vietnam and Germany." Lieberman Aff., Pls. Ex. 1 at 2. He possesses experience in the manufacture of rotor blades and composite parts for Boeing's Helicopter Division and has "worked extensively with design engineers on critical aircraft components, assemblies and mechanisms including reviewing fluid sealing systems." Id. Finally, Mr. Lieberman formerly served as Boeing's program manager for the V-22 Osprey -- the same aircraft in question here. Id. at unnumbered pg. 3.

"Rule 702's liberal policy of admissibility extends to the substantive as well as the formal qualification of experts." Paoli II, 35 F.3d 717, 741 (3d Cir. 1994). Courts should not impose overly rigorous requirements of expertise and may accept more generalized qualifications. Id. In light of the liberal approach employed by the Court of Appeals in evaluating expert qualifications, it is apparent that GM has thus far failed to

overcome plaintiffs' showing that Mr. Lieberman possesses "the specialized knowledge or expertise that will assist the trier of fact." See id. at 742.

ii. Grounds for Mr. Lieberman's Opinion

GM also contends that Mr. Lieberman should not be permitted to "parrot" or mischaracterize documentation exchanged in this litigation, and that he should be excluded because he performed no testing on the torquemeter shaft or the torquemeter housing. In forming his opinion, Mr. Lieberman: (1) reviewed the Navy's Court of Inquiry report and many of its exhibits; (2) reviewed data, documents, and testimony from Bell, Macrotech, and GM employees as well as non-party witnesses from Boeing and the United States government; (3) inspected the aircraft wreckage, including the torquemeter shaft and seals in question, and exemplar seals from Macrotech; (4) reviewed design drawings of the relevant components; and (5) reviewed the Interface Document, coordination memos, and testimony defining GM's responsibilities as they relate to the interface of its parts to Bell's parts. Rule 702 and Daubert do not require Mr. Lieberman to perform independent testing on the Osprey parts at issue here. See Daubert, 509 U.S. at 592 (noting that experts may offer opinions "that are not based on firsthand knowledge or observation"). Rule 703, however, does require that the secondhand evidence relied upon by Mr. Lieberman be "of a type reasonably relied upon

by experts" in his particular field. Fed. R. Evid. 703.¹⁰ Under Rule 703, the court must "make a factual inquiry and finding as to what data experts in the field find reliable." Indian Coffee Corp. v. Proctor & Gamble Corp., 752 F.2d 891, 894 (3d. Cir. 1985). But the parties have not yet submitted Mr. Lieberman's secondhand evidence for a determination of its reliability under Rule 703, and the court cannot make that finding without knowing the basis of Mr. Lieberman's opinion. Ambrosini v. Labarraque, 966 F.2d 1464, 1469 (D.C. Cir. 1992). Therefore, if plaintiffs wish to have Mr. Lieberman give his expert opinion based on that secondhand evidence, they should present it to the court and demonstrate that it is of a type reasonably relied upon by experts in the field of aviation accident investigation.¹¹

¹⁰ Fed. R. Evid. 703 provides:

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.

¹¹ The standard applied in determining the reliability of secondhand evidence under Rule 703 is identical to the standard applied under Rule 702 -- i.e., "whether there are good grounds to rely on this data to draw the conclusion reached by the expert." Paoli II, 35 F.3d 717, 748-49 (3d Cir. 1994). In making a Rule 703 reasonable-reliance determination, a judge can take into account "the particular expert's opinion that experts reasonably rely on that type of data, as well as the opinions of other experts as to its reliability . . . [and] other factors he or she deems relevant." Id. at 748. "If the underlying data are so lacking in probative force and reliability that no reasonable expert could base an opinion on them, an opinion which rests entirely upon them must be excluded." Id.

In addition, GM argues in its reply memorandum that plaintiffs have not divulged the grounds for Mr. Lieberman's opinion in four critical areas. First, Mr. Lieberman opines that GM's drawing allowed for a rougher surface finish on the torque-meter shaft than the 32 microinches specified by Bell. GM contends that plaintiffs have not explained the grounds for this observation and argue that the drawing itself flatly contradicts Mr. Lieberman's statement. Plaintiffs have not responded to this issue. However, in making this observation, Mr. Lieberman cites to the deposition of John Snakenberg, Allison's Flight Test Manager for the V-22 Osprey. See Lieberman Report, GM Ex. G at 6. The parties have not submitted Mr. Snakenberg's deposition to the court for examination. Plaintiffs must therefore establish the validity of Mr. Lieberman's grounds for this conclusion at the Daubert hearing.

Next, GM contests the lack of grounds for two related opinions by Mr. Lieberman: (1) that GM never resolved the problem of pressure in the torque-meter housing; and (2) that GM was aware of the removal of the environmental/donut seal from between the torque-meter housing and the input quill retainer of the PRGB. It is undisputed that the environmental/donut seal was removed. At issue is GM's knowledge of that action. Without citation of authority, GM argues that its awareness is a factual issue rather than an expert issue, and thus inappropriate for expert

testimony. In his report, Mr. Lieberman infers GM's awareness of the seal's removal from three facts: (1) that there "were numerous coordination memoranda between Bell and Allison without resolution to the problem;" (2) that GM field representatives were on-site at the flight test facilities where engines were being installed and removed; and (3) that unilateral removal of the environmental/donut seal by Bell-Boeing would have violated the interface agreement with GM. Lieberman Report, GM Ex. G at 6. Mr. Lieberman further testified that he gained experience in "interface relationships" between Boeing and other companies while working "on the administrative side of Boeing's projects." Lieberman Aff., Pls. Ex. 1 ¶ 4.

"The touchstone of Rule 702 ... is the helpfulness of the expert testimony, i.e., whether it 'will assist the trier of fact to understand the evidence or to determine a fact in issue.'" United States v. Stevens, 935 F.2d 1380, 1398 (3d Cir. 1991) (quoting Downing, 753 F.2d at 1235). In the Third Circuit, "doubts about whether an expert's testimony will be useful should generally be resolved in favor of admissibility unless there are strong factors such as time or surprise favoring exclusions. The jury is intelligent enough, aided by counsel, to ignore what is unhelpful in its deliberations." In re Japanese Elec. Products Antitrust Litig., 723 F.2d 238, 279 (3d Cir. 1983)(quoting 3 J. Weinstein & M. Berger, Weinstein's Evidence ¶ 702[03], at 702-14-15 (1982)). While a jury may be fully competent to receive the facts relied upon by Mr. Lieberman and decide whether or not GM

had knowledge of the environmental/donut seal's removal, the Third Circuit's liberal standard for "helpfulness" allows the admission of Mr. Lieberman's opinion on this ultimate issue of fact unless GM can demonstrate that strong factors favor exclusion. See Dunn v. HOVIC, 1 F.3d 1362, 1368 (3d Cir. 1993) (finding that, where expert's opinion was based upon review of defendant corporation's records, it was not abuse of discretion to admit expert's opinion that defendant knew of risks associated with asbestos exposure). In view of the current record, there are no factors which require exclusion of Mr. Lieberman's opinion on this subject. GM may, however, present further evidence on this issue at the Daubert hearing.

Lastly, GM takes issue with Mr. Lieberman's opinion that the three prior engine surges during the flight test program were caused by the ingestion of combustible fluids because "he provides no analysis, and refers to no documentation, to validate his view." GM Br. at 18. In his report, Mr. Lieberman states that "[o]ver a year before this accident, Bell and Allison were aware of potential damaging surges associated with the ingestion of an external source of combustible fluid and no action was taken." Lieberman Report, GM Ex. G at 8. He cites the Navy's Court of Inquiry Report, Exhibit 50, as the source of this observation. While an expert may base his opinion on data presented to the expert "outside of court and other than by his own observation," Fed. R. Evid. 703 advisory committee notes, in order for such information to be used in forming an expert

opinion it must be "of a type reasonably relied upon by experts in the particular field." Fed. R. Evid. 703. As previously mentioned, the Navy's Court of Inquiry Report has not been submitted to the court for a determination of whether it provides an adequate basis for Mr. Lieberman's opinions, nor have plaintiffs presented evidence that documents of that kind are reasonably relied upon by aviation accident experts in forming their opinions. The parties should therefore address the reliability of the Navy's Court of Inquiry Report and the reasonableness of its use in forming Mr. Lieberman's opinion on this issue at the Daubert hearing.

B. Fed. R. Evid. 403

GM also seeks exclusion of Mr. Dega's and Mr. Lieberman's testimony under Federal Rule of Evidence 403.¹² "Rule 403 is rarely appropriate as a basis for pre-trial exclusion, because a judge cannot ascertain potential relevance until that judge has a virtual surrogate for a trial record." Paoli II, 35 F.3d at 747. GM bases its Rule 403 motion on the broad assertion that "the opinions of Messrs. Dega and Lieberman contradict record facts and are unsupported by testing." GM Br. at 21. Whether the

¹² Fed. R. Evid. 403 provides:

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.

opinions of plaintiffs' experts contradict record facts is not clear from the record. Moreover, GM's assertion that Mr. Dega's and Mr. Lieberman's opinions are unsupported by testing has not been finally determined. As a result, the court will not exclude the opinions of plaintiffs' experts under Rule 403 at this time. GM remains free, however, to renew its Rule 403 objection to those experts' testimony at the Daubert hearing and/or at trial. See Paoli II, 35 F.3d at 747 (allowing exclusion under Rule 403 after in limine hearing on admissibility).

II. Conclusion

In sum, the court finds that the scientific reliability test set forth by the Supreme Court in Daubert, 509 U.S. at 593-94, and by the Court of Appeals in Downing, 753 F.2d 1238-39, will be applied to the technical testimony of plaintiffs' experts. GM's alternative request for a Daubert hearing on the reliability of Mr. Dega's and Mr. Lieberman's techniques and methodologies is **GRANTED**. With regard to the Daubert hearing, the parties should keep in mind the court's above-mentioned findings and its concerns relating to the shortcomings of the parties' arguments. The court will withhold final judgment on GM's motion to exclude the testimony of Mr. Dega and Mr. Lieberman until after the Daubert hearing. An appropriate order follows.