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Caroline Frances Barry

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CHEMICAL CLAIMS DRAFTING AFTER *LUBRIZOL*

CAROLINE FRANCES BARRY†

I. INTRODUCTION

One of the most significant chemical claims drafting cases to have been decided in recent years is *Exxon Chemical Patents, Inc. v. Lubrizol Corp.*¹ In two companion decisions,² divided panels of the U.S. Court of Appeals for the Federal Circuit held that a chemical composition claimed in an ingredient-based form³ is not infringed when there is interaction between the ingredients after they have been combined so as to alter either their quantity or their chemical form.⁴ The implications of

† B.S. ChE, August 1984, Michigan State University (East Lansing, Michigan); J.D., May 1991, Indiana University (Indianapolis, Indiana); Attorney at Blakely, Sokoloff, Taylor & Zafman.

1. 64 F.3d 1553 (Fed. Cir. 1995), *cert. denied*, 518 U.S. 1020 (1996) [hereinafter "*Lubrizol*" or "*Lubrizol* decision"].

2. *Lubrizol*, 64 F.3d 1553; *Exxon Chemical Pat., Inc. v. Lubrizol Corp., reh'g denied*, 77 F.3d 450 (Fed. Cir. 1996) [hereinafter "decision on rehearing in *Lubrizol*" or "companion decisions in *Lubrizol*"]. In *Lubrizol*, Judge Clevenger authored the majority's most substantive opinion, 64 F.3d at 1555-62; with Judge Plager concurring in a brief separate opinion, 64 F.3d at 1562-63; and Judge Nies provided a detailed dissent, 64 F.3d at 1563-70. *See infra* nn. 55-113 and accompanying text. In the decision on rehearing in *Lubrizol*, Judge Clevenger authored a terse decision denying a rehearing in which Judge Plager concurred, 77 F.3d at 451; Judge Mayer wrote a brief separate opinion concurring with reluctance, *id.*; and Judge Newman wrote an extended dissent, 77 F.3d at 451-57. *See infra* nn. 115-135 and accompanying text.

3. In what follows, a claim drafted in the traditional form for chemical compositions will be referred to as an "ingredient-based composition claim." This phrase has been defined as referring "to patent claims which claim a composition by listing the ingredients used in making it. In many cases the claim also specifies the amount or ratio of the ingredients." *Amicus Curiae Br. of the Pharm. Research and Mfr. of Am. at 2, Exxon Chemical Pat., Inc., v. Lubrizol Corp., cert. denied*, 518 U.S. 1020 (1996) [hereinafter "PhRMA Br."]. Claims for chemical compositions are a subset of those for compositions of matter—one of the four classes of statutory subject matter set out in 35 U.S.C. § 101. *Lubrizol*, 64 F.3d at 1562-63 (Plager, J., concurring); *see infra* nn. 138, 193-194 and accompanying text.

4. *Lubrizol*, 64 F.3d at 1557-58. This article will deal with the perception shared by the majority and the dissenting judges in both the *Lubrizol* decision and the decision on rehearing in *Lubrizol* that the central issue was whether ingredients-based claims can cover products where post-combination interactions have altered the identity and/or quan-

Lubrizol touch both existing patents for chemical compositions and the prudent drafting of patent claims for such inventions in the future.

As a consequence of the enforceability and validity of existing patent claims being thrown into doubt by *Lubrizol*, imitators may feel themselves free to use the same ingredients specified in the "recipe" disclosed by the patentee to create an identical product without incurring liability, save in the unusual case where there is no post-combination interaction between those ingredients.⁵ Such a *milieu* invites an increase in the incidence of costly patent litigation.⁶ Adverse results in such litigation by patentees may encourage recourse to trade secret protection as an alternative.⁷

In *Lubrizol's* aftermath, both patent attorneys and agents should be cautious when using ingredient-based composition claims to protect their clients' chemical inventions. The practical effect of this ruling is that a claim for a chemical compound must now provide *both* the initial ingredients *and* their respective amounts post-combination in order to prevail in a patent infringement case. This new disclosure requirement will be problematic for many chemical inventions because of the inherent complexity of determining when a reaction has reached equilibrium suf-

ties of the starting ingredients. A strong case has been made by a noted patent law authority that this understanding of the case is fundamentally flawed. Martin J. Adelman, *Patent Law Perspectives* vol. 3, § 3.2[1], §§ 3-12.20-37 (Matthew Bender & Co. 1996). Professor Adelman, who served as an expert witness for *Lubrizol*, maintains that the problem of interpretation before the Federal Circuit was the result of Exxon's defective specification. *Id.* at 3-12.20. The specification, he argued, reflects the inventors' ignorance of the occurrence of a chemical reaction that caused the listed ashless dispersants to cease being ashless once combined. *Id.* at 3-12.23. "Ashless" denotes an absence of combined or complexed metal." *Lubrizol*, 64 F.3d. at 1564 n.3 (Nies, J., dissenting). Dispersants for use in lubricating oils are easier to manufacture in ashless form. *Id.* Professor Adelman argued that since Exxon's specification focuses almost exclusively upon borated ashless dispersants that do not complex with metals drawn from other ingredients to become nonashless, the inventors may have mistakenly assumed that all of the dispersants listed in their specification would behave in the same way. Adelman, *Patent Law Perspective*, at 3-12.24. Based upon this mistaken assumption, the inventors may have felt free to distinguish their invention over a significant piece of prior art by noting that the copper used in their invention did not complex with metals from the other ingredients while that used in the prior art did. *Id.* at 3-12.25.

5. *Lubrizol*, 77 F.3d at 452 (Newman, J., dissenting on denial of rehearing).

6. *Amicus Curiae Br. of Proctor & Gamble Co.* at 7-8, *Exxon Chemical Patents, Inc., v. Lubrizol Corp.*, cert. denied, 518 U.S. 1020 (1996) [hereinafter "Proctor & Gamble Br."]. Indicative of the potential costliness of patent litigation is the fact that, at trial, Exxon received an award of \$23,700,000 in attorneys' fees. 64 F.3d at 1563 (Nies, J., dissenting). In assessing the reasonableness of Exxon's claim for attorney's fees, the district court judge noted that *Lubrizol's* attorneys' fees "closely approximat[ed] Exxon's." *Exxon Chemical Pat., Inc., v. Lubrizol Corp.*, No. H-89-3203 (S.D. Tex. Feb. 17, 1993) (preliminary order granting costs).

7. *Proctor & Gamble Br.*, *supra* n. 6, at 14-15.

ficient to determine its intermediate products.⁸

This article will attempt to examine the legitimacy of the Federal Circuit's companion decisions in *Lubrizol* in relation to long-standing precedent for chemical claims drafting. The author asserts that these decisions were wrongly decided and proposes that Congress amend the *Patent Act* to allow ingredient-based claiming to continue to be used and enforced in the same fashion as before the Federal Circuit's recent misadventure. As an interim measure, the author suggests precautions that practitioners may take to minimize the peril to their clients.

II. *EXXON CHEMICAL PATENTS, INC. v. LUBRIZOL CORPORATION*

A. FACTUAL AND PROCEDURAL BACKGROUND

Realizing that the oxidation of motor oils, with resultant increases in both acidity and viscosity, would become a major problem for the smaller, harder-working and hotter-running engines increasingly common during the 1970s, Exxon set about searching for a solution.⁹ In 1977, an experiment revealed that the addition of small amounts of copper to motor oil compositions significantly reduced oxidation.¹⁰ This discovery taught away from the consensus among lubricating oil fabricators that copper was a poor antioxidant.¹¹ In 1979 and 1980, Exxon applied for patent protection for its invention in the U.S., the United Kingdom ("U.K."), and elsewhere.¹² Lubrizol became aware of the teaching of Ex-

8. *Id.* at 6-7; see PhRMA Br., *supra* n. 3, at 11-12.

9. Petition for writ of certiorari. at 3-4, *Exxon Chemical Pat., Inc., v. Lubrizol Corp.*, 518 U.S. 1020 (1996) [hereinafter "Exxon's Pet. for Cert."]; see *Lubrizol*, 64 F.3d at 1556.

10. Exxon's Pet. For Cert., *supra* n. 9, at 4. The composition of crankcase lubricating oils and concentrates together with the need for a supplemental antioxidants such as oil-soluble copper is set out by Judge Clevenger in *Lubrizol* as follows:

Such products typically contain the following components as additives: (1) a dispersant, which suspends impurities to prevent sludge and varnish deposits on engine parts, (2) ZDDP, a zinc containing compound that inhibits engine wear and produces antioxidant results for the oil, (3) a detergent, which helps prevent engine deposits, and (4) a supplemental antioxidant, necessary because use of ZDDP is limited by environmental concerns.

64 F.3d at 1556.

11. Exxon's Pet. for Cert., *supra* n. 9, at 4; see *Lubrizol*, 64 F.3d at 1563 (Nies, J., dissenting). Professor Adelman correctly points out that

a mere discovery, no matter how important, is not itself patentable. Thus, the discovery of the antioxidation effect of copper used in prior art lubricating oil formulations was not patentable to Exxon. Because copper had been added to prior art lubricating oil formulations containing ZDDP and copper complexed PIBSA/PAM dispersants, it was necessary for the applicants to claim formulations that were not anticipated by them.

Adelman, *supra* n. 4, at 3-12.29; see *Lubrizol Corp. v. Imperial Oil Co.*, 33 C.P.R.3d 1, 23 (Fed. Ct. Trial Div. 1990) (explaining PIBSA/PAM dispersants).

12. Exxon's Pet. for Cert., *supra* n. 9, at 4.

xon's U.K. patent application during 1981,¹³ confirmed the effectiveness of oil-soluble copper as an antioxidant by the mid-1980s,¹⁴ and began work shortly thereafter on incorporating its teaching into its own product line.¹⁵ Exxon's patent application for lubricating products making use of an oil-soluble copper antioxidant was the subject of extended prosecution proceedings before the U.S. Patent and Trademark Office ("PTO"),¹⁶ which issued Patent 4,867,890 ("890 patent") on September 19, 1989, under the title "Lubricating Oil Compositions Containing Ashless Dispersant, Zinc dihydrocarbyldithiophosphate, Metal Detergent and a Copper Compound."¹⁷ Exxon filed suit against Lubrizol for patent infringement that same day in the United States District Court for the Southern District of Texas.¹⁸

13. Brief in opposition to petition for certiorari at 8, *Exxon Chemical Pat., Inc., v. Lubrizol Corp.*, 64 F.3d 1553 (Fed. Cir. 1995) [hereinafter "Lubrizol's App. Br."]; Exxon's Pet. for Cert., *supra* n. 9, at 4; 64 F.3d at 1563 (Nies J., dissenting). In the U.S., patent applications are optimally kept secret until the patent issues. 35 U.S.C. § 122. In the U.K., patent applications are made public after a period prescribed by regulation. *Patents Act*, (1977) SI 1978/586. The prescribed period is 18 months. *Id.* At the time of Exxon's U.K. patent application for the invention that ultimately lead to the '890 patent in the U.S., the relevant regulation was *Patent Rules*, (1978) S.I. 1978/216; currently, the relevant regulation is *Patent Rules*, (1995) S.I. 1995/2093.

14. Exxon's Pet. for Cert., *supra* n. 9, at 5.

15. *Id.*

16. Respt. Br. in Opposition at 4-5, *Exxon Chemical Pat., Inc., v. Lubrizol Corp.*, 518 U.S. 1020 (1996) [hereinafter "Lubrizol's Br. in Oppn"].

17. The claims at issue in the litigation between Exxon and Lubrizol, Claims 1 and 61; are set out in full in an Appendix to this paper. In her dissent, Judge Nies provides the following brief overview of these claims:

Claim 1 is directed to "a lubricating oil composition" comprising: (a) a major amount of lubricating oil; (b) a specified amount of dispersant (either about 1-10 wt. percent of an ashless dispersant or about 0.3-10 wt. percent of a "polymeric viscosity index improver"); (c) about 0.01 to 5.0 parts by weight of zinc dihydrocarbyl dithiophosphate ("ZDDP"); (d) about 5 to about 500 parts per million by weight of added copper in the form of an oil soluble copper compound; and (e) a calcium or magnesium detergent. Claim 61 claims a "lubricating oil concentrate composition" comprising the same five ingredients in different, specified amounts.

Lubrizol, 64 F.3d at 1564 (footnotes omitted).

18. Exxon's Pet. for Cert., *supra* n. 9, at 5. Several weeks after Exxon filed its patent infringement lawsuit, Lubrizol filed an action for a declaratory judgment in the United States District Court for the Northern District of Ohio without notice to the Texas district court. *Exxon Chemical Pat., Inc., v. Lubrizol Corp.*, 935 F.2d 1263-65 (Fed. Cir. 1991) (discussing the peculiar circumstances surrounding the issuance of this patent and the legal gamesmanship that they inspired). Lubrizol justified this action on the basis that Exxon's lawsuit was premature given the '890 patent's unavailability from the PTO. *Id.* Accordingly, Lubrizol argued, the Texas district court lacked subject matter jurisdiction to hear the patent infringement lawsuit. *Id.* The Federal Circuit ultimately determined that the Texas district court did have subject matter jurisdiction notwithstanding certain irregularities surrounding the issuance of the '890 patent. *Id.* See *Exxon Chemical Patents, Inc. v. Lubrizol Corp.*, 935 F.2d 1263, 1264-65 (Fed. Cir. 1991) (discussing the peculiar circum-

At trial, Lubrizol did not dispute that its products were manufactured using the same ingredients in the same amounts as had been disclosed in Exxon's patent.¹⁹ Instead, it argued that it had not literally infringed²⁰ Exxon's patent because Lubrizol's product did not contain the quantity of ashless dispersant²¹ that was indicated in the claims of Exxon's patent.²² Lubrizol asserted that the '890 patent was drawn to a composition defined by its final components rather than its initial ingredients; Exxon argued the reverse.²³ Instead of deciding the claim construction before the jury was impaneled, the issue was fully litigated.²⁴ After considering both parties' claim constructions, the trial court chose

stances surrounding the issuance of this patent and the legal gamesmanship that they inspired).

19. *Id.*; *Lubrizol*, 64 F.3d at 1559 n.5; *id.* at 1564 (Nies, J., dissenting).

20. *Lubrizol*, 64 F.3d at 1555 n.1. 35 U.S.C. § 271 sets out the requirements for patent infringement. Courts have held that such infringement may occur either literally or under the doctrine of equivalents. See generally *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 21 (1997). The panel majority in *Lubrizol* addresses itself only to literal infringement. *Lubrizol*, 64 F.3d at 1555 n.1. In her dissent, Judge Nies argued that Exxon should not be barred from a trial under the doctrine of equivalents. *Id.* at 1570. The availability of such a trial was confirmed only after yet another Federal Circuit ruling. *Exxon Chemical Pat., Inc. v. Lubrizol Corp.*, 137 F.3d 1475 (Fed. Cir. 1998), *cert. denied*, 1998 U.S. LEXIS 5713 (1998). Subsequent to the companion decisions in *Lubrizol*, Exxon had made a motion before the district court for a new trial under the doctrine of equivalents and was refused. *Lubrizol*, 137 F.3d at 1477. This denial was vacated by the Federal Circuit on the grounds that its earlier decisions were confined to literal infringement only. *Id.* While the Federal Circuit found a remand unnecessary as regards literal infringement, it believed itself to have left open the possibility of new trial on other grounds. *Id.* at 1478.

21. See *supra* n. 4 and accompanying text.

22. Exxon's Pet. for Cert., *supra* n. 9, at 5; Lubrizol's Br. in Opp'n, *supra* n. 16, at 5-6. Lubrizol believed this view to have been bolstered by the fact that the specification of the '890 patent indicated that the claims were directed to ashless PIBSA/PAM dispersants. Adelman, *supra* n. 4, at 3-12.24-25. In support of this argument, Lubrizol noted that the '890 patent's specification described a patent owned by Lubrizol (the '493 patent) that was directed to nonashless dispersants. *Id.* In order to avoid an anticipation rejection under 35 U.S.C. § 102(a), Exxon limited its claims to ashless dispersants. *Id.* These ashless dispersants reacted in Lubrizol's composition so that the ashless dispersant was apparently non-existent in Lubrizol's end product. *Id.* at 3-12.36.

23. Exxon's Pet. for Cert., *supra* n. 9, at 5-7.

24. *Id.* Had the decision, been issued before the *Lubrizol* litigation had begun, a *Markman* bench trial (also known as a "*Markman* hearing,") probably would have been conducted to decide upon the proper claim construction. See *Markman v. Westview Instruments, Inc.* [hereinafter "*Markman*"], 52 F.3d 967 (Fed. Cir. 1995) (*en banc*), *aff'd*, 517 U.S. 370 (1996). Both parties then would have had an opportunity to appeal the trial court's claim construction to the Federal Circuit. See generally *Markman*, 52 F.3d 967. A subsequent jury trial would then have made use of the court's (rather than one of the parties'), claim construction in determining infringement. See generally *Markman*, 52 F.3d 967; see generally Frank M. Gasparo, *Markman v. Westview Instruments, Inc. and Its Procedural Shock Wave: The Markman Hearing*, 5 J.L. & Policy 723 (1997).

Exxon's claim construction and instructed the jury accordingly.²⁵ The jury found that Lubrizol had acted in bad faith and willfully infringed Exxon's patent.²⁶

B. ESOTERIC AND EXOTERIC VIEWS OF THE CASE

In analyzing the litigation between Exxon and Lubrizol over the '890 patent, one is faced with often remarkably different understandings of the case. Many of those intimately familiar with the prosecution history of the '890 patent suspect that it may have been improvidently granted by the PTO and are not unhappy with the outcome of the litigation as a matter of justice between the parties, for the sake of conciseness, this understanding will be referred to as the "esoteric view." However, a far wider audience, whose understanding of the case is gleaned solely from the published decisions of the Federal Circuit, view its outcome as a puzzling situation in which a patentee apparently lost the benefit of its invention by a judicial interpretation out-of-step with over a century of patent practice, for the sake of conciseness, this understanding will be referred to as the "exoteric view."²⁷

This article concerns itself chiefly with the exoteric view on the grounds that it is this view that has been incorporated into the received understanding of this Federal Circuit precedent. However, for the sake of completeness, it is worthwhile sketching the bases for the esoteric view. In juxtaposing the esoteric and exoteric views, one may be excused for believing that the Federal Circuit's decisions in the litigation between Exxon and Lubrizol is an apt illustration of the maxim that difficult cases make bad law.

The application that ultimately resulted in the issuance of the Exxon's '890 patent was abandoned and continued three times before a fourth effort at prosecution proved successful. In its first three applications, Exxon claimed oil-soluble copper in concentrations from 5 to 500 ppm as a supplemental antioxidant.²⁸ Each of these first three applications were rejected on the grounds that the inclusion of oil-soluble copper

25. Exxon's Pet. for Cert., *supra* n. 9, at 7; 64 F.3d at 1555. The trial court instructed the jury as follows: "I instruct you that Exxon's claims cover the ingredients which go into the composition. If you find that a Lubrizol product is made by using the starting ingredients in the amounts called for in one or more of Exxon's claims, then that product directly infringes." *Lubrizol*, 64 F.3d at 1557; 64 F.3d at 1564 (Nies, J., dissenting).

26. Exxon's Pet. for Cert., *supra* n. 9, at 7.

27. Much of the critical comment directed at the companion decisions in *Lubrizol* is directed solely at the published judgments. See generally Kelly A. Casey, *Exxon Chemical Patents, Inc. v. Lubrizol Corp.: The Federal Circuit Sets Unreasonable Standards for Chemical Composition Inventions*, 31 Ga. L. Rev. 1223 (1997); see generally Jason M. Okun, *To Thine Own Claim Be True: The Federal Circuit Disaster in Exxon Chemical Patents, Inc. v. Lubrizol Corp.*, 21 Cardozo L. Rev. 1335 (2000).

28. *Lubrizol's App. Br.*, *supra* n. 13, at 5-6.

as an antioxidant was obvious in light of earlier issued U.S. patents.²⁹ Specifically, patents issued to Dowling in the mid-1940s had claimed oil-soluble copper as an antioxidant in concentrations from 50 to 500 ppm,³⁰ while patents issued to McNabb in the early 1950s had claimed oil-soluble copper as an antioxidant in concentrations from 200 to 30,000 ppm.³¹ In each of its three abandoned applications, Exxon tried to overcome obviousness rejections on the basis of test data allegedly showing unexpected antioxidant results.³² However, in each instance, Exxon's test results were rejected by the examiner for failing to provide sufficient proof of unexpected results.³³

In the prosecution of its fourth application, Exxon countered an obviousness rejection based upon the Dowling and McNabb patents with further antioxidation test data and the assertion that its four-component composition showed a "synergistic effect."³⁴ Specifically, Exxon maintained that the four components combined in the oil demonstrated enhanced stability over the prior art insofar as oxidation was concerned.³⁵

During the prosecution of the European counterpart to Exxon's application, a U.S. patent issued in 1967 to LeSuer³⁶ and subsequently assigned to Lubrizol came to light. Examples in the LeSuer patent taught the use of oil-soluble copper in the range of 8 to 850 ppm as a supplemental antioxidant in combination with similar ingredients in almost identical proportions to those in Exxon's patent application.³⁷ Additionally, the LeSuer patent taught the copper being reacted with the ashless dispersant prior to their being mixed with other ingredients, this pre-complexation assuring that the copper material would be soluble in oil while rendering the dispersant nonashless.³⁸ Once the LeSuer patent was brought to the attention of the U.S. examiner, an anticipation rejection was issued in conjunction with a further obviousness rejection based upon previously disclosed prior art.³⁹

Exxon sought to overcome rejections on these two bases with additional test results. Exxon claimed that these tests showed that a composition made according to the claims in its patent application was superior

29. *Id.*

30. U.S. Patent No. 2,343,756 (issued Mar. 7, 1944); U.S. Patent No. 2,356,661 (issued Aug. 22, 1944).

31. U.S. Patent No. 2,552,570 (issued May 15, 1951); U.S. Patent No. 2,618,597 (issued Nov. 18, 1952).

32. Lubrizol's App. Br., *supra* n. 13, at 5-6.

33. *Id.*

34. *Id.* at 6.

35. *Id.* at 5.

36. U.S. Patent No. 3,346,493 (issued Oct. 10, 1967).

37. Lubrizol's App. Br., *supra* n. 13, at 4-5.

38. *Id.*

39. *Id.* at 6-7.

to a composition made according to the claims in the LeSuer patent insofar as the avoidance of sludge and varnish deposits were concerned.⁴⁰ Exxon claimed that the difference in the performance of the two compositions was a consequence of Exxon's use of a borated dispersant in which the copper remained uncomplexed versus LeSuer's use of a non-borated dispersant in which the copper was pre-complexed.⁴¹ On the basis of these test results, the Examiner at last relented. Exxon's claims were allowed, and the '890 patent was issued.⁴²

At trial, one of the central contentions of Lubrizol's defense was that the final set of test results submitted by Exxon in support of the application that ultimately yielded the '890 patent made use of an undisclosed variable in violation of PTO examination practices.⁴³ Lubrizol contended that Exxon skewed the results in its favor by selecting a high-molecular-weight borated dispersant for use in the composition made in accordance with the claims in its patent application, while selecting a low-molecular-weight non-borated dispersant for use in the composition made in accordance with the claims of the LeSuer patent.⁴⁴ Since it was widely accepted that high-molecular-weight dispersants outperform low-molecular-weight dispersants in tests measuring dispersants' ability to avoid sludge and varnish deposits, Exxon had guaranteed that its composition would yield superior performance regardless of the complexed or uncomplexed status of the copper material.⁴⁵ Lubrizol's contention at trial was that while the skewed tests allowed Exxon to overcome the rejection of its claims as anticipated by the LeSuer patent, they did so at a cost of limiting the '890 patent to the use of copper as an antioxidant with dispersants that did remain uncomplexed.⁴⁶ Under this interpretation, for Exxon's '890 patent to be valid, Lubrizol's products, all of which contained copper that was complexed with the dispersant, must necessarily be non-infringing.⁴⁷ Lubrizol asserted that by advancing the view that the claims provided a recipe, it was contradicting the claim construction that it had previously used to establish the patent's validity, in order to establish infringement.⁴⁸

40. *Id.* at 7-8.

41. *Id.* at 21-22.

42. *Id.* at 7-8.

43. *Id.* at 7.

44. *Id.* Lubrizol noted that "Exxon did so even though the high-molecular-weight dispersant used in its own composition was within the molecular weight range of the LeSuer '493, and the low-molecular-weight dispersant used with the LeSuer composition was within the molecular weight of Exxon's claim." *Id.*

45. *Id.* at 8.

46. *Id.* at 15, 18.

47. *Id.*

48. *Id.* at 23, 25 n. 24.

At trial, Lubrizol also maintained that these skewed tests should result in the '890 patent being held unenforceable by virtue of Exxon's inequitable conduct in the prosecution of the patent application before the PTO.⁴⁹ After Exxon submitted its last batch of test data in connection with its prosecution of the '890 patent application, tests run by Amoco in connection with an opposition proceeding before the PTO showed that when dispersants with the same molecular weights were used, the Exxon and the LeSuer compositions performed substantially identically.⁵⁰ Although the results of the Amoco tests were available to Exxon months before the issuance of its '890 patent, Exxon made no effort to disclose them to the PTO.⁵¹ Nonetheless, Lubrizol's attempt to put the defense of inequitable conduct squarely before the jury was undermined by jury instructions and a verdict form that maintained, erroneously,⁵² that the statutory presumption of validity has to be overcome before Lubrizol could prevail on inequitable conduct.⁵³

Given the foregoing discussion of the treatment that the prosecution history of Exxon's '890 patent received at trial, one is left wondering why the Federal Circuit decided the litigation surrounding it as it did. One can imagine a judgment that held Exxon to be estopped from seeking to recapture through litigation what it had given up during the prosecution of the '890.⁵⁴ A judgment made on that basis would have done justice to the parties while avoiding the confusion in chemical composition claiming practice that exists in the wake of the decisions in the companion decisions in *Lubrizol*.

Nonetheless, very few of the facts central to the esoteric view of the case have made their way into the Federal Circuit's published decisions. Accordingly, it will be the exoteric understanding of the case that is the primary focus of the balance of this article.

49. *Id.* at 28–30.

50. *Id.* at 8.

51. *Id.* at 8, 29; see Br. for App. at 32–35, *Exxon Chemical Patents, Inc., v. Lubrizol Corp.*, 64 F.3d 1553 (Fed. Cir. 1995) [hereinafter "Exxon's App. Br."] (providing Exxon's justifications for nondisclosure); see reply Br. for App. at 11–14, *Exxon Chemical Patents, Inc., v. Lubrizol Corp.*, 64 F.3d 1553 (Fed. Cir. 1995) [hereinafter "Lubrizol's App. Br. in Reply"] (providing Lubrizol's rebuttal).

52. Lubrizol's App. Br., *supra* n. 13, at 31 (quoting *Gardco Mfg. Co. v. Herst Lighting Co.*, 820 F.2d 1209, 1213 (Fed. Cir. 1987) that "a patent may be valid yet be rendered unenforceable for . . . inequitable conduct").

53. *Id.* at 30–31; Lubrizol's App. Br. in Reply, *supra* n. 51, at 10–11; Exxon's App. Br., *supra* n. 51, at 35.

54. *Warner-Jenkinson*, 520 U.S. at 30–32.

C. THE *LUBRIZOL* DECISION(i) *The Majority Opinion*

On appeal, a divided panel of the Federal Circuit reversed the jury's finding of infringement on the basis that the trial judge had incorrectly instructed it as to the construction of Exxon's claims.⁵⁵ Relying on *Markman*,⁵⁶ Judge Clevenger, with whom Judge Plager concurred, found that the trial court judge failed to properly construct Exxon's claims.⁵⁷ Judge Clevenger sets out the post-*Markman* state of the law concerning claim construction as follows:

It may well be that in some cases one side or the other will offer the correct claim interpretation to the [trial] judge. More often, however, it is likely that the adversaries will offer claim interpretations arguably consistent with the claims, the specification and the prosecution history that produce victory for their side. In any event, the judge's task is not to decide which of the adversaries is correct. Instead the judge must independently assess the claims, the specification, and if necessary the prosecution history, and relevant extrinsic evidence, and declare the meaning of the claims. No matter when or how a judge performs the *Markman* task, on appeal we review the issue of claim interpretation independently without deference to the trial judge.⁵⁸

Holding that under a jury charge setting out the correct interpretation of the claims of '890 patent, no reasonable jury could have found infringement based upon the evidence presented at trial by Exxon, the panel majority reversed the trial verdict without a remand for a new trial.⁵⁹

According to the panel majority, for Exxon to have prevailed in its patent infringement case, at some point after the ingredients were combined, the resulting combination must have contained ashless dispersant in the quantity set out in the claims of the '890 patent.⁶⁰ In other words, the panel majority ruled that Exxon used claims directed to the resulting product, not merely the initial ingredients as asserted in Judge Nies' dis-

55. *Lubrizol*, 64 F.3d at 1561. For the text of the jury instruction, see *supra* note 25.

56. 52 F.3d at 970. It should be noted that the U.S. Supreme Court's affirmance of *Markman* (Apr. 23, 1996) was handed down subsequent both to *Lubrizol* (Sept. 1, 1995) and to the decision on rehearing in *Lubrizol* (Feb. 23, 1996). *Markman*, 517 U.S. 370; *Lubrizol*, 64 F.3d at 1553; *Lubrizol*, 77 F.3d at 450.

57. *Lubrizol*, 64 F.3d at 1557-58.

58. *Id.* at 1556.

59. *Id.* at 1555; see *infra* n. 77 and accompanying text.

60. This claim interpretation differed from those advanced by either Exxon or *Lubrizol* at trial. See *supra* n. 23 and accompanying text. In order to prevail in a patent infringement action, the plaintiff must show that all of the elements in the patent claim are embodied in the accused device. *Laitam Corp. v. Rexnord, Inc.*, 939 F.2d 1533, 1535 (Fed. Cir. 1991).

sent in *Lubrizol*⁶¹ and Judge Newman's dissent in the decision on the rehearing in *Lubrizol*.⁶²

The panel majority asserted that "[n]othing in the claims, the specification, or the prosecution history suggests that Exxon's claims are not drawn to a product that contains particular ingredients."⁶³ However, the support provided for this assertion is highly idiosyncratic and contentious.⁶⁴ First, it is noted that the term "containing" was used once in the patent's title⁶⁵ and more than twenty times in its specification⁶⁶ in reference to the compositions' ingredients, the panel majority apparently believing that this term could only refer to ingredients after they have been combined.⁶⁷ Second, the panel majority notes that key claims of the '890 patent refer both to "added" copper and to a detergent "additive,"⁶⁸ such terms purportedly showing the claims' focus on "a chemical composition to which ingredients are being introduced."⁶⁹ Third, the panel majority notes that during the prosecution of the '890 patent application, Exxon emphasized the synergism of small quantities of oil-soluble copper with the antioxidant ZDDP "in the presence of an ashless dispersant,"⁷⁰ reference to such synergism necessarily involving the ingredients after they had been combined.⁷¹

On these bases, Judge Clevenger propounded his understanding of the meaning of the phrase "chemical composition" as follows:

The chemical composition exists at the moment the ingredients are mixed together. Before creation of the mixture, the ingredients exist independently. The particular proportions specified in the claims simply define the characteristics of the claimed composition.⁷²

61. 64 F.3d at 1565.

62. 77 F.3d at 453-56.

63. *Lubrizol*, 64 F.3d at 1557.

64. See Lubrizol's Br. in Opp'n, *supra* n. 16, at 7-9 (elaborating on these arguments).

65. *Id.*; see *supra* n. 17 and accompanying text.

66. *Lubrizol*, 64 F.3d. at 1557.

67. It has been noted that the panel majority "offered no support for this construction of the word "containing," and it obviously defies common usage—*e.g.*, an angel food cake "contains" egg whites, but only in the sense that they were one of the ingredients used in baking the cake." PhRMA Br., *supra* n. 3, at 14 n. 8. Lubrizol's Br. in Opp'n, *supra* n. 16, at 3.

68. *Lubrizol*, 64 F.3d. at 1557. Criticism of the panel majority's gloss on use of the term "containing" can be applied, *mutatis mutandis*, to the terms "added" and "additive." See *supra* n. 67 and accompanying text.

69. *Lubrizol*, 64 F.3d at 1557.

70. See *id.* (appearing to quote statements made by Exxon during patent prosecution).

71. However, the panel majority ignores the fact that all chemical compositions must be established to possess properties not found in their initial ingredients alone before the PTO will grant a patent. 77 F.3d at 455 (Newman, J., dissenting on denial of rehearing) (citing Anthony W. Deller, *Patent Claims* vol. 3, § 465 at 48 (2d ed. 1971)).

72. *Lubrizol*, 64 F.3d at 1558. It should be noted that the distinction between "ingredients" on the one hand, and "compositions of matter" on the other, rests upon a linguistic

Having precluded the possibility that ingredient-based claims identify the components at any time before the moment of their being combined, Judge Clevenger goes on to reject the claim construction advanced by Lubrizol insofar as he held that Exxon's claims extend to the mixture at any time after the initial ingredients' combination and not just in the end product of the manufacturing process.⁷³ The basis for this determination was that Exxon's "specification as a whole, and the claims in particular, contain no temporal limitation to the term 'composition.'"⁷⁴ Accordingly, Judge Clevenger concludes that

Exxon's claims are to a composition that contains the specified ingredients at any time from the moment at which the ingredients are mixed together. This interpretation of Exxon's claims preserves their identity as product claims, and recognizes as a matter of chemistry that the composition exists from the moment created.⁷⁵

Maintaining that Exxon had taken advantage of the correct interpretation at trial but had failed to discharge its evidentiary burden,⁷⁶ Judge Clevenger thought it appropriate to reverse the jury's decision without remand for a new trial.⁷⁷

The panel majority's analysis is flawed for three reasons. First, chemical inventions that do not depend on the order in which their initial ingredients are added and involve nothing more than mixing have traditionally been claimed by listing those ingredients.⁷⁸ Second, chemical inventions by their very nature involve reactions whereby an initial ingredient will likely interact with other ingredients to produce a compound in which it appears in a different chemical form—possibly leaving no trace of the initial ingredient in its original form.⁷⁹ Third, ingredient-

ambiguity in the word "ingredients" similar to that in the word "containing." See *supra* n. 67 and accompanying text. Indeed, recourse to dictionary definitions of the word "ingredient" show that the most natural reading is that of "something that enters into a compound." Exxon's Pet. for Cert., *supra* n. 9, at 12 (emphasis added) (citing *Webster's Third New International Dictionary* 1162 (1968)). For authority that chemical compositions are a subset of "chemical compositions" see *supra* n. 3. For the most widely accepted definition of "composition of matter" see *infra* nn. 193-94 and accompanying text.

73. *Lubrizol*, 64 F.3d at 1558.

74. *Id.*

75. *Id.*

76. Judge Clevenger noted that "[i]n order to prevail under properly interpreted claims, Exxon was obliged to prove both the presence of ashless dispersant and presence of the required quantity. Exxon's failure as to the latter requires us to conclude as a matter of law in Lubrizol's favor." *Id.* at 1560.

77. *Id.* at 1558-61. For extended discussions of the appropriateness of this disposition, see *Lubrizol*, 64 F.3d at 1568-70; *id.* at 1568-70 (Nies, L., dissenting). For the decision on rehearing see *Lubrizol*, 77 F.3d at 451; *id.* at 457 (Newman J., dissenting).

78. *Lubrizol*, 64 F.3d at 1568 (Nies, J., dissenting).

79. *Lubrizol*, 77 F.3d at 455-56 (Newman, J., dissenting on denial of rehearing). As Judge Newman correctly noted, after the *Lubrizol* decision "table salt dissolved in water will not be an adequate description of the composition for infringement purposes, since the

based claims have traditionally used the terms “added,” “additive,” and “containing” to indicate the initial ingredients entering into a chemical composition.⁸⁰

(ii) *The Dissenting Opinion*

Judge Nies agreed with the trial court judge’s determination that one skilled in the art, upon reviewing the claims, specification, prosecution history, and expert testimony, would interpret claims of the ‘890 patent as covering lubricating oil compositions “comprising”⁸¹ the product resulting from the specified initial ingredients having been combined.⁸² She states that

[t]o hold that the final product does not “comprise” those ingredients because of their possible reaction with each other upon mixing seems to me nothing short of double speak. The claims can be interpreted as the majority does only by reading them in isolation from the context of the patent.⁸³

Once the claims interpretation arrived at by the trial court judge was accepted, the jury’s finding of literal infringement was inevitable.⁸⁴

Two precepts guide Judge Nies’ approach to claims interpretation: first, that claims are to be construed in order to ascertain the patentee’s invention,⁸⁵ and second, that such claims construction be carried out, where possible, to sustain those claims’ validity.⁸⁶ Interpreted in light of

sodium chloride molecule no longer ‘exists’: in dissolution the sodium and chloride ions will have broken their bonds to each other, in interaction with molecules of water.” *Id.* at 452–53.

80. Reply to Br. in Opp’n at 7; *Exxon Chemical Patents, Inc., v. Lubrizol Corp.*, 518 U.S. 1020 (1996) [hereinafter “Exxon’s Reply Br.”].

81. Typically, one of three transitions, or one of their cognates, serves to join the preamble of a claim to the body of that claim: “consisting of,” “consisting essentially of,” and “comprising.” The phrase “consisting of” means that the claimed invention covers only the recited elements and nothing else. “Consisting essentially of” includes the recited elements along with some other elements, but excludes “additional unspecified ingredients which would affect the basic and novel characteristics of the product defined in the balance of the claim.” *Atlas Powder Co. v. E.I. du Pont de Nemours & Co.*, 750 F.2d 1569, 1574 (Fed. Cir. 1984). The term “comprising” means including the following elements but not excluding others. *Moleculon Research Corp. v. CBS Inc.*, 793 F.2d 1261, 1271 (Fed. Cir. 1986). The term “comprising” was used in Claim 1 of the ‘890 patent, while “comprises” was used in Claim 61. See *infra* nn. 244–45 and accompanying text.

82. *Lubrizol*, 64 F.3d at 1565 (Nies, J., dissenting).

83. *Id.* at 1563.

84. *Id.* at 1565.

85. *Id.* at 1564. In support of this precept, Judge Nies notes that the U.S. Supreme Court has stated that “it is fundamental that claims are to be construed in light of the specifications and both are to be read with a view to ascertaining the invention.” *Adams v. U.S.*, 383 U.S. 39, 49 (1966).

86. *Lubrizol*, 64 F.3d at 1564. In support of this precept, Judge Nies noted that the Federal Circuit has held that claims are to be “construed, if possible, as to sustain their

such precepts, Judge Nies asserts that ingredient-based chemical compositions like Exxon's would be enforceable in the future as they have been in the past.⁸⁷ By insisting that the ashless dispersant set out in the claims of the '890 patent remain inert after being combined with other ingredients, the panel majority violated these precepts.⁸⁸ Having asserted that "[t]he claims can be interpreted as the majority does only by reading them in isolation from the context of the patent,"⁸⁹ Judge Nies presents her interpretation of Exxon's claims by reviewing the specification, the prosecution history, and expert testimony.⁹⁰

Specification. The specification focused on the amount of various initial ingredients to be used and not on the amounts to be found after those ingredients had been mixed together.⁹¹ Moreover, Judge Nies noted that there was no discussion in the specification of the identity of intermediate or final products created during or after the mixing of the ingredients.⁹² The particular focus was on oil-soluble copper as an initial ingredient and the amount of it that was to be used to achieve optimal antioxidant effects without interfering with the functioning of other ingredients.⁹³ Judge Nies concluded that, given the omission of analysis of the identity of intermediate or final "complexation" products in the specification, "to say that one of ordinary skill in the art would nevertheless conclude that the proportions must be measured in the [mixing] pot is divorced from reality."⁹⁴

Judge Nies then observed that the majority's interpretation of the claims of the '890 patent render much of the specification superfluous.⁹⁵ In it, Exxon discusses use of both borated and nonborated ashless dispersants as starting ingredients for its lubricating oil compositions.⁹⁶ Borated ashless dispersants do not complex with metals derived from other ingredients.⁹⁷ Nonborated ashless dispersants, on the other hand, do

validity." *North American Vaccine, Inc. v. Am. Cyanamid Co.*, 7 F.3d 1571, 1577 (Fed. Cir. 1993).

87. *Lubrizol*, 64 F.3d at 1564 (Nies, J., dissenting).

88. *Id.* at 1563-64.

89. *Id.* at 1563.

90. *Id.* at 1565. The prosecution history, file history, or file wrapper contains a record of the interactions between the inventor and the PTO during the pendency of the patent application. During patent prosecution, statements may be made that may be useful in determining the scope of the patent that is finally issued. See *Graham v. John Deere Co.*, 383 U.S. 1, 33 (1966); see generally *Warner-Jenkinson*, 520 U.S. at 30-32.

91. *Lubrizol*, 64 F.3d at 1565.

92. *Id.*

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*

97. *Id.*

complex with metal moieties derived from other ingredients.⁹⁸ Under the majority's interpretation, the claims did not cover use of such nonborated ashless dispersants if enough of it complexed with metal to form nonashless dispersants in the intermediate or final reaction products below the specified levels.⁹⁹ But, as Judge Nies noted, the specification is primarily focused on the use of nonborated ashless dispersants¹⁰⁰ and Lubrizol used such dispersants exclusively in their products.¹⁰¹ Moreover, the claim interpretation proffered by the majority would result in the claims being deemed invalid due to inadequate disclosure in the specification.¹⁰²

Prosecution History. Judge Nies found that the prosecution history focuses on ashless dispersant as an ingredient and not as an intermediate or final reaction product.¹⁰³ After reviewing several exchanges that occurred between the examiner and Exxon during the prosecution of the applications that led to the issuance of the '890 patent,¹⁰⁴ Judge Nies concluded that

[t]he argument made during prosecution that some of the claims read on embodiments wherein the copper complexes with the "ashless" dispersant is probative of Exxon's claim interpretation Specifically, it shows the claim is directed to a product with ashless dispersant as a starting ingredient, inasmuch as some of the claims covered formation of a complex between that dispersant and metal, a formation that would

98. *Id.*

99. *Id.*

100. *Id.*

101. Lubrizol's App. Br. in Reply, *supra* n. 51, at 17.

102. While the bulk of Judge Nies' remarks are directed to the *infringement* of Exxon's '890 patent, she also notes that the panel majority's claim interpretation has unintended consequences for the patent's *validity*. 35 U.S.C. § 112 requires that

[t]he specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains or with which it is most nearly connected, to make and use the same

35 U.S.C. § 112 (2001).

By interpreting the claims of the '890 patent as being directed to intermediate or final post-combination products rather than to initial ingredients, the panel majority compels the conclusion that the specification fails to enable one skilled in the art to make products containing ashless dispersant within the range claimed when nonborated ashless dispersants are used as initial ingredients. 64 F.3d at 1563 n. 2, 1565 n. 6 (Nies, J., dissenting).

Judge Nies' interpretation of the '890 patent's specification was roundly criticized by Professor Adelman. Adelman, *supra* n. 4, at 3-12.29-30. He claims that Judge Nies erred in failing to note that Exxon was limited to claims related to ashless dispersants because the '493 patent in the prior art disclosed the use of nonashless dispersants. *Id.* Professor Adelman notes that while many ashless dispersants will be converted to nonashless dispersants by the addition of copper, borated PIBSA/PAM dispersants always remain ashless. *Id.* at 3-12.30.

103. *Lubrizol*, 64 F.3d at 1566.

104. *Id.*

render the dispersant "non-ashless."¹⁰⁵

This view of the claims and the specification as being directed to initial ingredients rather than intermediate or final reaction products was found to be unobjectionable by patent examiners in the U.S. and elsewhere.¹⁰⁶

*Expert Testimony.*¹⁰⁷ A review of expert testimony at trial by Judge Nies revealed uncertainty over how and why oil-soluble copper acts to produce enhanced antioxidant effects in lubricating oil compositions:

The record includes testimony by Exxon witnesses that it is not known how copper serves as an antioxidant in the environment of the claimed composition, that certain reactions are not predictable in that environment, even though they might be predictable in a model, that it is uncertain whether zinc or phosphorus of ZDDP undergoes interaction, and in general, that no one was certain of the exact identity of the final composition or what was happening in the pot.¹⁰⁸

Accordingly, Judge Nies criticized the majority panel because its ruling effectively required Exxon, and now other chemical companies, to know precisely *how* their invention worked even though all that has ever been required under U.S. patent law is that an inventor know *that* his invention worked.¹⁰⁹

Judge Nies concluded her critique of the panel majority's infringement analysis by noting a significant weakness in their suggestion that claim drafters prepare a product-by-process claim, instead of an ingredient-based claim, to claim chemical compositions whose ingredients un-

105. *Id.* Professor Adelman argues that the incidents upon which Judge Nies based this conclusion dealt with discussions of how to get copper into the lubricant. Adelman, *supra* n. 4, at 3-12.33-34. In its Brief in Opposition, Lubrizol severely criticized Judge Nies for employing excerpts from the prosecution history prior to Exxon's fourth application, those prior applications being ones that the PTO had rejected. Lubrizol's Br. in Opp'n, *supra* n. 16, at 18 n. 15. Lubrizol's contention was that Exxon overcame obviousness rejections to its fourth application only by arguing that its composition demonstrated superior antioxidant properties precisely because a significant quantity of the ashless dispersant remained uncomplexed with metal. *Id.* at 3-4. However, if Lubrizol is correct, Exxon distinguished its application based upon a misrepresentation and the PTO was "hoodwinked" into granting the patent. Exxon's Reply Br., *supra* n. 80, at 4. Under that scenario, the patent should have been invalidated by the courts. However, neither the district court nor the panel majority in the Federal Circuit did so. Furthermore, Lubrizol could not rebut Exxon's argument that it used ingredient-based claims throughout its entire patent prosecution, and that because the PTO granted the patent, this type of claim should be given effect. *Id.*

106. *Lubrizol*, 64 F.3d at 1566 (Nies, J., dissenting).

107. The decision of the panel majority makes no reference to expert testimony. Presumably, this was because under *Markman*, the claims, the specification, and the prosecution *must* be considered, while expert testimony *may* be considered. *Markman*, 52 F.3d at 979 (citing *Unique Concepts, Inc. v. Brown*, 939 F.2d 1558, 1561 (Fed. Cir. 1991), and *Fonar Corp. v. Johnson & Johnson*, 821 F.2d 627, 631 (Fed. Cir. 1987)).

108. *Id.*

109. *Id.* at 1567; see *infra* n. 147.

dergo post-combination interaction.¹¹⁰ Because there is no requirement for mixing the ingredients according to a particular method or order, there is no process involved.¹¹¹ Why then, would a claim drafter use a product-by-process claim when there is nothing but a trivial process involved? Simply put, he would not. Because those possessing ordinary skill in the art understand that the ingredient-based claims cover a product and not a method, Judge Nies believed that the claims of Exxon's '890 should have been found to have been infringed by Lubrizol's lubricating oil products.¹¹² Accordingly, she would have upheld the district court's judgment.¹¹³

D. THE DECISION ON REHEARING IN *LUBRIZOL*

After the Federal Circuit's opinion was handed down, Exxon filed a petition for rehearing with a suggestion for rehearing *en banc* that was subsequently denied.¹¹⁴ Two of the four judges who voted on the petition, Judges Clevenger and Plager, formed the panel majority below.¹¹⁵ Judge Clevenger, writing the order denying the petition for rehearing, tried to reassure the reader that although the panel majority's decision to adopt a claim construction that was proposed neither by the trial court judge nor by the parties, the *Lubrizol* trial court did nothing out of the ordinary.¹¹⁶ Instead, the panel majority accused Judges Newman and Mayer of misreading both their decision and the record below.¹¹⁷ Judge Mayer also voted against rehearing the decision because the Supreme Court decision in *Markman* left the task of claim construction entirely up to the courts, thus tying his hands.¹¹⁸ In his separate concurring opinion, however, Judge Mayer roundly criticized the panel majority for construing Exxon's claims in contravention of the extrinsic evidence that established how those skilled in the art would have interpreted the

110. *Id.* at 1567–68. Judge Clevenger suggested, and Judge Plager stated, that Exxon might have been better off had it used product-by-process claims in its patent application. *Id.* at 1557, 1562–63. Product-by-process claims have long been available for claiming a product that “cannot be properly defined and discriminated from prior art otherwise than by reference to the process of producing it.” *Ex Parte Painter*, 1891 C.D. 200, 201 (Commr. of Pat. 1891).

111. *Lubrizol*, 64 F.3d at 1568 (Nies, J., dissenting).

112. *Id.*

113. *Id.*

114. *Lubrizol*, 77 F.3d at 450.

115. The Rules of Practice for the Federal Circuit encourage petitions for rehearing to be considered, as nearly as possible, by the same panel that heard the original appeal. Fed. Cir. R. Prac. 47.2 (1997).

116. 77 F.3d at 451; see *infra* n. 131 and accompanying text.

117. 77 F.3d at 451.

118. *Id.* (Mayer, J., concurring).

claims.¹¹⁹

Judge Newman, who holds a Ph.D. in chemistry and worked both as a research chemist and as a patent attorney prior to her judicial career,¹²⁰ embraced the district court's decision.¹²¹ She set forth three principal arguments.¹²² First, Judge Newman insisted that chemical compositions are correctly claimed by listing the types of ingredients involved, together with their amounts.¹²³ This standard way of claiming such compositions "is the clearest, most accurate, and most comprehensible way of describing such inventions. Often there is no other way of describing chemical compositions."¹²⁴ Chemical compositions claimed in this fashion are "easy to describe with precision, easy to search and to examine for patentability, easy to understand, and unambiguous in content and scope."¹²⁵ As such, ingredient-based claims satisfy the specificity requirements set out in 35 U.S.C. § 112, ¶ 2 whether or not the ingredients interact subsequent to their combination.¹²⁶ Second, Judge Newman notes that the patent grant allows its beneficiary to prevent

119. *Id.* Judge Mayer saw the *Lubrizol* decision as an indication of the mischief that he had predicted would follow in the wake of the *Markman* decision's holding that claims interpretation is invariably a question of law. *Markman*, 52 F.3d at 989–98 (Mayer, J., concurring in judgment). In the decision on rehearing in *Lubrizol*, Judge Mayer noted that

[t]wo judges have divined an interpretation of the claim that occurred to no one else in this extensive litigation. None of the parties or the trial court offered the interpretation that these two judges chose, and none of the extensive extrinsic evidence about how those skilled in the art would understand the claim supports it. After *Markman*, apparently the meaning of a claim has very little to do with the parties' theories of the case and the record made in support, and everything to do with what at least two judges here prefer regardless of the record.

77 F.3d at 451.

Judge Newman reached similar conclusions in her dissent.

The court's holding that a chemical composition claim that is written by listing the ingredients can not be enforced against the identical composition made by combining the identical ingredients in the identical ratio, unless none of the ingredients interact when they are placed together, is simply bad law. It is without precedent, and it is contrary to the way that chemical formulation composition claims are understood within the chemical and the legal communities. This *sua sponte* transformation of the patent law does not bode well for this court's implementation of its *Markman* role as *de novo* construer of patent claims.

Id. at 453.

120. PhRMA Br., *supra* n. 3, at 2.

121. *Lubrizol*, 77 F.3d at 451.

122. *Id.* at 453–57.

123. *Id.* at 453–56 (Newman, J., dissenting on denial of rehearing).

124. *Id.* at 453.

125. *Id.*

126. *Id.* at 452–54. 35 U.S.C. § 112 requires that "[t]he specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention." 35 U.S.C. § 112 ¶ 2 (2001).

others from making, using, or selling his invention.¹²⁷ Exxon's inventions were lubricating oils and lubricating oil concentrates with enhanced resistance to oxidation due to the presence of small quantities of oil-soluble copper.¹²⁸ *Lubrizol* made Exxon's invention when it combined the ingredients set out in the claims of the '890 patent, thereby infringing it.¹²⁹ Third, Judge Newman asserted that the decision to reverse the finding of infringement without remand for a new trial was a denial of procedural fairness insofar as Exxon was not allowed to present "evidence or argument on the new factual issues raised by this court's new law of claim construction."¹³⁰ In particular, she argued that reversal without remand denied Exxon an opportunity to argue that there is a transient moment after combination when the initial ingredients were present in the amounts set out in the claims of its '890 patent.¹³¹

In sum, the *Lubrizol* decision is not limited to its facts as the panel majority disingenuously asserted.¹³² Rather, as Judge Newman maintained, the panel majority "made an error of major consequence, an error that transcends the interests of these parties and this patent."¹³³ Alarm expressed in the *amicus curiae* briefs filed in support of Exxon's ultimately unsuccessful petition for a writ of certiorari¹³⁴ lent credence to Judge Newman's anxiety over "the serious disruption of chemical patent-

127. *Lubrizol*, 77 F.3d at 456 (Newman, J., dissenting on denial of rehearing). At the time of trial, 35 U.S.C. § 271 stated that "whoever without authority makes, uses, or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent." 35 U.S.C. § 271 (1995); As of January 1, 1996, § 271(a) was amended to read that "whoever without authority makes, uses, offers to sell, or sells any patented invention, within the United States or imports into the United States any patented invention during the term of the patent therefor, infringes the patent." 35 U.S.C. § 112 (1996).

128. *Lubrizol*, 64 F.3d at 1556.

129. *Id.* at 456 (Newman, J., dissenting on denial of rehearing).

130. *Id.*

131. *Id.* at 457; Exxon's Pet. for Cert., *supra* n. 9, at 20. Both Judge Newman and Professor Adelman note that the majority's view in the decision on rehearing in *Lubrizol* may be read as suggesting that the momentary existence of a substance in combination with other compounds is insufficient to find infringement by *Lubrizol*'s composition. 77 F.3d at 457 n. 4; Adelman, *supra* n. 4, at 3-1.28. The majority's view may also be read as a compressed version of its earlier holding that Exxon had failed to prove that *Lubrizol*'s product infringed Exxon's '890 patent. *Cf.* 64 F.3d at 1555; *cf.* 77 F.3d at 451. However, in her dissenting opinion to the decision on rehearing in *Lubrizol*, Judge Newman explicitly stated that Exxon should be given the opportunity to present evidence that under the claim construction advanced by the majority in the *Lubrizol* decision, *Lubrizol*'s composition momentarily infringed the '890 patent. 77 F.3d at 457.

132. 77 F.3d at 451.

133. *Id.* at 453 (Newman, J., dissenting on denial of rehearing).

134. *Amicus curiae* briefs were filed by Pfizer Inc., the Pharmaceutical Research and Manufacturers of America, and Proctor & Gamble Co. *Amicus Curiae Br. of Pfizer, Inc.*, at 1-3; *Exxon Chemical Pat., Inc. v. Lubrizol Corp., cert. denied*, 518 U.S. 1020 (1996) [hereinafter "Pfizer Br."]; PhRMA Br., *supra* n. 3, at 1-2; Proctor & Gamble Br., *supra* n. 6, at 2-4.

dependent activity flowing from this decision and the massive taint upon existing property rights.”¹³⁵

III. SOURCES OF LAW FOR ANALYZING THE COMPANION DECISIONS IN *LUBRIZOL*

A. OVERVIEW OF THE HISTORY OF CHEMICAL COMPOSITION CLAIMS

Chemical compositions and the processes for making them have been protectible under the U.S. patent law since its earliest beginnings under the *Patent Act of 1790*.¹³⁶ Indeed, the first U.S. patent was issued for a process for making potash from wood ash.¹³⁷ From the time of the *Patent Act of 1793*, chemical compositions have been protectible as “compositions of matter.”¹³⁸ However, the form that such patents have taken over the years has evolved along with those in other categories of eligible subject-matter.

Under the *Patent Act of 1790*¹³⁹ and the *Patent Act of 1793*,¹⁴⁰ only the most general of specifications were required. It was not until the *Patent Act of 1836* that formal claims were required to be included in a patent application.¹⁴¹ Even then, the “central definition”¹⁴² claim format predominated, with the formal claims consisting of little more than

135. *Lubrizol*, 77 F.3d at 453 (Newman, J., dissenting on denial of rehearing).

136. The categories of patent-eligible subject matter specified in the *Patent Act of 1790* were “any useful art, manufacture, engine, machine, or device, or any improvement therein not before known or used.” Act of Apr. 10, 1790, ch. 7, § 1, 1 Stat. 109 (1790) (repealed 1793). Presumably, a chemical composition would have been classified as a “manufacture,” while the process for making it would have been classified as an “art.”

137. See generally Henry Paynter, *The First U.S. Patent*, Am. Heritage of Invention & Tech. 18 (1990).

138. The categories of patent-eligible subject matter specified in the *Patent Act of 1793* were “any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement on any art, machine, manufacture or composition of matter.” Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318, 318-21 (1793) (repealed 1836). The names of these categories remained unchanged until the adoption of *Patent Act of 1952*, when “process” was substituted for “art.” Act of July 19, 1952, ch. 950, § 101, 66 Stat. 792, 797 (1952) (codified at 35 U.S.C. § 1 (2001)); *Diamond v. Diehr*, 50 U.S. 175, 182 (1981).

139. Act of Apr. 10, 1790, ch. 7, § 1, 1 Stat. 109, 110-11 (1790) (repealed 1793).

140. Act of Feb. 21, 1793, ch. 11, § 1, 1 Stat. 318, 321-22 (1793) (repealed 1836).

141. Under the *Patent Act of 1836*, the inventor was required to “particularly point out the part, improvement, or combination, which he claims as his own invention or discovery.” Act of July 4, 1836, ch. 357, § 6, 5 Stat. 117, 119 (repealed 1952); *Penwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 958 (Fed. Cir. 1987) (Newman, J., commenting).

142. “Central definition involves the drafting of a narrow claim setting forth a typical embodiment coupled with broad interpretation by the courts to include all equivalent constructions.” *Hilton Davis Chemical Co. v. Warner-Jenkinson Co.*, 62 F.3d 1512, 1565 (Fed. Cir. 1995) (en banc) (Nies, J., dissenting), *rev'd in part on other grounds*, 520 U.S. 17 (1997) (citing Ridsdale Ellis, *Patent Claim* § 4 (1949)).

references to the specification or the diagrams.¹⁴³ It was not until the adoption of the precursor of the present day 35 U.S.C. § 112, ¶ 2 in the *Patent Act of 1870*¹⁴⁴ that claims in U.S. patents began to take on their current “peripheral definition”¹⁴⁵ format.¹⁴⁶ Thus, it was in that late nineteenth-century context that contemporary ingredient-based claims for chemical compositions took shape. Given the limited ability of chemists of that era to discern the post-combination constituents of their compositions, this is hardly surprising.¹⁴⁷

As the U.S. patent system developed, certain canons of interpretation grew up from the litigated cases. Among these was the view that the proper procedure for infringement analysis was the comparison of the elements of the patent’s claims with the corresponding elements of the allegedly infringing product.¹⁴⁸ This was so because a U.S. patent is essentially a negative right: “the right to *exclude* others from making,

143. *Ex parte Fressola*, 27 U.S.P.Q.2d (BNA) 1608, 1609–11 (Bd. of Pat. App. & Interferences, 1993).

144. Under the *Patent Act of 1870*, the inventor was required to “particularly point out and distinctly claim the part, improvement, or combination which he claims as his invention or discovery” Act of July 18, 1870, ch. 230, § 26, 16 Stat. 198, 201 (repealed 1952).

145. “Peripheral definition involves marking out the periphery or boundary of the area covered by the claim and holding as infringements only such constructions as lie within that area.” *Hilton Davis*, 62 F.3d at 1565 (citing Ridsdale Ellis, *Patent Claim* § 4 (1949)); *Penwalt v. Durand-Wayland*, 833 F.2d at 959 (Newman, J., commenting).

146. *Fressola*, 27 U.S.P.Q.2d at 1609–11.

147. *Exxon’s Pet. for Cert.*, *supra* n. 9, at 15. The long-settled patent law principal that, although disclosure of the means by which their invention is achieved is required, disclosure of the principles in which the invention is based is immaterial, dates from this period. The Supreme Court embraced this proposition in *Eames v. Andrews*, when it stated that, “[a]n inventor may be ignorant of the scientific principle, or he may think he knows it and yet be uncertain, or he may be confident as to what it is and others may think differently. All this is immaterial, if by the specification the thing to be done is so set forth that it can be reproduced.” 122 U.S. 40, 56 (1887).

The Supreme Court echoed this sentiment in *Diamond Rubber Co. v. Consolidated Tire Co.*, when it said of an inventor that it was “not necessary that he understand or be able to state the scientific principles underlying his invention, and it is immaterial whether he can withstand a successful examination to the speculative ideas involved.” 220 U.S. 428, 435–36 (1911). This principle has been reiterated in recent years by the Federal Circuit. In *Fromson v. Advance Offset Plate Inc.*, the Federal Circuit stated that “it is axiomatic that an inventor need not comprehend the scientific principles on which the practical effectiveness of his invention rests.” 720 F.2d 1565, 1570 (Fed. Cir. 1983). In *Newman v. Quigg*, the Federal Circuit stated that “it is not a requirement of patentability that an inventor correctly set forth, or even know, how or why the invention works.” 877 F.2d 1575, 1581 (Fed. Cir. 1989), *modified*, 886 F.2d 329 (Fed. Cir. 1989). In *Malta v. Schulmerich Carillons, Inc.*, Judge Newman, in dissent, noted that “[a]n inventor need not know the why of the scientific and technologic principles underlying an invention.” 952 F.2d 1320, 1341 (Fed. Cir. 1991).

148. *Markman*, 52 F.3d at 976; see *St. Louis Car-Coupler Co. v. Natl. Malleable Castings Co.*, 81 F. 706, 725 (C.C.N.D. Ohio, 1897) (providing an example of an early case on the matter).

using, offering for sale, or selling the invention."¹⁴⁹ This claim-to-product comparison also accords well with notions of fairness, for to do otherwise would be to do the patentee a disservice. Such disservice would come about in situations where the patentee had claimed and provided enabling disclosure for several product variations but produced less than the full range of such variations.¹⁵⁰ In such a situation, a product-to-product comparison would permit an infringer to use the patentee's own disclosure to produce a product that he had enabled and claimed but chosen not to manufacture.

The genius of Lubrizol's litigation strategy¹⁵¹ was to exploit an anomaly in U.S. patent law that had lain dormant for decades. Claiming practice had grown up where the description of starting components or ingredients had proved acceptable for chemical, electrical, and mechanical inventions. Infringement analysis developed where the elements of the patentee's claims were compared with corresponding elements of the allegedly infringing product. Juxtaposing this claiming practice and method of infringement analysis with the fact that chemical compositions unlike their electrical or mechanical counterparts, undergo post-combination changes,¹⁵² one realizes that elements in an ingredient-based claim for a chemical composition will not be met with an allegedly infringing product made according to it where there has been any such changes.

A consequence of the evolution of U.S. patent claims drafting practice described above¹⁵³ is that all judicial and academic authority indicates that Exxon's method of claiming its chemical composition was beyond reproach.

B. SOURCES OF AUTHORITY

(i) *Supreme Court Precedent*

Although there are other U.S. Supreme Court decisions that discuss ingredient-based claims,¹⁵⁴ the Supreme Court clearly and unambiguously embraced this form of claims drafting in *Holland Furniture Co. v.*

149. 35 U.S.C. § 154(a)(1) (2001) (emphasis added).

150. See *CTS Corp. v. Piher Intl. Corp.*, 527 F.2d 95, 100 (7th Cir. 1975), cert. denied, 424 U.S. 978 (1976) (stating that "[a] patentee need produce no commercial device. Infringement is determined by comparison with the patentee's claimed invention, not with its marketed product.")

151. This strategy was possible only before a panel majority unwilling to consider expert testimony. See *supra* n. 107 and accompanying text.

152. See *infra* n. 193 and accompanying text.

153. See *supra* nn. 136-150 and accompanying text.

154. *Wood v. Underhill*, 46 U.S. 1, 5 (1847); *Tyler v. Boston*, 74 U.S. 327, 330 (1868); *Béné v. Jeantet*, 129 U.S. 683, 685-86 (1889).

*Perkins Glue Co.*¹⁵⁵ *Holland Furniture* involved product claims for a glue suitable for wood veneering made with a particular type of vegetable starch as an initial ingredient.¹⁵⁶ Previously, such glues had been made exclusively from animal substances.¹⁵⁷

The Supreme Court ruled that the product claims at issue were invalid because they focused on use or function of the glue.¹⁵⁸ The Supreme Court stated that the patentee's claims should have been drawn to the ingredients of the invention¹⁵⁹ *i.e.*, raw cassava starch treated with oxidizing agents and heat to a point just short of its conversion into dextrine.¹⁶⁰ By failing to do so, the patentee claimed more than he had enabled.¹⁶¹

In *Holland Furniture*, the Supreme Court stated that the claims of "a patent of a composition of matter, should contain some description of the ingredients entering into the composition which would both define the patent, . . . and carry it beyond the previous development of the art."¹⁶² The Court went on to stress that "[t]here can be no description of a composition of matter without some designation of its ingredients."¹⁶³ However, later in its judgment, the Court appeared to equivocate on what it meant by the term "ingredient" when it complained that by employing functional language, "[t]he ingredient was thus described [in the relevant patent claims], not in terms of its own physical characteristics or chemical properties or those of the product, but wholly in terms of the

155. 277 U.S. 245 (1928).

156. *Id.* at 250. The product claims at issue read as follows:

28. A glue comprising cassava carbohydrate rendered semifluid by digestion and having substantially the properties of animal glue.

30. A wood and fiber glue formed of a starchy carbohydrate or its equivalent by union therewith of about 3 parts or less by weight of water and alkali metal hydroxid.

31. A wood and fiber glue containing amylaceous material as a base dissolved without acid in about three parts of water or less, and being viscous, semifluid and unjellified.

Id.

157. *Id.* at 247. The Supreme Court described the prior art as follows:

The characteristic qualities of animal glue, making it peculiarly suitable for [veneer], are a low absorptiveness of water and a consequent high degree of fluidity, facilitating its application by mechanical means, high elasticity and great tensile strength. A high water content, characteristic of other adhesive preparations, delays drying, warps the wood and when dry leaves too little bonding material to secure the requisite strength.

Id.

158. *Id.* at 256-58.

159. *Id.* at 254-56.

160. *Id.* at 248-49.

161. *Id.* at 256-58.

162. *Id.* at 253 (emphasis added) (citations omitted).

163. *Id.* at 255.

manner of use of the product.”¹⁶⁴ Thus, one is left with the ambiguity noted above¹⁶⁵ regarding the term “ingredient.” However, all that was necessary for Exxon to have prevailed against Lubrizol was for it to have been recognized that it was permissive, and not mandatory that ingredient-based claims be understood as designating “the ingredients entering into the composition.”¹⁶⁶

(ii) *Appellate Court Precedent*

Post-*Holland* appellate and trial court decisions confirm that ingredient-based claims may be used to obtain an enforceable patent on a composition of matter.¹⁶⁷

*Panzl v. Battle Island Paper & Pulp Co.*¹⁶⁸ provides support for the view that claims specifying ingredients are most naturally read as referring to substances entering into the composition of matter rather than as substances that are found in the composition post-combination.¹⁶⁹ The claim at issue read as follows:

A composition of matter for acid-proof lining of boilers, tanks, and similar vessels, composed of twenty-six per cent. of hydraulic cement, twelve per cent. chamotte, twenty-one per cent. of quartz and of a suitable quantity of diluted silicate of soda.¹⁷⁰

Importantly, just as in *Lubrizol*, two of the ingredients set out in this claim, the hydraulic cement and the silicate of soda, reacted with one another to form monocalcium silicate and caustic soda.¹⁷¹ Notwithstanding this post-combination interaction, the district court found that a composition made by combining the named initial ingredients “contained” those ingredients and was infringing.¹⁷² The Second Circuit affirmed the findings of validity and infringement, stating “that by compounding the ingredients in the proportions stated . . . a new and highly useful result is obtained, and that the discovery and disclosure of such mixture and its proportions entitle the patentee to the benefit thereof.”¹⁷³

In *Chadeloid Chemical Co. v. Frank S. De Ronde Co.*,¹⁷⁴ the Circuit

164. *Id.* at 256 (emphasis added).

165. *See supra* n. 72 and accompanying text; *Lubrizol's Br. in Opp'n*, *supra* n. 16, at 15.

166. *See supra* nn. 60–62 and accompanying text. *Compare Exxon's Pet. for Cert.*, *supra* n. 9, at 11–12 and *Exxon's Reply Br.*, *supra* n. 80, at 7 with *Lubrizol's Br. in Opp'n*, *supra* n. 16, at 14–15.

167. *See supra* nn. 146–54 and accompanying text.

168. 138 F. 48 (2d Cir. 1905), *aff'd in part, rev'd in part*, 132 F. 607 (N.D.N.Y. 1904)

169. *Exxon's Pet. for Cert.*, *supra* n. 9, at 13.

170. *Panzl*, 132 F. at 608.

171. *Id.* at 610.

172. *Id.* at 613.

173. *Panzl*, 138 F. at 53.

174. 146 F. 988 (C.C.S.D.N.Y. 1906)

Court for the Southern District of New York considered a patent claim for “[a] composition for removing paint and varnish, consisting of four parts each of paraffin and currier’s hard grease, eight parts benzol, and seven parts methyl alcohol.”¹⁷⁵ The Circuit Court held that infringement was proved when “[t]he materials used by the defendant *in compounding its product* are practically similar to those of the composition in suit, and by their use the same product is created.”¹⁷⁶ Thus, even though the alleged infringer had substituted acetone for methyl alcohol, infringement was found under the doctrine of equivalents due to their recognized interchangeability as starting ingredients for these purposes.¹⁷⁷

In *American Purifyne Co., Inc. v. Novadel Process Corp.*,¹⁷⁸ the patent at issue was for a process of bleaching flour without affecting its quality using benzoyl peroxide as the active agent and calcium diphosphate as a dispersant.¹⁷⁹ The alleged infringer objected that the process claims gave no indication how the post-combination product could be identified.¹⁸⁰ To this argument, the Second Circuit responded that “[t]he complaint that the mixture claims give no information by which the mixture could be identified, does not invalidate them. None was necessary because both ingredients of this mixture were known and the means of identifying them were known. This was sufficient identification.”¹⁸¹ Accordingly, the Sixth Court upheld a finding of infringement of the process patent.¹⁸²

In *American Chemical Paint Co. v. Firestone Steel Products Co.*,¹⁸³ the patents at issue dealt with the composition of sulphuric acid baths used to remove scale from iron and steel articles.¹⁸⁴ Litigation arose concerning chemicals added to the bath in order to arrest the action of the sulphuric acid upon the underlying metal.¹⁸⁵ In its discussion of the claims of one of these patents, the Sixth Circuit stated that “[q]uestions of infringement of patents for compositions of matter are peculiar to themselves. Infringement depends upon the identity or equivalence of the ingredients and upon substantial sameness of the proportions in

175. *Id.* at 989.

176. *Id.* at 991 (emphasis added).

177. *Id.* at 991–92.

178. 3 U.S.P.Q. (BNA) 180, 185 (2d Cir. 1929).

179. *Id.* at 181.

180. *Id.* at 185.

181. *Id.*

182. *Id.* at 186.

183. 117 F.2d 927 (6th Cir. 1941).

184. *Id.* at 930.

185. *Id.*

which the ingredients are used.”¹⁸⁶ Finding that the alleged infringer had used the key ingredient in proportions different from those set out in the relevant patent’s claims, the Circuit Court upheld a determination that the patent was valid but not infringed.¹⁸⁷

(iii) *Treatises*

With the adoption of the “peripheral definition” claim format allowing the enactment of the *Patent Act of 1870*,¹⁸⁸ the need for treatises providing guidance on the proper drafting of claims was felt and amenable to being satisfied for the first time.¹⁸⁹ These treatises reflected the norms of claims drafting arising from both practice and decided cases;¹⁹⁰ in turn, they tended to stabilize accepted claims drafting practice¹⁹¹ and to influence the outcome of subsequent cases.¹⁹²

One of the earliest and most influential discussions of compositions of matter appears as follows in *Robinson on Patents*:

A composition of matter is an instrument formed by the intermixture of *two or more ingredients*, and possessing properties which belong to none of these ingredients in their separate state. An ingredient is a substance which, though capable of independent existence, may yet so far *lose its identity and individuality*, when mingled with other substances, as no longer distinguishable from them. [An ingredient in a composition of matter patent] differs from a part or element of a machine or manufacture which, however closely united with its associated parts or element, always preserves its own identity, and is discernible in its independent as well as in its combined condition.¹⁹³

186. *Id.* at 930–31. The most natural reading of the term “ingredients” contained in this passage is as the equivalent of the phrase “starting ingredients.” This is so because of the Sixth Circuit’s clear recognition that the chemical responsible for arresting the action of the sulphuric acid upon the metal, hydrocyanic acid, was created by the interaction of the initial ingredients set out in the patent claim: “the desired result is accomplished by the reaction of thiocyanate with the nascent hydrogen developed by the action of the acid on the metal.” *Id.* at 931. Lubrizol sought to blunt the effect of this case by noting that what was claimed was “an admixture of water, acid and thiocyanate.” Lubrizol’s Brief in Opp’n, *supra* n. 16, at 15–16 n. 12. However, “admixture” admits of the same ambiguity as “containing,” “added,” “additive,” and “ingredients.” See *supra* nn. 67–68, 72 and accompanying text.

187. *Am. Chemical Paint Co.*, 117 F.2d at 931–32.

188. See *supra* nn. 139–146 and accompanying text.

189. William C. Robinson, *The Law of Patents of Useful Inventions* vol. 1, at i (1890) [hereinafter *Robinson on Patents*].

190. *Id.* at vii–viii.

191. See *infra* nn. 195–196 and accompanying text.

192. See *In re Henderson*, 348 F.2d 550, 551 (C.C.P.A. 1965) (applying *Robinson on Patents*, see *supra* n. 189).

193. *Robinson on Patents*, *supra* n. 189, at § 192 278 (emphasis added).

This understanding of compositions of matter has proved so influential that it is quoted verbatim in most contemporary patent treatises.¹⁹⁴

The understanding of the appropriateness of ingredient-based patent claims has been similarly resilient. Dating from 1890, *Robinson on Patents* states that a composition of matter claim may be drafted

by enumerating its elements, stating the mode of their union, and the essential qualities of the resulting combination. If such a Claim cannot be framed, whatever defines and distinguished the composition from all others will suffice – as where it describes the compound as a result of mixing certain ingredients in a certain manner.¹⁹⁵

A contemporary treatise's understanding of the appropriateness of ingredient-based chemical is more categorical: "[C]omposition of matter claims list the chemical ingredients (compounds, elements or radicals) making up the composition or compound . . . Where necessary to novelty, etc., the proportions or other conditions or parameters of the compounds are stated, usually in ranges of concentrations of ingredients."¹⁹⁶

From the foregoing, it is clear that in drafting its claims in the way that it did, Exxon was simply following what had been accepted practice for a century. Treatises, then and now, recognized the possibility of post-combination change while approving claims drafted specifying compositions of matter in terms of their initial ingredients.

IV. CRITIQUE OF THE COMPANION DECISIONS IN LUBRIZOL DECISIONS

A. POST-LUBRIZOL QUANDARY

Lubrizol provides no viable alternative to the easy-to-prepare, easy-to-search, and easy-to-understand ingredient-based chemical claims.¹⁹⁷ Indeed, for very complex chemical inventions in which it is virtually impossible to meet the *Lubrizol* disclosure requirements regarding post-combination constituent identification, ingredient-based claims may be a company's only option.¹⁹⁸ At a time in which government is trying both to be more business-friendly and to promote technology-based industries,

194. Deller, *supra* n. 71, at § 463 39; Ernest B. Lipscomb III, *Walker on Patents* vol. 3, § 11.8, at 328–29 (3d ed. 1985); Donald S. Chisum, *Patents* vol. 1, § I .02[2], at 1–10 (1995).

195. *Robinson on Patents*, *supra* n. 189, at 148 (footnote omitted).

196. Robert C. Faber, *Landis on Mechanics of Patent Claim Drafting* § 49, at 148 (3d ed. 1990) (emphasis added).

197. In *Lubrizol*, Judges Clevenger and Plager discussed product-by-process claims as an alternative to ingredient-based claims for chemical compositions. See *supra* n. 110 and accompanying text. For a critique of this view, see *infra* nn. 209–214 and accompanying text.

198. See nn. 234–43 and accompanying text (providing possible modifications of ingredient-based composition claims drafting practice in the absence of legislative revisions to the *Patent Act*).

the *Lubrizol* decision moves chemical patent law in a more difficult and costly direction for no apparent reason.

B. AFFECT ON EXISTING AND PROSPECTIVE CHEMICAL PATENTS

Many existing chemical patents, for which tremendous aggregate resources have been spent, are in jeopardy of losing their enforceability; as a consequence, further research and development expenditures may be discouraged. Chemical patents affected by the *Lubrizol* decision cut across a wide range of industries. The Pharmaceutical Research and Manufacturers of America ("PhRMA"), which spends over \$15 billion dollars annually in pharmaceutical and medical research, filed an *amicus curiae* brief in support of Exxon's petition for certiorari in which PhRMA observed that during a six-month period over 200 patents containing ingredient-based composition claims were issued by the PTO.¹⁹⁹ Moreover, major corporations, such Proctor & Gamble, a producer of both commercial and consumer products, and Pfizer Inc., a manufacturer of chemical and pharmaceutical products, also noted in their *amicus curiae* briefs the significant impact on their businesses of the *Lubrizol* decision.²⁰⁰ These companies reveal technical information useful to society, yet they may be unable to reap the rewards typically accorded to patentees in return for their enabling disclosure. The new claims drafting requirements imposed by the panel majorities in *Lubrizol* may act as a disincentive on the filing of new patent applications. Instead of disclosing information on a patent application, companies may consider maintaining recipes as a trade secret because of the potential losses due to the new requirements.²⁰¹ However, in cases where reverse engineering is possible, trade secret protection will likely prove inadequate. The amounts of money at stake are enormous, with it taking an average of \$350 million dollars and twelve years to research, develop, and market a single new drug.²⁰²

C. PROVING INFRINGEMENT WILL BE IMPOSSIBLE FOR SOME PATENTS

Both Judges Nies²⁰³ and Newman²⁰⁴ understood that the new claims drafting requirements enunciated by the panel majority in the companion decisions in *Lubrizol* would prove to be impractical and, in some cases, impossible to satisfy. As a former patent law practitioner,

199. PhRMA Br., *supra* n. 3, at 5; *Lubrizol*, 77 F.3d at 454 (Newman, J., dissenting on denial of rehearing).

200. Proctor & Gamble Br., *supra* n. 6, at 2-3; Pfizer Br., *supra* n. 134, at 1, 9.

201. Proctor & Gamble Br., *supra* n. 6, at 14-15.

202. PhRMA Br., *supra* n. 3, at 3 (citing J.A. DiMasi, *Trends in Drug Development Costs, Times and Risks*, 29 Drug Info. J. 376 (1995)).

203. *Lubrizol*, 64 F.3d at 1567 (Nies, J., dissenting).

204. *Lubrizol*, 77 F.3d at 451 (Newman, J., dissenting on denial of rehearing).

Judge Newman realized that patent attorneys and those skilled in the art would know that Exxon's patent and others prepared in the same fashion were drawn to a list of starting ingredients.²⁰⁵ Exxon's chemical invention was simple and straightforward. All that was required was the combination of five ingredients.²⁰⁶ Complex chemical inventions may involve multiple intermediate reactions and various procedures.²⁰⁷ The more complex the chemical reaction the more unlikely one will be able to prove infringement.²⁰⁸

D. PRODUCT-BY-PROCESS CLAIMS ARE NOT A VIABLE OPTION

There are three disadvantages to implementing the *Lubrizol* panel majority's suggestion²⁰⁹ of using product-by-process claims instead of ingredient-based claims. First, product-by-process claims do not address the enforceability of chemical patents in existence at the time that the companion decisions in *Lubrizol* were handed down. As a consequence, many of these patents may be unenforceable. Because ingredient-based claims were considered a standard way to claim chemical compositions, it is unfair to allow these patentees whose patents were drafted according to then-accepted standards not to reap the benefit of their efforts. Second, there is a split in the Federal Circuit with regard to the proper infringement analysis to be applied to product-by process claims. In *Atlantic Thermoplastics Co., Inc. v. Faytex Corp.*,²¹⁰ a panel of the Federal Circuit held that in order to determine infringement, courts should compare the alleged infringing product to the patented product *with* the process acting as a claim limitation.²¹¹ On the other hand, another Federal Circuit panel in *Scripps Clinic & Res Found. v. Genentech, Inc.*,²¹² held that with respect to product-by-process claims, the alleged infringing product should be compared to the patented product *without* regard to

205. Indeed, *Lubrizol*'s own employee compared the starting ingredients, not the intermediate or final products, in order to determine whether *Lubrizol*'s product infringed the European counterpart of Exxon's '890 patent. *Lubrizol*, 64 F.3d at 1567 (Nies, J., dissenting). This employee of *Lubrizol* read the claims as a person of skill in the art would. *Id.* Additionally, a lubricant formulator working for *Lubrizol* testified that her concern was with "what goes in the pot." *Id.* at 1566 n. 3.

206. *Id.* at 1564.

207. *Id.* at 1567.

208. Both Exxon's and *Lubrizol*'s experts testified to the technical difficulty in determining the precise chemical composition of the product in its intermediate and final forms. *Id.*

209. *See supra* n. 110 and accompanying text.

210. *Id.* at 834, 846-47.

211. 970 F.2d at 846-47 (stating "[t]hus, process terms in product-by-process claims serve as limitations in determining infringement")

212. 927 F.2d 1565, 1583 (Fed. Cir. 1991).

the process.²¹³ Third, the PTO disfavors product-by-process claims and actively discourages their use.²¹⁴

E. OBJECTIVE OF DEVELOPING UNIFORM DECISIONS IS THWARTED

The main purpose of creating the Federal Circuit was to provide uniform and consistent decisions.²¹⁵ Yet, the *Lubrizol* decision is a striking example of how a rogue Federal Circuit panel may ignore long-standing claims drafting practice and the impossibility of some patentees adhering to its strictures, in the area of patent law – thereby creating havoc in

213. *Id.* (stating that “[s]ince claims must be construed the same way for validity and for infringement, the correct reading of product-by-process claims is that they are not limited to product prepared by the process set forth in the claims.”)

214. The following excerpts from the Manual of Patent Examining Procedures, make clear that applicants using product-by-process claims face a more difficult prosecution than those using conventional product claims:

2113 Product by Process Claims [R-1]

ONCE A PRODUCT APPEARING TO BE SUBSTANTIALLY IDENTICAL IS FOUND AND A 35 U.S.C. §§ 102/103 REJECTION MADE, THE BURDEN SHIFTS TO THE APPLICANT TO SHOW AN UNOBLVIOUS DIFFERENCE.

“The Patent Office bears a lesser burden of proof in making out a case of *prima facie* obviousness for product-by-process claims because of their peculiar nature than when a product is claimed in the conventional fashion.” *In re Fessmann*, 180 USPQ 4324, 326 (CCPA 1974). Once the Examiner provides a rationale tending to show that the claimed product appears to be the same or similar to that of the prior art, although produced by a different process, the burden shifts to applicant to come forward with evidence establishing a nonobvious difference between the claimed product and the prior art product. *In re Marosi*, 218 U.S.P.Q. 289, 292 (Fed. Cir. 1983). . . .

THE USE OF 35 U.S.C. §§ 102/103 REJECTIONS FOR PRODUCT-BY-PROCESS CLAIMS HAS BEEN APPROVED BY THE COURTS

“[T]he lack of physical description in a product-by-process claim makes determination of the patentability of the claim more difficult, since in spite of the fact that the claim may recite only process limitations, it is the patentability of the product claimed and not of the recited process steps which must be established. We are therefore of the opinion that when the prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, a rejection based alternatively on either section 102 or section 103 of the statute is eminently fair and acceptable. As a practical matter, the Patent Office is not equipped to manufacture products by the myriad of processes put before it and then obtain prior art products and make physical comparisons therewith.” *In re Brown*, 1773 U.S.P.Q. (BNA) 685, 688 (C.C.P.A. 1972).

Manual of Patent Examining Procedures § 2113, at §§ 2100-50-51 (U.S. Pat. & Trademark Off. 1995).

215. Under the *Federal Court Improvement Act of 1982*, Pub. L. No. 97-164, 96 Stat. 25 (1982), Congress created the Court of Appeals for the Federal Circuit, *inter alia*, “to reduce the widespread lack of uniformity and uncertainty of legal doctrine that exist in the administration of patent law.” H.R. Rep. 97-312, at § 23 (1981). Before the Federal Circuit was created, district court decisions were appealed to the regional circuit courts of appeal. Thereafter, the Federal Circuit had exclusive jurisdiction to hear patent appeals from district courts. 28 U.S.C. § 1295(a)(1) (1988).

claims drafting for chemical compositions. In the hands of skillful attorneys, enough anomalies may be found in the claims and specifications of patents drafted before *Lubrizol* was handed down to render the outcome of litigation unpredictable.

F. POLICY

When evaluating a legislative change to the *Patent Act*, Congress should consider the strong policy reasons that support overturning the *Lubrizol* decision. First, innovation in the chemical arts, especially as regards pharmaceuticals, depends upon patents that have been drafted using ingredient-based composition claims. The chemical industry has invested billions of dollars to develop the chemical inventions that were patented before the *Lubrizol* decision. These companies should still reap the benefits from their efforts by enacting a law that protects them. This will encourage these companies to invest in the development of new chemical inventions. Second, the *Lubrizol* decision will increase litigation since it is unclear whether other Federal Circuit panels will follow it. Third, because the *Lubrizol* decision may be interpreted as requiring that the inventor understand how his invention works, the cost of patenting ingredient-based chemical inventions will increase. Companies will be forced to perform expensive research to determine the post-combination constituents of chemical inventions that might otherwise be directed to more productive uses.

V. LEGISLATIVE PROPOSAL ON CHEMICAL COMPOSITION PATENTS

In sum, there are many ramifications to the *Lubrizol* decision. First, if the holding in the *Lubrizol* decision is left uncorrected, it will significantly affect the enforceability of many existing chemical patents. Holders of these patents certainly desire to enforce their patents especially in circumstances where they could have kept their information private and protected as a trade secret. Additionally, the panel majority's new technical rule on ingredient-based composition claims unnecessarily burdens companies by forcing them to spend resources determining the identity of chemicals that are found in the intermediate or final products. Ingredient-based claims in their specified amounts provides an enabling disclosure. The law does not require further disclosure. Ingredient-based composition claims are easier to write, search, examine and to learn the scope of the patent so that one may draft his application around the prior art. Additionally, there are strong policy reasons for reinstating the long-standing precedent of allowing the practical approach of ingredient-based chemical claims without the additional enabling requirement announced by the *Lubrizol* court. Finally, the panel majority's idiosyn-

cratic analysis of the words used in the title, claims, and the specification of the patent is devoid of practical bases in chemistry and patent law.

It is unlikely that the *Lubrizol* decision will be judicially corrected in the near term. Although the companion decisions in *Lubrizol* are not binding upon other panels of the Federal Circuit,²¹⁶ they do constitute binding precedent for district courts.²¹⁷ Consequently, district courts will likely follow *Lubrizol*, leaving a very slim likelihood that the Federal Circuit will rehear this issue.²¹⁸ With judicial change unlikely, legislative change remains the only viable option.

A. TEXT OF AMENDMENT TO 35 U.S.C. § 112, ¶ 2

In order to rectify the wrongly decided *Lubrizol* decision, the author proposes the following modification of 35 U.S.C. § 112, ¶ 2:

216. *South Corp. v. U.S.*, 690 F.2d 368, 370 n. 2 (Fed. Cir. 1982). Absent an appeal to the U.S. Supreme Court, the determination of one panel of the Federal Circuit can only be judicially overturned by an *en banc* decision. *Id.*

217. The Federal Circuit has exclusive jurisdiction over appeals on patent decisions issued from district courts. *See supra* n. 215 and accompanying text.

218. To date, *Lubrizol* has been followed in six cases: *Ultradent Prods. v. Life-Like Cosmetics*, 924 F. Supp. 1101, 1108 (D. Utah 1996) (citing *Lubrizol* as authority for requiring that the allegedly infringing product and not just the initial ingredients for the product be shown to contain specific chemical compound in a concentration within the range specified in the claim); *Revlon Consumer Prods. Corp. v. L'Oreal S.A.*, 170 F.R.D. 391, 400 (D. Del. 1997) (citing *Lubrizol* for the proposition that a trial judge has the responsibility to independently construe the meaning of a patent claim); *CVI/Beta Ventures v. Tura LP*, 112 F.3d 1146, 1162 (Fed. Cir. 1997) (citing *Lubrizol* for the proposition that reversal rather than remand was appropriate where the claim interpretation adopted was identical (or nearly identical) to that offered at trial by one of the parties at trial); *Elkay Mfg. Co. v. Ebco Mfg. Co.*, 1998 U.S. Dist. LEXIS 10697 at *20 (N.D. Ill. July 10, 1998) (citing *Lubrizol* as authority for the proposition that the trial court judge is not limited to choosing from the claim constructions offered by the parties); *StairMaster Sports/Medical Prods. v. Groupe Procycle*, 1998 U.S. Dist. LEXIS 11328 at **6-7 (D. Del. July 14, 1998) (citing *Lubrizol* for the proposition that the trial court judge is not limited to choosing from the claim constructions offered by the parties); *Calabrese v. Square D Co.*, 2000 U.S. Dist. LEXIS 4307 at *5 (N.D. Ill. Mar. 23, 2000) (citing *Lubrizol* for the proposition that where only one term in a patent claim is in dispute, the court need only construe the term in question and not simply rely upon the definitions proffered by the parties).

In addition, *Lubrizol* has been distinguished in two cases: *Hunter Douglas, Inc. v. Comfortex Corp.*, 1998 U.S. Dist. LEXIS 22220 at *25 n. 6 (N.D.N.Y. Dec. 23, 1998) (distinguishing the principle enunciated in *Lubrizol*, 64 F.3d at 1557 n. 4, that "a product claim is infringed by any product containing every claim limitation regardless of how the product is made" as shedding no light on whether alleged infringer's "composite strips" or "composite facings" were the same as the patentee's "first" and "second" sheets in an end product used as a window covering); *Exxon Corp. v. Mobil Oil Corp.*, 1998 U.S. Dist. LEXIS 17555 at *18 (S.D. Tex. Aug. 13, 1998) (distinguishing the fate of Exxon's '890 patent from the Exxon patent at issue in the case under consideration because the latter was "not a 'comprising' invention and it is not defined by what may be found in the product or process. The [p]atent simply states the starting ingredients for the catalyst system.").

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention. *Claims for chemical compositions will be deemed to satisfy these requirements when they indicate both the type and the quantity of the ingredients to be combined to produce the invention.* (New text emphasized.)

This modest change in the law will assure that inventors who received their patents pre-*Lubrizol* will receive the benefit of their “bargain” upon which the U.S. patent system is based—full disclosure of their invention in return for a limited period of exclusivity in which to exploit it. Moreover, this change will provide the uniformity and continuity that the Federal Circuit was to created to provide for the business community.²¹⁹

B. BENEFITS

There are significant benefits to adopting this legislative change. First, ingredient-based claims make it easier to write, to search, and to determine the scope of the patent. Second, allowing chemical inventions to continue to use ingredient-based claims without listing the identity of the chemicals found in the intermediate or final product promotes consistency in patent law.

C. DISADVANTAGES

A question that is applicable to all legislation that applies to a wide swath of industries is whether the law should become a quilt of patches addressed to specific industries or should only be modified when more than one industry is affected. However, even a statutory provision of long-standing may need to be changed to deal with an anomalous appellate court ruling. For example, the *Patent Act* was modified in 1995 to allow for a modified examination of process patents for the biotechnology industry.²²⁰ The legislative change was due to “two conflicting and irreconcilable decisions” by the Federal Circuit²²¹ and was enacted notwithstanding Congress’ recognition that “industry specific legislation, particularly in the context of patent law, is generally not favored.”²²²

Additionally, the fair use provision of the *Copyright Act*, enacted in 1976 and in effect at the outset of 1978,²²³ derives from the formulation

219. See *supra* n. 215 and accompanying text.

220. See generally Pub. L. No. 104-41, 109 Stat. 351 (1995) (codified as amended in 35 U.S.C. § 103).

221. H.R. Rep. 104-78, at § 3 (1995) (reprinted in 1995 U.S.C.C.A.N. 395, 397). The two cases cited by Congress were *In re Durden*, 763 F.2d 1406 (Fed. Cir. 1985); and *In re Pleudemann*, 910 F.2d 823 (Fed. Cir. 1990). *Id.*

222. H.R. Rep. 104-78, at §§ 4-5 (1995) (reprinted in 1995 U.S.C.C.A.N. 395, 398-99).

223. 17 U.S.C. § 107 (1978); Sen. Rep. 94-473, at § 62 (1975); H.R. Rep. 94, at § 65 (1976).

contained in Justice Joseph Story's 1841 judgment in *Folsom v. Marsh*.²²⁴ Nonetheless, following three decisions by the Second Circuit, *Salinger v. Random House, Inc.*,²²⁵ *New Era Publications International ApS v. Henry Holt & Co.*,²²⁶ and *Wright v. Warner Books, Inc.*,²²⁷ Congress added an additional sentence to the relevant provision of the *Copyright Act* to make clear that a work's unpublished status did not render the affirmative defense of fair use unavailable.²²⁸

Similarly, U.S. trademark law has also been amended to overcome an anomalous understanding imposed by an appellate court in the face of the U.S. Supreme Court's refusal to grant *certiorari*. In *Anti-Monopoly, Inc. v. General Mills Fun Group, Inc.*, the Ninth Circuit endorsed a consumer motivation test for determining genericness.²²⁹ The *Trademark Clarification Act of 1984*²³⁰ amended relevant sections of the *Lanham Act*²³¹ to restore the law as it existed before the *Anti-Monopoly* case.²³²

There are no real disadvantages to reinstating the pre-*Lubrizol* law. Patentees who have been able comply with the claims drafting regime on claim construction required by *Lubrizol* will, presumably, have been sufficiently careful in drafting their chemical composition claims to avoid

224. 9 F. Cas. 342, 348 (C.C.D. Mass. 1941).

225. 811 F.2d 90 (2d Cir.), *cert. denied*, 484 U.S. 890 (1987).

226. 873 F.2d 576 (2d Cir.), *cert. denied*, 498 U.S. 921 (1990).

227. 953 F.2d 731 (2d Cir. 1991).

228. Act of October 24, 1992, Pub. L. No. 102-492, 106 Stat. 3145 (codified as amended in 17 U.S.C. § 106). The amendment added the following sentence: "The fact that a work is unpublished shall not itself bar a finding of fair use if such finding is made upon consideration of all the above factors." *Id.*

229. 684 F.2d 1316 (9th Cir. 1982), *cert. denied*, 459 U.S. 1227 (1983).

230. Pub. L. No. 98-620, 98 Stat. 3335 (1984).

231. The *Trademark Clarification Act* amended two sections of the *Lanham Act*. Section 14(c), dealing with procedures for canceling the registration of a trademark, was amended with the addition of the following two sentences: "A registered mark shall not be deemed to be a common descriptive name of goods or services solely because such mark is also used as a name of or to identify a unique product or service. The primary significance of the registered mark to the relevant public rather than purchaser motivation shall be the test for determining whether the registered mark has become the common descriptive name of goods or services in connection with which it has been used." Pub. L. No. 98-620, § 102, 98 Stat. 3335 (1984). Section 45 of the *Lanham Act* was amended to alter the definitions of "trademark," "service mark," and "abandonment." Pub. L. No. 98-620, § 103, 98 Stat. 3335 (1984). As amended, the "trademark" denotes "any word . . . used by a manufacturer or merchant to identify and distinguish his goods, including a unique product, from those manufactured or sold by others and to indicate the source of goods, even if that source is unknown." *Id.* The amended definition of "service mark" also emphasizes the inclusion of unique goods from unknown sources. *Id.* Similarly, the definition of "abandonment" was augmented by the addition of the following sentence: "Purchaser motivation shall not be a test for determining abandonment under this subparagraph." Pub. L. No. 98-620, § 103, 98 Stat. 3336 (1984).

232. See Wayne F. Osoba, *The Legislative Response to ANTI-MONOPOLY: A Missed Opportunity to Clarify the Genericness Doctrine*, 1985 U. Ill. L. Rev. 197, 209-11.

being whipsawed by the proposed legislative change. Accordingly, they should be unaffected by a legislative change to the law.²³³

VI. INTERIM MEASURES

Notwithstanding the merits of revising the *Patent Act*, practitioners faced with the problem of drafting chemical composition claims under the current statutory regime need guidance. Accordingly, a few lessons drawn from the foregoing may prove helpful to deal with those circumstances where specifying the intermediate or final chemical constituents of the invention prove economically or technically unfeasible.

Notwithstanding the PTO's reluctance to grant product-by-process claims,²³⁴ a practitioner may wish to include an otherwise gratuitous product-by-process claim in the application for a chemical composition. While a practitioner opting for this route must be prepared to deal with the patent prosecution difficulties outlined above,²³⁵ need he be concerned about prosecution history estoppel if this claim is rejected during the course of patent prosecution? In *Warner-Jenkinson*, the Supreme Court noted that

It is telling that in each case this Court probed the reasoning behind the Patent Office's insistence upon a change in the claims. In each instance, a change was demanded because the claim as otherwise written was viewed as not describing a patentable invention at all – typically because what it described was encompassed within the prior art. . . . Our prior cases have consistently applied prosecution history estoppel only where claims have been amended for a limited set of reasons, and we see no substantial cause for requiring a more rigid rule invoking an estoppel regardless of the reasons for a change.²³⁶

Accordingly, there would seem to be little concern that a patent practitioner intent upon ensuring protection for his client's chemical invention through a product-by-process claim might inadvertently undermine it, except in those circumstances where the deletion of the claim could be viewed as being necessitated by prior art.

An equally prudent strategy may be to make abundantly clear in drafting both the specification and the claims that it is materials entering into the composition and not those already in intermediate or final product that are intended. The panel majority in *Lubrizol* made a great deal of Exxon's use of the terms such as "added," "additive," "containing,"

233. Exxon and Lubrizol may be affected by the change to the law, however. Once the law is changed, and if Lubrizol is continuing to infringe Exxon's patent, Exxon may be able to file another infringement action unless such action is precluded by the enacting statute.

234. See *supra* n. 214 and accompanying text.

235. See *supra* nn. 210–215 and accompanying text.

236. *Warner-Jenkinson*, 520 U.S. at 31–32.

and "ingredients."²³⁷ While these terms have been demonstrated to be systematically ambiguous,²³⁸ prudent drafting would suggest caution in their use.

Finally, one method of avoiding the problems encountered by Exxon may be to use a phrase derived from *Ex parte Greenbaum*.²³⁹ There, the patent applicant drafted a claim for "[a]n ointment containing stearic acid, triethanolamine, and allantoin particles" ²⁴⁰ However, when mixed together as indicated in the specification, the stearic acid and triethanolamine combined to form an amine soap.²⁴¹ Accordingly, the examiner rejected the claim on the basis that the chemical composition did not "contain" the three ingredients stated.²⁴² The Board of Patent Appeals allowed the claims to be redrafted to claim "the reaction product of" the three initial ingredients.²⁴³ Such phraseology may be particularly helpful where the reaction product of the initial ingredients is too unstable to be otherwise identified and where there is nothing sufficiently remarkable in the manner of their combination to merit the drafting of a product-by-process claim.

VIII. CONCLUSION

The companion decisions in *Lubrizol* are examples of panels of the Federal Circuit run amok. The panel majority used the *Markman* decision as a license to go beyond performing claim construction and to change claims drafting practices that had proved unobjectionable for a century. After the companion decisions in *Lubrizol*, ingredient-based claims must now include the quantities in which the reactants are found in the intermediate or final product. This new claims drafting requirement eviscerates the long-standing rule on ingredient-based composition claims. Despite the panel's assurances that the *Lubrizol* holding was limited to Exxon's patent, lower courts are now applying the *Lubrizol* rule to other patents. Because it is unlikely that the Federal Circuit *en banc* will have an opportunity to overturn the *Lubrizol* decision in the immediate future, Congress should adopt a modest legislative change to the law. However, until that enactment, patent attorneys and agents should proceed with caution.

237. See *supra* nn. 67-68, 72 and accompanying text.

238. *Id.*

239. 38 U.S.P.Q. 350 (Bd. of Pat. App. 1938); *Lubrizol's Br. in Opp'n*, *supra* n. 16, at 16 n. 13; Deller, *supra* n. 71, at 67-68.

240. *Greenbaum*, 38 U.S.P.Q. at 350.

241. *Id.*

242. *Id.*

243. *Id.* Presumably, this could be adopted for the contemporary transitions "consisting of," "consisting essentially of," and "comprising." See *supra* n. 81 and accompanying text.

APPENDIX

Claim 1 of the '890 patent for a lubricating oil reads as follows:

1. A lubricating oil composition suitable as a crankcase lubricant in internal combustion engines comprising:

A. a major amount of lubricating oil;

B. a dispersing amount of lubricating oil dispersant selected from the group consisting of:

(1) ashless nitrogen or ester containing dispersant compounds selected from the group consisting of:

(a) oil soluble salts, amides, imides, oxazolines, esters, and mixtures thereof, of long chain hydrocarbon substituted mono- and dicarboxylic acids or their anhydrides;

(b) long chain aliphatic hydrocarbons having a polyamine attached directly thereto; and

(c) Mannich condensation products formed by condensing about a molar proportion of long chain hydrocarbon substituted phenol with from about 1 to 2.5 moles of formaldehyde and from about 0.5 to 2 moles of polyalkylene polyamine; wherein said long chain hydrocarbon group is a polymer of a C₂ to C₅ monoolefin, said polymer having a molecular weight of from about 700 to about 5000;

(2) nitrogen or ester containing polymeric viscosity index improver dispersants which are selected from the group consisting of:

(a) polymers comprised of C₄ to C₂₄ unsaturated esters of vinyl alcohol or of C₃ to C₁₀ unsaturated mono- or dicarboxylic acid with unsaturated nitrogen containing monomers having 4 to 20 carbons,

(b) copolymers of C₂ to C₂₀ olefin with C₃ to C₁₀ mono- or dicarboxylic acid neutralized with amine, hydroxy amine or alcohols, and

(c) polymers of ethylene with a C₃ to C₂₀ olefin further reacted either by grafting C₄ to C₂₀ unsaturated nitrogen containing monomers thereon or by grafting an unsaturated acid onto the polymer backbone and then reacting said carboxylic acid groups with amine, hydroxy amine or alcohol; and

(3) mixtures of (1) and (2); wherein when said lubricating oil dispersant (1) is present, then said dispersing amount of (1) is about 1 to 10 wt. %, and when said lubricating oil dispersant (2) is present, then said dispersing amount of (2) is from about 0.3 to 10 wt. %;

C. from about 0.01 to 5.0 parts by weight of oil soluble zinc dihydrocarbyl dithiophosphate wherein the hydrocarbyl groups contain from 1 to 18 carbon atoms;

D. an antioxidant effective amount, within the range of from about 5 to about 500 parts per million by weight, of added copper in the form of an oil soluble copper compound; and

E. a lubricating oil detergent additive which comprises at least one magnesium or calcium salt of a material selected from the group consisting of sulfonic acids, alkyl phenols, sulfurized alkyl phenols, alkyl salicylates and naphthenates, wherein said parts by weight are based upon 100 parts by weight of said lubricating composition and said weight % is based on the weight of said lubricating composition.²⁴⁴

Claim 61 of the '890 patent for a lubricating oil concentrate reads as follows:

61. A lubricating oil concentrate composition suitable for use in preparing crankcase lubricants for internal combustion engines which comprises:

A. lubricating oil;

B. at least one lubricating oil dispersant selected from the group consisting of:

(1) ashless nitrogen or ester containing dispersant compounds selected from the group consisting of:

(a) oil soluble salts, amides, imides, oxazolines, esters, and mixtures thereof, of long chain hydrocarbon substituted mono- and dicarboxylic acids or their anhydrides;

(b) long chain aliphatic hydrocarbons having a polyamine attached directly thereto; and

(c) Mannich condensation products formed by condensing about a molar proportion of long chain hydrocarbon substituted phenol with from about 1 to 2.5 moles of formaldehyde and from about 0.5 to 2 moles of polyalkylene polyamine; wherein said long chain hydrocarbon group is a polymer of a C₂ to C₅ monoolefin, said polymer having a molecular weight of from about 700 to about 5000;

(2) nitrogen or ester containing polymeric viscosity improver dispersants which are selected from the group consisting of:

(a) polymers comprised of C₄ to C₂₄ unsaturated esters of vinyl alcohol or of C₃ to C₁₀ unsaturated mono- or dicarboxylic acid with unsaturated nitrogen containing monomers having 4 to 20 carbons,

(b) copolymers of C₂ to C₂₀ olefin with C₃ to C₁₀ mono- or dicarboxylic acid neutralized with amine, hydroxy amine or alcohols, and

(c) polymers of ethylene with a C₃ to C₂₀ olefin further reacted either by grafting C₄ to C₂₀ unsaturated nitrogen containing monomers thereon or by grafting an unsaturated acid onto the polymer backbone and then reacting said carboxylic acid groups with amine, hydroxy amine or alcohol; and

(3) mixtures of (1) and (2); wherein when said lubricating oil dispersant (1) is present, then said dispersing amount of (1) is about 10 to 60

244. U.S. Pat. No. 4,867,890 (issued Sept. 19, 1989).

wt. %, and when said lubricating oil dispersant (2) is present, then said dispersing amount of (2) is from about 3 to 40 wt. %;

C. oil soluble zinc dihydrocarbyl dithiophosphate wherein the hydrocarbyl groups contain from 1 to 18 carbon atoms and said dithiophosphate provides from 0.1 to 10.0 wt. % phosphorus and from 0.1 to 10.0 wt. % zinc;

D. added copper, within the range of from 0.005 to 2 weight percent, in the form of an oil soluble copper compound; and

a magnesium or calcium containing lubricating oil detergent additive which comprises at least one magnesium or calcium salt of a material selected from the group consisting of sulfonic acids, alkyl phenols, sulfurized alkyl phenols, alkyl salicylates, and naphthenates, wherein said parts by weight are based upon 100 parts by weight of said lubricating concentrate and said weight % is based on the weight of said lubricating concentrate.²⁴⁵

245. *Id.* at col. 22-23.

