IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

RECKITT BENCKISER PHARMACEUTICALS INC., RB PHARMACEUTICALS LIMITED, and MONOSOL RX, LLC, Plaintiffs, v. WATSON LABORATORIES, INC. and ACTAVIS LABORATORIES UT, INC., Defendants.	Civil Action No. 13-1674-RGA
RECKITT BENCKISER PHARMACEUTICALS INC., RB PHARMACEUTICALS LIMITED, and MONOSOL RX, LLC, Plaintiffs, v. PAR PHARMACEUTICAL, INC. and INTELGENX TECHNOLOGIES CORP., Defendants.	Civil Action No. 14-422-RGA

TRIAL OPINION

Mary W. Bourke, Esq., Dana K. Severance, Esq., Daniel M. Attaway, Esq., WOMBLE CARLYLE SANDRIDGE & RICE, LLP, Wilmington, DE, attorneys for Plaintiffs.

Daniel A. Ladow, Esq., James M. Bollinger, Esq., Timothy P. Heaton, Esq., J. Magnus Essunger, Esq., TROUTMAN SANDERS LLP, New York, NY; Charanjit Brahma, Esq., TROUTMAN

SANDERS LLP, San Francisco, CA; Robert E. Browne, Jr., Esq., TROUTMAN SANDERS LLP, Chicago, IL; Puja Patel Lea, Esq., TROUTMAN SANDERS LLP, Atlanta, GA; Jeffrey B. Elikan, Esq., Jeffrey Lerner, Esq., Erica N. Andersen, Esq., Ashley M. Kwon, Esq., COVINGTON & BURLING LLP, Washington, DC, attorneys for Plaintiffs Reckitt Benckiser Pharmaceuticals Inc. and RB Pharmaceuticals Limited.

James F. Hibey, Esq., Timothy C. Bickham, Esq., STEPTOE & JOHNSON LLP, Washington, DC; David L. Hecht, Esq., Cassandra A. Adams, Esq., STEPTOE & JOHNSON LLP, New York, NY, attorneys for Plaintiff MonoSol Rx, LLC.

John C. Phillips, Jr., Esq., Megan C. Haney, Esq., PHILLIPS, GOLDMAN & SPENCE, P.A., Wilmington, DE; George C. Lombardi, Esq., Michael K. Nutter, Esq., Tyler G. Johannes, Esq., WINSTON & STRAWN LLP, Chicago, IL; Stephen Smerek, Esq., David P. Dalke, Esq., Ashlea P. Raymond, Esq., WINSTON & STRAWN LLP, Los Angeles, CA; Melinda K. Lackey, Esq., Donald Mahoney, III, Esq., WINSTON & STRAWN LLP, Houston, TX, attorneys for Defendants Watson Laboratories, Inc. and Actavis Laboratories UT, Inc.

Steven J. Fineman, Esq., Katharine Lester Mowery, Esq., RICHARDS, LAYTON & FINGER, P.A., Wilmington, DE; Daniel G. Brown, Esq., LATHAM & WATKINS LLP, New York, NY; James K. Lynch, Esq., LATHAM & WATKINS LLP, San Francisco, CA; Terry Kearney, Esq., LATHAM & WATKINS LLP, Menlo Park, CA; Jennifer Koh, Esq., B. Thomas Watson, Esq., LATHAM & WATKINS LLP, San Diego, CA; Emily C. Melvin, Esq., Brenda L. Danek, Esq., LATHAM & WATKINS LLP, Chicago, IL, attorneys for Defendants Par Pharmaceutical, Inc. and IntelGenx Technologies Corp.

June 3, 2016

Richard G. Andrews
ANDREWS, U.S. DISTRICT JUDGE:

Plaintiffs Reckitt Benckiser Pharmaceuticals, Inc., RB Pharmaceuticals Limited, and MonoSol Rx, LLC (collectively, "Reckitt") brought this suit against Defendants Watson Laboratories, Inc. and Actavis Laboratories UT, Inc. (collectively, "Watson") (D.I. 1, 11, 287)[1] and Defendants Par Pharmaceutical, Inc. and IntelGenx Technologies Corporation (collectively, "Par") (C.A. No. 14-422 D.I. 1, 9, 14; D.I. 80) alleging infringement of U.S. Patent Nos. 8,475,832 ("the '832 patent"); 8,603,514 ("the '514 patent"); and 8,017,150 ("the '150 patent"). Reckitt's suits against Watson and Par were consolidated for all pretrial proceedings. (D.I. 66; C.A. No. 14-422 D.I. 19). The Court held a four day bench trial. (D.I. 414, 415, 416, 417).[2] On November 3–4, 2015, the parties addressed the validity of the '150 and '514 patents and infringement of the '150 patent by Watson (D.I. 414, 415). On December 17–18, 2015, the parties addressed the validity of the '832 patent, infringement of the '150 patent by Par, and infringement of the '832 and '514 patents by Watson and Par (D.I. 416, 417). The parties filed post-trial briefing (D.I. 396, 397, 406, 407, 408, 410, 411) and proposed findings of fact (D.I. 400).[3] Having considered the documentary evidence and testimony, the Court makes the following findings of fact and conclusions of law pursuant to Federal Rule of Civil Procedure 52(a).

[1] Citations to "D.I.___" are to the docket in C.A. No. 13-1674 unless otherwise noted.
[2] Although the official transcript is filed in four parts (D.I. 414, 415, 416, 417), citations to the transcript herein are generally cited as "Tr."
[3] Reckitt also submitted a notice of supplemental authority on March 28, 2016 (D.I. 424), informing the Court of the final written decisions of the Patent Trial and Appeal Board in *inter partes* review proceedings of a patent related to the '514 patent.

I. BACKGROUND

A. Overview

Plaintiff Reckitt Benckiser Pharmaceuticals is the holder of approved New Drug Application ("NDA") No. 22-410 for Suboxone® sublingual film, which is indicated for maintenance treatment of opioid dependence. (D.I. 353-1 at ¶¶ 10, 16). The active ingredients of Suboxone® sublingual film are buprenorphine hydrochloride and naloxone hydrochloride. (*Id.* at ¶ 17). Buprenorphine is an opioid. (Tr. 1292:7–11; DFF137).[4] Naloxone is an opioid antagonist that prevents the action of opioids like buprenorphine when delivered simultaneously to the bloodstream of a user. (Tr. 1293:3–17, 1474:9–14). Suboxone® sublingual film includes both buprenorphine and naloxone to prevent unintended diversion of the product for abuse. (Tr. 1474:9–14).

Suboxone® sublingual film is available in four dosage strengths (buprenorphine hydrochloride/naloxone hydrochloride): 2 mg/0.5 mg, 4 mg/1 mg, 8 mg/2 mg, and 12 mg/3 mg. (D.I. 353-1 at ¶ 17). Plaintiff RB Pharmaceuticals Limited is the assignee of the '832 patent, entitled "Sublingual and Buccal Film Compositions." (*Id.* at ¶ 24; '832 patent, (54) & (73)). Plaintiff MonoSol Rx, LLC is the assignee of the '514 patent, entitled "Uniform Films for Rapid Dissolve Dosage Form Incorporating Taste-Masking Compositions," and the '150 patent, entitled "Polyethylene Oxide-Based Films and Drug Delivery Systems Made Therefrom." (D.I. 353-1 at ¶¶ 28, 32; '514 patent, (54) & (73); '150 patent, (54) & (73)). Plaintiff Reckitt Benckiser Pharmaceuticals is an exclusive licensee of the '832, '514, and '150 patents. (D.I. 353-1 at ¶¶ 25, 29, 33). The '832, '514, and '150 patents are listed in the Food and Drug

[4] Citations to "PFF," "DFF," "DPRF," and "DWRF" herein are to the Corrected Joint Proposed Findings of Fact and related responses filed at D.I. 400.

Administration's "Approved Drug Products with Therapeutic Equivalence Evaluations" (the "Orange Book") entry for Suboxone® sublingual film. (*Id.* at ¶ 34).

Watson and Par each filed Abbreviated New Drug Applications ("ANDAs") seeking FDA approval to market generic versions of the 2 mg/0.5 mg, 4 mg/1 mg, 8 mg/2 mg, and 12 mg/3 mg dosage strengths of Suboxone® sublingual film prior to the expiration of the '832, '514, and '150 patents. (*Id.* at ¶¶ 42, 45, 118). Watson seeks approval for its ANDA Product through ANDA Nos. 204383 and 207087.[5] (*Id.* at ¶¶ 43, 45). Par seeks approval for its ANDA Product through ANDA No. 205854. (*Id.* at ¶ 118). Watson's ANDAs and Par's ANDA contain Paragraph IV certifications alleging that the '832, '514, and '150 patents are invalid, unenforceable, and/or will not be infringed by the manufacture, use, or sale of the generic products proposed in the ANDAs. (*Id.* at ¶¶ 43, 44, 46, 119). Reckitt received notices of Watson's and Par's Paragraph IV certifications and initiated the present litigation. (*Id.*; D.I. 1, 11, 80, 287).

B. Asserted Patents

1. '832 Patent

The '832 patent is directed to pharmaceutical film compositions and formulations that contain buprenorphine and naloxone. ('832 patent, 23:58–25:6). Reckitt asserts independent claims 1 and 15 and dependent claims 3, 6, and 16–19 against Watson and Par. (PFF21). The '832 patent issued on July 2, 2013. ('832 patent, (45)). The asserted claims of the '832 patent are entitled to a priority date of August 7, 2009. (D.I. 353-1 at ¶ 120).

Claim 1 of the '832 patent reads:

A film dosage composition comprising:

[5] "Watson's ANDA Product" and "Par's ANDA Product" refer to the parties' respective proposed generic drug formulations.

a. A polymeric carrier matrix;

b. A therapeutically effective amount of buprenorphine or a pharmaceutically acceptable salt thereof;

c. A therapeutically effective amount of naloxone or a pharmaceutically acceptable salt thereof; and

d. A buffer in an amount to provide a local pH for said composition of a value sufficient to optimize absorption of said buprenorphine, wherein said local pH is from about 3 to about 3.5 in the presence of saliva.

('832 patent, 23:58–67).

Claim 15 of the '832 patent reads:

An orally dissolving film formulation comprising buprenorphine and naloxone, wherein said formulation provides an in vivo plasma profile having a Cmax of between about 0.624 ng/ml and about 5.638 ng/ml for buprenorphine and an in vivo plasma profile having a Cmax of between about 41.04 pg/ml to about 323.75 pg/ml for naloxone.

(*Id.* at 24:56–61).

2. '514 Patent

The '514 patent is directed to pharmaceutical film compositions that achieve certain levels of active ingredient content uniformity. ('514 patent, (57)). Reckitt asserts independent claim 62 and dependent claims 64, 65, 69, and 73 against Watson and Par. (PFF19). The '514 patent issued on December 10, 2013. ('514 patent, (45)). The asserted claims of the '514 patent are entitled to a priority date of September 27, 2002. (D.I. 353-1 at ¶ 121).

Claim 62 of the '514 patent reads:

A drug delivery composition comprising:

(i) a cast film comprising a flowable water-soluble or water swellable film-forming matrix comprising one or more substantially water soluble or water swellable polymers; and a desired amount of at least one active;

wherein said matrix has a viscosity sufficient to aid in substantially maintaining non-self-aggregating uniformity of the active in the matrix;

(ii) a particulate active substantially uniformly stationed in the matrix; and

(iii) a taste-masking agent selected from the group consisting of flavors, sweeteners, flavor enhancers, and combinations thereof to provide taste-masking of the active;

wherein the particulate active has a particle size of 200 microns or less and said flowable water-soluble or water swellable film-forming matrix is capable of being dried without loss of substantial uniformity in the stationing of said particulate active therein; and

wherein the uniformity subsequent to casting and drying of the matrix is measured by substantially equally sized individual unit doses which do not vary by more than 10% of said desired amount of said at least one active.

('514 patent, 73:48–74:10).

3. '150 Patent

The '150 patent is directed to pharmaceutical film products comprising, among other things, certain amounts of specific polymers, including polyethylene oxides. ('150 patent, (57)). Reckitt asserts independent claim 1 and dependent claim 4 against Watson. (PFF23). Reckitt asserts independent claim 10 and dependent claim 13 against Par. (PFF25). The '150 patent issued on September 13, 2011. ('150 patent, (45)). The parties stipulated that, for purposes of the present case, the asserted claims of the '150 patent are entitled to a priority date no earlier than May 28, 2003. (D.I. 353-1 at ¶ 122).

Claim 1 of the '150 patent reads:

A mucosally-adhesive water-soluble film product comprising:

an analgesic opiate pharmaceutical active; and

at least one water-soluble polymer component consisting of polyethylene oxide in combination with a hydrophilic cellulosic polymer;

wherein:

the water-soluble polymer component comprises greater than 75% polyethylene oxide and up to 25% hydrophilic cellulosic polymer;

the polyethylene oxide comprises one or more low molecular weight polyethylene oxides and one or more higher molecular weight polyethylene oxides, the molecular weight of the low molecular weight polyethylene oxide being in the range 100,000 to 300,000 and the molecular weight of the higher molecular weight polyethylene oxide being in the range 600,000 to 900,000; and

the polyethylene oxide of low molecular weight comprises about 60% or more in the polymer component.

('150 patent, 57:36–54).

Claim 10 of the '150 patent reads:

A mucosally-adhesive water-soluble film product comprising:

an analgesic opiate pharmaceutical active; and

at least one water-soluble polymer component consisting of polyethylene oxide in combination with a hydrophilic cellulosic polymer;

wherein:

the water-soluble polymer component comprises the hydrophilic cellulosic polymer in a ratio of up to about 4:1 with the polyethylene oxide;

the polyethylene oxide comprises one or more low molecular weight polyethylene oxides and one or more higher molecular weight polyethylene oxides, the molecular weight of the low molecular weight polyethylene oxide being in the range 100,000 to 300,000 and the molecular weight of the higher molecular weight polyethylene oxide being in the range 600,000 to 900,000; and

the polyethylene oxide of low molecular weight comprises about 60% or more in the polymer component.

(*Id.* at 58:28–46).

II. LEGAL STANDARDS

A. Infringement

A patent is infringed when a person "without authority makes, uses, offers to sell, or sells any patented invention, within the United States . . . during the term of the patent . . . ." 35

U.S.C. § 271(a). A two-step analysis is employed in making an infringement determination. *See Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 976 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). First, the court must construe the asserted claims to ascertain their meaning and scope. *See id.* The trier of fact must then compare the properly construed claims with the accused infringing product. *See id.* This second step is a question of fact. *Bai v. L & L Wings, Inc.*, 160 F.3d 1350, 1353 (Fed. Cir. 1998).

"Literal infringement of a claim exists when every limitation recited in the claim is found in the accused device." *Kahn v. Gen. Motors Corp.*, 135 F.3d 1472, 1477 (Fed. Cir. 1998). "If any claim limitation is absent from the accused device, there is no literal infringement as a matter of law." *Bayer AG v. Elan Pharm. Research Corp.*, 212 F.3d 1241, 1247 (Fed. Cir. 2000). If an accused product does not infringe an independent claim, it also does not infringe any claim depending thereon. *See Wahpeton Canvas Co. v. Frontier, Inc.*, 870 F.2d 1546, 1553 (Fed. Cir. 1989). However, "[o]ne may infringe an independent claim and not infringe a claim dependent on that claim." *Monsanto Co. v. Syngenta Seeds, Inc.*, 503 F.3d 1352, 1359 (Fed. Cir. 2007) (internal quotation marks omitted). A product that does not literally infringe a patent claim may still infringe under the doctrine of equivalents if the differences between an individual limitation of the claimed invention and an element of the accused product are insubstantial. *See Warner–Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 39–40 (1997). The patent owner has the burden of proving infringement by a preponderance of the evidence. *See SmithKline Diagnostics, Inc. v. Helena Labs. Corp.*, 859 F.2d 878, 889 (Fed. Cir. 1988).

B. Anticipation

A patent claim is invalid as anticipated under 35 U.S.C. § 102 if "within the four corners of a single, prior art document . . . every element of the claimed invention [is described], either

expressly or inherently, such that a person of ordinary skill in the art could practice the invention without undue experimentation." *Callaway Golf Co. v. Acushnet Co.*, 576 F.3d 1331, 1346 (Fed. Cir. 2009) (alterations in original) (internal quotation marks omitted). As with infringement, the court construes the claims and compares them against the prior art. *See Enzo Biochem, Inc. v. Applera Corp.*, 599 F.3d 1325, 1332 (Fed. Cir. 2010). "[T]he accused infringer must show by clear and convincing evidence that a single prior art reference discloses each and every element of a claimed invention." *Silicon Graphics, Inc. v. ATI Techs., Inc.*, 607 F.3d 784, 796 (Fed. Cir. 2010). "A claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled. . . . [A disclosure] is not truly prior art[] if that disclosure fails to enable one of skill in the art to reduce the disclosed invention to practice." *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1354 (Fed. Cir. 2003). "Enablement is a question of law." *Id.* at 1334. Disclosures in prior art patents are presumptively enabled absent persuasive contrary evidence. *Id.* at 1355. "[T]he burden still rests on the party asserting invalidity to ultimately demonstrate by clear and convincing evidence that the prior art is enabled." *Forest Labs., Inc. v. Ivax Pharm., Inc.*, 438 F. Supp. 2d 479, 487 n.3 (D. Del. 2006), *aff'd*, 501 F.3d 1263 (Fed. Cir. 2007).

C. Obviousness

A patent claim is invalid as obvious under 35 U.S.C. § 103 "if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." 35 U.S.C. § 103; *see also KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 406–07 (2007). "Under § 103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be

ascertained; and the level of ordinary skill in the pertinent art resolved." *KSR*, 550 U.S. at 406 (citations and internal quotation marks omitted).

A court is required to consider secondary considerations, or objective indicia of nonobviousness, before reaching an obviousness determination, as a "check against hindsight bias." *See In re Cyclobenzaprine Hydrochloride Extended–Release Capsule Patent Litig.*, 676 F.3d 1063, 1078–79 (Fed. Cir. 2012). Relevant secondary considerations include commercial success, long felt but unsolved needs, failure of others, praise, unexpected results, and copying, among others. *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966); *Ruiz v. A.B. Chance Co.*, 234 F.3d 654, 662–63 (Fed. Cir. 2000); *Tex. Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 988 F.2d 1165, 1178 (Fed. Cir. 1993).

D. Indefiniteness

All valid patents must "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. The principal justification for the definiteness requirement "is to ensure that the claims are written in such a way that they give notice to the public of the extent of the legal protection afforded by the patent, so that interested members of the public, *e.g.*, competitors of the patent owner, can determine whether or not they infringe." *All Dental Prodx, LLC v. Advantage Dental Prods., Inc.*, 309 F.3d 774, 779–80 (Fed. Cir. 2002); *see also Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2129 (2014). "[A] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc.*, 134 S. Ct. at 2124. "Where it would be apparent to one of skill in the art, based on the specification, that the invention set forth in a claim is not what the patentee regarded as

his invention, [a court] must hold that claim invalid under § 112, paragraph 2." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1349 (Fed. Cir. 2002). Indefiniteness is a legal question. *Biomedino, LLC v. Waters Techs. Corp.*, 490 F.3d 946, 949 (Fed. Cir. 2007).

III. '832 PATENT

A. Validity

1. Findings of Fact

1. A person of ordinary skill in the art with respect to the '832 patent would have a bachelor's degree in pharmaceutical science, chemistry, or a related field, and two to five years of relevant experience in developing drug formulations. Alternatively, a person of ordinary skill in the art could have a master's degree or Ph.D. and less practical experience.[6]

2. The conditions under which local pH is measured can have demonstrable impacts on the resulting pH values. The '832 patent does not disclose the volume of solvent that should be used to measure local pH in *in vitro* dissolution tests, the type of solvent that should be used to measure local pH in *in vitro* dissolution tests, or the time point at which local pH should be measured in *in vitro* dissolution tests.

3. The following are prior art to the '832 patent: (1) the Suboxone® sublingual tablets; (2) PCT Publication WO 2008/025791 to Euro-Celtique ("Euro-Celtique"); PCT Publication WO 2008/040534 to LabTec ("LabTec"); Cassidy et al., "Controlled buccal delivery of buprenorphine," *Journal of Controlled Release* (1993) ("Cassidy"); and U.S. Patent Application Publication No. 2005/0085440 to Birch ("Birch"). The European Medicines Agency Initial Marketing-Authorisation Document, Scientific Discussion, Oct. 19, 2006 for Suboxone® tablets ("European Medicines Agency Document") is also prior art to the '832 patent.

4. Because the nasal and sublingual mucous membranes are structurally similar, a person of skill in the art would expect that the teachings of Birch with respect to absorption of buprenorphine across nasal mucosa at acidic pHs would also apply to absorption across sublingual mucosa.

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[6] Although the parties' experts did not testify at trial as to descriptions of a person of ordinary skill in the art with respect to the '832 patent, they did testify regarding the knowledge and motivations of such a person. No party objected to testimony regarding the knowledge and motivations of a person of ordinary skill in the art on the ground that the characteristics of such a person had not been established. I therefore take it that there was no dispute about the characteristics of the person of ordinary skill in the art in the context of the '832 patent.

The characteristics of the person of ordinary skill in the art with respect to the '514 patent are undisputed. (*See* DFF37, PFF466). The necessary qualifications in the context of the '514 patent were stated at trial at a level of generality such that they do not seem to materially differ from those relevant to the '832 patent. (*See* Tr. 315:23–316:5). Thus, the finding above is derived from testimony regarding the person of ordinary skill in the art in the context of the '514 patent and, if it does not precisely represent the person of ordinary skill in the art with respect to the '832 patent, it is sufficiently similar to permit resolution of the issues raised in the parties' post-trial briefing.

5. A person of ordinary skill in the art would have copied the buffer and pH of the Suboxone® tablet in creating a film dosage form of buprenorphine and naloxone.

6. A person of ordinary skill in the art would have expected that the lower end of the operative pH range of the Suboxone® tablet's sodium citrate and citric acid buffer would achieve the targeted selective bioabsorption parameters for buprenorphine and naloxone.

7. Formulating a dosage form to achieve specific pharmacokinetic parameters was routine and formulating orally dissolving films was known in the art before the priority date of the '832 patent.

2. Conclusions of Law

a) Indefiniteness

Defendants argue that claims 1, 3, and 6 of the '832 patent are invalid for indefiniteness because the terms "local pH" and "optimized absorption" of buprenorphine have no standard meaning and the '832 patent provides no guidance regarding how to determine those limitations with reasonable certainty. (D.I. 396 at 20).

Defendants argue that the '832 patentees could have defined the claimed pH values as those measured by dissolution testing, which was well known in the art. (*Id.* at 20). Instead, the '832 patent claims "local pH" ranges, a term that was not well known in the art. (*See, e.g.*, '832 patent, 23:64–67; *see also* Tr. 1363:8–18). Testimony at trial indicated that "local pH" implicates complex dynamics and measurement techniques. (*See* Tr. 876:2–15, 962:15–964:7, 969:10–19, 1117:15–1118:17, 1364:9–22). Reckitt's expert Dr. Davies testified that "local pH" is equivalent to "microenvironmental pH," which was described in the prior art. (Tr. 1469:14–1470:7; JTX47 at 1; JTX72 at 1). Defendants' expert Dr. Bley, on the other hand, testified that the microenvironmental pH that Dr. Davies identified is not "local pH." (Tr. 1364:9–22). Further, Defendants argue, the parties' attempts to measure local pH in this case demonstrate that the patent lacks sufficient information to provide objective boundaries to the claim. (*See* D.I. 396 at 21). The pH measurements obtained by the experts in this case varied with conditions

including volume of solvent, type of solvent, and component concentration. (Tr. 876:7–15, 921:18–922:12, 962:15–964:7, 969:10–19; *see* DFF229–DFF230, DPRF73).

Reckitt maintains that the local pH limitation does not render claims 1, 3, and 6 indefinite because the '832 patent expressly defines "local pH" and the Court adopted the definition in its claim construction. (D.I. 406 at 24). According to Reckitt, the patent defines "local pH" to mean "the pH of the region of the carrier matrix immediately surrounding the active agent as the matrix hydrates and/or dissolves, for example, in the mouth of the user." ('832 patent, 3:35–38; D.I. 406 at 24; PFF800; D.I. 156 at 11). Reckitt's expert Dr. Davies testified that a person of skill in the art would understand that local pH is measured through an *in vitro* experiment simulating *in vivo* conditions in the mouth, using a volume of water or simulated saliva that approximates the amount of saliva to which a film would be exposed in the mouth. (Tr. 1470:19–1471:7). Reckitt maintains that Dr. Davies' testimony is supported by the fact that Defendants' expert Dr. Bley did *in vitro* measurements of local pH. (D.I. 406 at 24; Tr. 1471:7–14; *see also* PTX183 at 28440 (IntelGenx lab notebook referring to *in vitro* pH testing as "[m]easur[ing] pH [of] strips in the mouth using simulated saliva")). Reckitt also maintains that Dr. Bley's assertion that the term "local pH" is indefinite is inconsistent with his testimony that a person of skill in the art would have recognized that the claimed local pH range was disclosed in the prior art. (D.I. 406 at 24; *see* Tr. 1332:15–21).

The term "local pH" is indefinite. Reckitt cites the "microenvironmental pH" discussed in prior art to show how a person of skill in the art would understand "local pH." (PFF801; *see* Tr. 1469:23–1470:7; JTX47 at 1; JTX72 at 1). Aside from Dr. Davies' conclusory testimony that "somebody of ordinary skill would know how to [dissolve], . . . in a small volume of water or simulated saliva so that they can predict or approximate in vivo local pH in the mouth,"

Reckitt has not explained how microenvironmental pH correlates to the dissolution pH testing that the experts have conducted in this case. (Tr. 1471:1–7). The testimony of Drs. Davies, Toste, McConville, and Michniak-Kohn makes clear that the particular conditions under which pH is measured can have demonstrable impacts on the resulting pH values. (Tr. 921:18–922:12, 969:15–970:6, 1117:15–1119:14, 1189:9–1191:6, 1195:3–17, 1280:21–1281:3; JTX274 at 2–3; *see* DFF230–DFF231). Nowhere in the patent is there an explanation of the volume or type of solvent to be used to measure local pH or at what point during dissolution the local pH is to be measured. The parties' experts vigorously disagree regarding the appropriate conditions for measuring local pH. (*See* Tr. 875:13–879:3, 921:15–922:12; 976:12–978:10, 1114:15–1115:21, 1120:14–1122:22, 1191:21–1192:12, 1280:21–1281:3, JTX274 at 2–3; *see also* PFF196, PFF284, DFF225).

In *Akzo Nobel Coatings, Inc. v. Dow Chemical Co.*, the Federal Circuit affirmed the district court's conclusion that "viscosity below 10 Pa.s" did not render claims indefinite because, although the patent did not indicate the temperature at which viscosity was to be measured, an expert declaration proved that "[t]he standard practice in analytical chemistry dictates that if a temperature is not specified for a given measurement, room temperature is implied." 811 F.3d 1334, 1344 (Fed. Cir. 2016). Here, there is no evidence as to a standard type of solvent, volume of solvent, or time at which pH is to be measured. I therefore conclude that the patent fails to provide persons of ordinary skill with information from which they could determine the "local pH" of a formulation with reasonable certainty. Claims 1, 3, and 6 of the '832 patent are indefinite and therefore invalid.[7]

[7] Defendants also argue that claims 1, 3, and 6 are indefinite because a person of skill in the art would generally be unable to determine whether any particular product meets the "sufficient to optimize absorption" limitation. (D.I. 396 at 21). The patent describes only a single example of "optimized absorption": absorption bioequivalent to the Suboxone® tablet. ('832 patent, 3:15–21; D.I. 396 at 21). Defendants maintain, however, that nothing in the '832

b) Anticipation and Obviousness

Defendants argue that claims 1, 3, and 6 of the '832 patent are invalid for obviousness. (D.I. 396 at 10). Defendants argue that the '832 patent claims nothing more than films that are bioequivalent to the prior-art Suboxone® sublingual tablets and that a person of skill in the art would have copied the tablets' buffer system to make a film bioequivalent to the Suboxone® tablets with a pH in the claimed range. (*Id.*). As a result, Defendants argue, "the claimed invention is the most routine of pharmaceutical industry tasks: mimicking the pharmacokinetics of an existing product." (*Id.* at 9). Reckitt maintains that the claimed "buffer in an amount to provide a local pH for said composition of a value sufficient to optimize absorption of said buprenorphine, wherein said local pH is from about 3 to about 3.5 in the presence of saliva" is inventive and would not have been obvious to persons of skill in the art. (*See* D.I. 406 at 19).

Defendants' obviousness argument focuses on five pieces of prior art: (1) the Suboxone® sublingual tablets (JTX239, JTX240; DFF135); (2) PCT Publication WO 2008/025791 to Euro-Celtique ("Euro-Celtique") (JTX188; DFF145); (3) PCT Publication WO

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patent indicates that the meaning of "optimized absorption" is limited to absorption bioequivalent to the Suboxone® tablet. (D.I. 396 at 21). Thus, "a skilled artisan is unable to determine whether any particular product not having bioequivalent absorption meets [the sufficient to optimize absorption] limitation, rendering claims 1, 3, and 6 indefinite." (*Id.*).

Reckitt argues that the Court's construction of the "sufficient to optimize" term "indicates bioequivalent absorption as compared to Suboxone tablets." (D.I. 406 at 24–25 (quoting Dr. McConville's testimony at Tr. 1131:18–20) (internal quotation marks omitted)). Because the "sufficient to optimize" term means absorption bioequivalent to the Suboxone® tablets, according to Reckitt, persons of skill in the art have no difficulty understanding and applying the term. (*Id.* at 25 (citing '832 patent for explanation of what is considered bioequivalent to the Suboxone® tablet)).

The Court's construction, however, did not equate "sufficient to optimize absorption" with absorption bioequivalent to that of the Suboxone® tablet. Instead, it indicated that bioequivalent absorption to the Suboxone® tablet was one example of optimized absorption. (*See* D.I. 156 at 11–12 ("The term 'sufficient to optimize absorption of said buprenorphine' means sufficient to reach an optimum level of buprenorphine absorption *that includes* a bioequivalent absorption as compared to the absorption after administration of Suboxone® tablets." (emphasis added))). Still, Defendants have failed to prove that because "optimized absorption" is not limited to bioequivalent absorption, the patent provides insufficient guidance to persons of skill in that art as to what absorption qualifies as "optimized absorption." The term "sufficient to optimize absorption" therefore does not render claims 1, 3, and 6 of the '832 patent indefinite.

2008/040534 to LabTec ("LabTec") (JTC186; DFF148); (4) Cassidy et al., "Controlled buccal delivery of buprenorphine," *Journal of Controlled Release* (1993) ("Cassidy") (JTX117; DFF153); and (5) U.S. Patent Application Publication No. 2005/0085440 to Birch ("Birch") (JTX179; DFF157). In particular, Defendants argue that "[t]he combination of the Suboxone sublingual tablet with EuroCeltique or LabTec in view of Cassidy and Birch renders claim 1 obvious." (DFF197). There is no dispute that each of these references is prior art to the '832 patent. (D.I. 353-1 at ¶¶ 123, 125–29).

Suboxone® sublingual tablets provided effective selective transmucosal delivery of buprenorphine, but not naloxone, under the tongue. (Tr. 1291:6–22, 1294:12–1295:1, 1474:1–1475:1, 1475:7–11; JTX239 at 12; JTX240 at 4). Suboxone® sublingual tablets included an acidic buffer of sodium citrate and citric acid that was effective in pHs ranging from 3.0 to 6.2.[8] (Tr. 1296:21–1297:9, 1327:23–1328:4; JTX176 at 12; JTX240 at 24; D.I. 353-1 at ¶ 188). Euro-Celtique instructed a person of skill in the art to make pharmaceutical films containing buprenorphine and, optionally (but preferably), naloxone. (JTX188 at 12–13, 21–22; Tr. 1298:10–14). Euro-Celtique also instructed that "[a]s far as drug substitution therapy is concerned, the effectiveness of the afore-described amounts and pharmacokinetic parameters of buprenorphine and optionally naloxone are known from the pharmaceutical preparations of Subutex® and Suboxone®." (JTX188 at 22). Euro-Celtique disclosed a film designed for sublingual transmucosal absorption. (*Id.* at 7). Euro-Celtique disclosed the preferred pharmacokinetic parameters for buprenorphine in its oral dosage forms. (*Id.* at 10, 21; Tr.

[8] Defendants also proffered opinion testimony by Dr. Bley that relied on the dissolution pH testing of Suboxone® tablets in a small amount of water. (Tr. 1309:20–1323:11; *see also* DFF165–DFF167). The dissolution test results were reported in a declaration submitted on behalf of a Reckitt competitor in an '832 patent *inter partes* review proceeding (the "Reitman declaration"). (Tr. 1391:24–1392:12). The Reitman declaration itself is inadmissible hearsay. FED. R. EVID. 801(c), 802. Dr. Bley testified that he "would have never used something as, taken from litigation to do formulating in the lab." (Tr. 1315:13–15). Dr. Bley's opinions based on the Reitman declaration are therefore inadmissible under Federal Rule of Evidence 703.

1298:20–1299:6). Euro-Celtique did not disclose any pharmacokinetic parameters for naloxone. (*See* JTX188; Tr. 1420:17–22). LabTec instructed making non-mucoadhesive orally disintegrating pharmaceutical films intended for gastrointestinal tract absorption that "mimic the pharmacokinetic profile [and bioabsorption] of orally administered drug products such as tablets, [etc.]." (JTX186 at 3). LabTec identified Suboxone® sublingual tablets as a drug of interest to make into a bioequivalent film. (JTX186 at 21, 23). Cassidy teaches that buprenorphine absorbs transmucosally across buccal tissue at acidic pHs. (JTX117 at 3, 5–7, Fig. 4; Tr. 1303:20–1305:10). Birch teaches that buprenorphine absorbs transmucosally across nasal mucosa at acidic pHs. (JTX179 at 13–14, 19; Tr. 1305:17–1307:22).

Defendants argue that LabTec instructed a person of skill in the art to make a film product mimicking the pharmacokinetics and bioabsorption of Suboxone® sublingual tablets. (D.I. 396 at 11; JTX186 at 3, 23; Tr. 1299:11–22, 1302:2–15). Defendants further argue that it was well known that the Suboxone® sublingual tablets provide for sublingual transmucosal delivery of buprenorphine and that buprenorphine does not absorb via the gastrointestinal tract. (D.I. 396 at 13; Tr. 1302:2–15). Dr. Bley testified that "LabTec essentially contains all the building blocks of the '832 patent application." (Tr. 1299:11–13). Thus, Defendants maintain that LabTec directed a person of skill in the art to make a film product for the sublingual transmucosal delivery of buprenorphine. (DFF150).

Reckitt contends that LabTec did not instruct a person of skill in the art to create a sublingual film comprising buprenorphine and naloxone because LabTec specifically designed its films to have predominantly gastrointestinal absorption and to avoid or minimize oral transmucosal absorption. (D.I. 406 at 19–20; PFF580–PFF584). Reckitt points out that, although LabTec "merely listed Suboxone Tablets among 19 'drugs of interest' for potential

development into film dosage forms," LabTec consistently distinguished its films from those intended for absorption in the mouth and therefore teaches away from the invention claimed in the '832 patent. (DFF150; *see also* PFF640–PFF642). Dr. Davies opined that, in light of the objects of LabTec, the inclusion of the Suboxone® tablet as a drug "of interest" would not instruct a person of skill in the art to make the films claimed in the '832 patent. (Tr. 1409:7–1415:15). Dr. Bley disagreed with Dr. Davies' assessment, testifying that "a person of skill in the art would have clearly known that the instruction [in LabTec] was to make a sublingual delivery form of buprenorphine. (Tr. 1302:8–15).

LabTec distinguished prior art "focused principally on improving the delivery profile of a given pharmaceutical agent" in favor of "appreciat[ing] that an innovator's drug product, be it a tablet, capsule, or other oral dosage form, has already proven itself effective through rigorous clinical testing." (JTX186 at 3). Indeed, LabTec recognized that "[w]hat is needed is a film product that mimics the pharmacokinetics of an innovator's product, and that follows the same metabolic and bioabsorption pathways as the innovator's product." (*Id.*). On the other hand, LabTec taught means for preventing oral transmucosal absorption and promoting gastrointestinal absorption. (*Id.* at 15). Additionally, LabTec instructed that "adjust[ing] the pH of the environment surrounding the dosage form" could reduce the transmucosal permeability of the active agent. (*Id.* at 16). On the whole, however, I find that a person of ordinary skill would read the disclosure in LabTec to instruct making a pharmaceutical film mimicking the transmucosal absorption of the Suboxone® tablet.

Reckitt argues that a person of skill in the art "would have expected insufficient buprenorphine absorption in [the claimed] pH range and have had no reason to copy Suboxone Tablet's citric acid and sodium citrate in devising a film formulation." (D.I. 406 at 19 (emphasis

omitted)). Reckitt maintains that a person of skill in the art would have had no reason to investigate pH to achieve bioequivalent absorption to the Suboxone® tablet because the '832 patent was first to teach that pH was critical to absorption of buprenorphine. (*Id.* at 22). Further, Reckitt argues that pH Partition Theory teaches away from the claimed pH range. (*Id.* at 22–23). "pH Partition Theory teaches that the un-ionized form of a drug should preferentially diffuse across the membrane of the oral mucosa and subsequently get absorbed into the bloodstream." (PFF557; *see* Tr. 1403:17–1404:1, 1404:8–11). At the acidic pH 3.5, more than 99.99% of buprenorphine exists in its ionized form, which, according to pH Partition Theory, is less readily absorbable. (PFF561; *see* Tr. 1405:5–9). Thus, pursuant to pH Partition Theory, a person of ordinary skill would have expected that "buprenorphine in a polymeric carrier matrix buffered to a local pH of about 3 to about 3.5 would not provide sufficient absorption of buprenorphine through the sublingual mucosa." (PFF555; *see* Tr. 1401:16–1402:6, 1404:24–1405:9, 1452:9–1453:1).

Reckitt argues that a person of ordinary skill in the art would have expected buprenorphine to follow pH partition theory even in light of Cassidy and Birch, which taught that that transmucosal absorption of buprenorphine occurs at acidic pHs. (D.I. 406 at 20–21; JTX179 at 19, Table 11; JTX117 at 4, Fig. 1; Tr. 1328:15–1329:14, 1357:1–11, 1383:3–1384:12, 1483:19–1484:9). First, Reckitt argues that pH Partition Theory was well established in the pharmaceutical arts. (D.I. 406 at 20). Reckitt cites several references, including a 2007 book chapter co-authored by Par's expert, Dr. Michniak-Kohn, in support of its argument that the literature in the field consistently taught that buprenorphine followed pH Partition Theory. (PFF715–PFF716 (citing JTX44, JTX50, JTX51, JTX72, JTX73); *see* JTX44 at 10; Tr. 1452:9–1453:1). Dr. Michniak-Kohn's book chapter cited Weinberg (JTX72) for the proposition that

"studies conducted with sublingual administration of opioids such as buprenorphine . . . showed increased absorption with increase in pH." (JTX44 at 10). Second, Reckitt argues that persons skilled in the art would not have read Cassidy and Birch to teach that buprenorphine does not follow pH Partition Theory. (D.I. 406 at 20–21). In support of this argument, Reckitt maintains that neither Cassidy nor Birch has been cited in the art as teaching that buprenorphine does not follow pH Partition Theory and that, even after Cassidy and Birch were published, references in the field continued to teach that buprenorphine followed pH Partition Theory. (*See* PFF717 (citing, *e.g.*, JTX44 at 10); Tr. 1452:9–1453:1). Further, Dr. Davies testified that Cassidy and Birch did not report on the effect of pH on absorption; instead, they reported the effect of pH on the solubility of buprenorphine. (Tr. 1434:23–1435:4, 1439:21–1440:11, 1445:20–1446:5, JTX117 at 2, 4, JTX179 at 16; *see also* Tr. 1353:22–1358:16; 1441:7–1443:2 (explaining that the solubility of a drug is a separate and distinct question from its transmucosal absorption)). Finally, Dr. Davies testified that Birch is inapposite because absorption in nasal mucosa and absorption in oral mucosa are fundamentally different. (Tr. 1445:5–14, 1447:24–1449:14; *see also* Tr. 1387:11–1388:9).

In light of the overall evidence, I conclude that a skilled artisan would have copied the Suboxone® tablet's buffer and its pH in creating a film dosage form of buprenorphine and naloxone. Suboxone® tablets included a sodium citrate and citric acid buffer that was effective in a pH range of 3.0 to 6.2. (D.I. 353-1 at ¶ 188; JTX240 at 24; JTX176 at 12; Tr. 1296:21–1297:9, 1327:23–1328:4). pH was known in the prior art to affect transmucosal absorption. (Tr. 1355:5–1362:13, 1490:3–16; DFF184). "Where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. This rule is limited to cases in which the optimized variable is a 'result-

effective variable.'" *In re Applied Materials, Inc.*, 692 F.3d 1289, 1295 (Fed. Cir. 2012) (citations, internal quotation marks, and alterations omitted). A skilled artisan therefore would copy the Suboxone® tablet's buffer and its pH in creating a film dosage form. (*See* Tr. 1329:15–1330:12; JTX205 at 1, 4, 6. *But see* PFF766–PFF784). A person of skill in the art who did not have access to directly measure the dissolution pH of the Suboxone® tablet would have formulated a bioequivalent film within the operative pH range of the buffer and routinely and iteratively modified the formulation to achieve the target bioabsorption parameters. (Tr. 1296:21–1297:9, 1327:23–1328:19; *see also* JTX240 at 2; D.I. 353-1 at ¶ 188). Further, a person of skill in the art would have expected that the lower end of the buffer's operative pH range would achieve the targeted selective bioabsorption parameters of buprenorphine and naloxone because (1) a skilled artisan knew that transmucosal absorption of naloxone decreases as pH decreases and (2) Cassidy and Birch taught that transmucosal absorption of buprenorphine occurs at acidic pHs. (Tr. 1328:5–1329:14, 1383:3–1384:12, 1483:19–1484:9; JTX117 at 4, Fig. 1; JTX179 at 19, Table 11; DFF181). Although Dr. Davies testified that absorption in nasal and oral mucosa is fundamentally different (Tr. 1445:5–14, 1447:24–1449:14; *see also* Tr. 1387:11–1388:9), Dr. Bley testified that, because the nasal and oral mucous membranes are structurally similar, a person of skill in the art would expect the teachings of Birch regarding absorption of buprenorphine at acidic pHs to apply to oral as well as nasal mucosa. (Tr. 1308:5–1309:14, 1387:11–1388:9; DFF159). Further, Cassidy teaches that absorption of buprenorphine across oral mucosa occurs at acidic pHs. (JTX117 at 3, 5–7, Fig. 4; Tr. 1303:20–1305:10). A person of skill in the art would have credited specific data demonstrating that buprenorphine is transmucosally absorbed at pH values within or near the claimed range over the general implications of pH Partition Theory. (*See* JTX117 at 4; JTX179 at Table 11). I therefore

conclude that claims 1, 3, and 6 are obvious in light of the Suboxone® tablet, Euro-Celtique, LabTec, Cassidy, and Birch.

Defendants argue that claims 15–19 of the '832 patent are invalid as anticipated or obvious over Euro-Celtique and LabTec. (D.I. 396 at 18). Independent claim 15 of the '832 patent, from which claims 16–19 depend, recites "[a]n orally dissolving film formulation comprising buprenorphine and naloxone, wherein" the formulation produces certain Cmax and AUC pharmacokinetic parameters. ('832 patent, 24:56–61). "When a claim element is recited as a range of values, . . . that claim element is anticipated by a prior art disclosure which describes any value in that range." *Bristol-Myers Squibb Co. v. Boehringer Ingelheim Corp.*, 86 F. Supp. 2d 433, 440 (D.N.J. 2000), *aff'd in part, vacated in part on other grounds sub nom. Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc.*, 246 F.3d 1368 (Fed. Cir. 2001).

LabTec does not anticipate claims 15–19 of the '832 patent. LabTec does not anticipate claim 17 because claim 17 specifies a mean AUC range for naloxone, and LabTec does not disclose AUC values for naloxone. (*See* JTX186 at 23; '832 patent, 24:65–67). Otherwise, LabTec discloses orally dissolving film formulations comprising buprenorphine and naloxone with the pharmacokinetic and dosage parameters claimed in claims 15, 16, 18, and 19. (*See* JTX186 at 21, 23; '832 patent, 24:56–25:6). However, the disclosures in LabTec do not anticipate because they are not enabling. *See Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1354 (Fed. Cir. 2003) ("A claimed invention cannot be anticipated by a prior art reference if the allegedly anticipatory disclosures cited as prior art are not enabled"); *Forest Labs., Inc. v. Ivax Pharms., Inc.*, 438 F. Supp. 2d 479, 487 n.3 (D. Del. 2006), *aff'd*, 501 F.3d 1263 (Fed. Cir. 2007) ("[E]ven if the patentee is required to present some evidence of nonenablement, the burden still rests on the party asserting invalidity to ultimately demonstrate

by clear and convincing evidence that the prior art is enabled."). LabTec is not enabling because it describes designing films for optimum gastrointestinal absorption. (*See* JTX186; Tr. 1380:9–1381:2, 1414:17–1415:15). It does not disclose a film designed for sublingual mucosal absorption. (*See* JTX186; Tr. 1414:17–1415:15). Given that the claimed pharmacokinetic parameters for buprenorphine and naloxone cannot be achieved in a film designed for gastrointestinal absorption (*see* Tr. 1380:9–1381:2, 1415:5–1416:15), LabTec does not enable one of skill in the art to formulate the claimed films.

Euro-Celtique does not anticipate claims 15–19 because, although Euro-Celtique discloses an orally dissolving film formulation comprising buprenorphine and naloxone, it does not disclose the Cmax or AUC values of naloxone in its films. (*See* JTX188).

Euro-Celtique and the European Medicines Agency Initial Marketing-Authorisation Document, Scientific Discussion, Oct. 19, 2006 for Suboxone® tablets (JTX239) render claims 15–19 obvious. Euro-Celtique states that "the effectiveness of the afore-described amounts and pharmacokinetic parameters of buprenorphine and optionally naloxone are known from the pharmaceutical preparations Subutex® and Suboxone®. Therefore it can be firmly assumed that the same efficacy will be observed in drug substitution therapy with the inventive preparations of the present invention." (JTX188 at 22). The European Medicines Agency document is prior art to the '832 patent. (D.I. 353-1 at ¶ 125). The European Medicines Agency document states the pharmacokinetic parameters of naloxone in Suboxone® sublingual tablets, which are within the claimed ranges. (JTX239 at 12; '832 patent, 24:56–25:6). Formulating a dosage form to achieve specific pharmacokinetic values was routine and formulating orally dissolving films designed for sublingual mucosal absorption was disclosed in Euro-Celtique. (Tr. 1342:5–1347:18, 1486:21–

1488:16; JTX188 at 13–14, JTX254). Thus, the inventions claimed in claims 15–19 of the '832 patent would have been obvious to one of skill in the art.

Secondary considerations do not render the asserted claims of the '832 patent non-obvious. At trial, Reckitt presented evidence going to secondary considerations, including long-felt need, failure of others, and praise of the Suboxone® sublingual film. (Tr. 87:19–88:6, 1297:13–1298:1 (praise), 1368:2–1369:13, 1370:15–1372:6, PTX1147 (failure of others); 78:20–85:15, 419:23–420:1 (long-felt need); *see also* D.I. 406 at 24, 28). Reckitt maintains that the Suboxone® sublingual film is an embodiment of the asserted claims of the '832 patent. (PFF664–PFF666, PFF790–793). Defendants argue that Reckitt failed to meet its burden to establish a nexus between the claimed invention and the secondary considerations asserted. (D.I. 396 at 19). Reckitt failed to establish a nexus between Suboxone® sublingual film and claims 1, 3, and 6 of the '832 patent because there is no record evidence of the local pH of Suboxone® film.[9] Reckitt established a nexus between Suboxone® sublingual film and claims 15–19 the '832 patent. (JTX27 at 26–30). Still, the secondary considerations do not point to non-obviousness with sufficient force to overcome the other evidence that claims 15–19 are obvious in light of Euro-Celtique and the European Medicines Agency document. *See Wyers v. Master Lock Co.*, 616 F.3d 1231, 1246 (Fed. Cir. 2010) ("[S]econdary considerations of nonobviousness—considered here by the district court—simply cannot overcome a strong prima facie case of obviousness.").

[9] Reckitt cites JTX54 at 23 and PTX163 at 7, 23–25 as evidence that Suboxone® sublingual film contains a buffer in an amount to provide a local pH of about 3.0 to about 3.5. (PFF793). That the buffer provides a local pH within the claimed range is not apparent from JTX54 and Reckitt provides no further explanation. (*See id.*). PTX163 does describe pH measurements obtained by dissolution testing. Those measurements, however, cannot establish the required nexus because it is not clear that they are measuring "local pH."

Thus, the Court finds that Defendants have proved by clear and convincing evidence that all asserted claims of the '832 patent are obvious and that asserted claims 1, 3, and 6 are indefinite. Defendants did not prove their other invalidity challenges to the asserted claims of the '832 patent.

B. Infringement

1. Findings of Fact

1. During their respective development efforts, Watson and Par obtained pH measurements by performing *in vitro* dissolution testing.

2. *In vitro* dissolution testing does not yield measurements of "local pH" as that term is used in the '832 patent.

3. Buffer Maker is not a tool to calculate "local pH."

4. Watson's ANDA contains a pH specification for its ANDA Product of 3.0 to 5.0.

5. Par's ANDA contains a "Quality Target Product Profile" for its ANDA Product that states a pH target of 3.5 to 4.0.

6. The pH values reported in Watson's ANDA do not correspond to local pHs from about 3 to about 3.5 in the presence of saliva.

7. The pH values reported in Par's ANDA and the pH values obtained by IntelGenx pH testing do not correspond to local pHs from about 3 to about 3.5 in the presence of saliva.

2. Conclusions of Law

a) Claims 1, 3, and 6

Watson admits that its ANDA Product meets all limitations of claims 1, 3, and 6 of the '832 patent except for the "local pH" and "sufficient to optimize absorption" limitations. (PFF167; PFF168). Par admits that its ANDA Product meets all limitations of claims 1, 3, and 6 of the '832 patent except for the "local pH" and "buffer" limitations. (PFF264–PFF267, PFF303–PFF306).

Claim 1 of the '832 patent recites "a local pH for [the claimed] composition . . . from about 3 to about 3.5 in the presence of saliva." ('832 patent, 23:58–67). The Court construed the term "local pH" to mean "the pH of the region of the carrier matrix immediately surrounding the active agent as the matrix hydrates and/or dissolves, for example, in the mouth of the user." (D.I. 156 at 11). Reckitt argues that Watson's and Par's ANDA Products meet the local pH limitation. (D.I. 397 at 20). Watson and Par argue that Reckitt has not proven that their ANDA Products meet the local pH requirement because Reckitt presented no test results showing the local pH of Watson's or Par's ANDA Product. (D.I. 407 at 7; D.I. 408 at 20).

Reckitt did not measure the local pH of samples of Watson's and Par's ANDA Products. (Tr. 879:4–17; *see also* D.I. 397 at 23, 28). Instead, Reckitt relies on pH data in the ANDAs as evidence that the ANDA Products meet the local pH limitation. (*See* D.I. 397 at 23, 28). Watson's ANDA contains a target pH value for its ANDA Product of 3.0 to 5.0. (JTX87 at 45, 47; *see also* Tr. 1116:11–18). Par's ANDA contains a "Quality Target Product Profile" for its ANDA Product that states a pH target of 3.5 to 4.0. (JTX269 at 4; *see also* Tr. 918:10–17). Additionally, IntelGenx conducted pH testing on a prototype of Par's ANDA Product that yielded pH measurements around 3.5. (JTX 270 at 108; *see also* Tr. 922:13–923:9). Watson and Par obtained the pH measurements in their ANDAs by conducting *in vitro* dissolution testing. (Tr. 1116:15–1122:2; 1197:10–19). Reckitt maintains that those values, with calculated adjustments, demonstrate that the ANDA Products' local pHs fall within the claimed range. (D.I. 397 at 20). Dr. Davies, Reckitt's expert, testified that, although Watson's and Par's dissolution testing was done in a larger volume of solvent than would be present in the mouth, local pH can be calculated by adjusting the reported pHs to account for the smaller amount of saliva in the mouth. (Tr. 875:13–877:17, 921:15–922:12). Dr. Davies testified that, after the

appropriate adjustment, the pHs reported by Watson's and Par's ANDAs correlate to local pH values within "about 3 to about 3.5." (Tr. 884:17–22, 888:7–8, 922:6–12, 923:24–924:20). Reckitt argues that Dr. Davies' analysis of Watson's and Par's reported pHs is reinforced by his calculations of local pH using the software "Buffer Maker." (D.I. 411 at 10).

Par and Watson argue that Reckitt has not demonstrated that the local pHs of their ANDA Products are "about 3 to about 3.5" because: (1) Reckitt has not established that *in vitro* dissolution testing or calculations using Buffer Maker are valid tests for measuring local pH; (2) Dr. Davies' adjustments to Watson and Par's reported pH values are unfounded; and (3) the word "about" does not expand the claimed range beyond routine measurement error. (D.I. 407 at 7–14; D.I. 408 at 20–25). Par argues, further, that even if Dr. Davies' analysis were valid, he relies only on pH values related to Par's early prototypes, not its ANDA Product, to calculate the local pH of Par's ANDA Product. (D.I. 407 at 10–11).

Reckitt has not met its burden to show that *in vitro* dissolution testing yields a valid local pH measurement. Dr. Davies testified that, to determine the local pH of a film dosage composition, a person of ordinary skill in the art would dissolve a film in an appropriate volume of liquid and measure the resulting pH. (Tr. 872:6–873:6, 877:18–879:3). Local pH is the pH within the matrix and around the active "as the matrix hydrates and/or dissolves." (D.I. 156 at 11). Dissolution testing, however, measures pH in a closed system in solutions in which the matrix has completely dissolved. (Tr. 1194:14–1195:11). Dr. Davies testified that the pH measured after dissolution will not be significantly different from the pH measured when the matrix begins to hydrate and dissolve because the buffering components of the film establish and maintain the local pH during and after dissolution. (Tr. 877:18–879:3, 977:21–978:10). There is no support for Dr. Davies' assertion that, despite the fact that buffer and saliva flow into and out

of the mouth during dissolution, the buffering components of Watson's and Par's ANDA Products maintain the local pH from beginning of dissolution until the matrix is fully dissolved. *See Alza Corp. v. Mylan Labs., Inc.*, 464 F.3d 1286, 1296 (Fed. Cir. 2006) (holding that, to rely on *in vitro* approximations of *in vivo* measurements, the proponent must credibly link the *in vitro* method with the relevant *in vivo* parameter). In an open system such as the mouth, the components of the matrix are absorbed and swallowed at different rates. (Tr. 1192:1–12). Dr. McConville testified that, even with a buffer, it is not possible to say that the pH after dissolution of the matrix is the same as during dissolution because the buffer itself is released during dissolution of the matrix and there is a constant flow of saliva and buffer into and out of the mouth. (Tr. 1114:20–1115:1, 1121:5–1122:22).

Dr. Davies' conversion of Watson's and Par's reported dissolution pHs to correlated local pHs is unsupported. (*See* Tr. 883:11–22, 921:18–922:4). As an initial matter, Dr. Davies did not provide any support for his opinion that 0.25–1.0 mL of saliva is present in the mouth during dissolution. (*See* Tr. 975:5–976:20; *see also* Tr. 1117:15–1118:17). Dr. Davies testified that reducing the volume of solvent used in a dissolution test from 8 mL to approximately 0.25 to 1 mL would reduce the pH by about 0.5 units. (Tr. 921:18–922:12). Dr. Davies also testified that reducing the volume of solvent used in a dissolution test from 15 mL to approximately 0.25 to 1 mL would reduce the pH by about 0.5 units. (Tr. 882:21–883:22, 886:24–887:7). Dr. Davies did not explain why converting Watson's and Par's reported pHs to local pH by subtracting 0.5 pH units is appropriate for dissolution tests conducted in 8 mL and 15 mL, despite the difference in initial volume. (*See* Tr. 1205:21–1206:11, 1208:7–1209:1).[10] Thus, Reckitt's reliance on

[10] Additionally, Dr. Toste's Buffer Maker calculations demonstrated that the impact of the volume of solvent on the dissolution pH varies depending on the components of the formulation that are in the solution. (*See* JTX274 at 2–3; Tr. 1208:7–9; DPRF57–58).

Watson's and Par's reported pHs to establish that their ANDA Products meet the local pH limitation is unavailing.

Reckitt also has not established that Dr. Davies' Buffer Maker calculations are valid tests for measuring local pH. Buffer Maker is a tool for the design of buffers, not a tool to calculate local pH. (*See* Tr. 1023:14–1024:14). The patent does not suggest Buffer Maker as a method of calculating local pH. Dr. Davies acknowledged that the pH results from Buffer Maker have limited accuracy. (Tr. 1029:15–19). The makers of Buffer Maker instruct that it is good practice to check buffer pH with a calibrated pH meter. (Tr. 1029:20–1030:1). In addition, Par's expert, Dr. Toste, used Buffer Maker to demonstrate that, even using the same methods to calculate pH as Dr. Davies did, the dissolution pH of Par's ANDA Product would be lower than the claimed range. (JTX274 at 2). Dr. Davies' attempt to rebut those calculations by including alkaline earth metals, a possible impurity in Par's ANDA formulation, in his Buffer Maker calculations is unpersuasive. (*See* Tr. 1209:2–1211:9; *see also* 926:11–927:15, 970:12–973:21; JTX 271 at 1; JTX281; JTX282); *see also Glaxo, Inc. v. Novopharm, Ltd.*, 110 F.3d 1562, 1568 (Fed. Cir. 1997) ("[T]he [Hatch-Waxman] statute requires an infringement inquiry focused on what is likely to be sold following FDA approval."). More fundamentally, however, for the reasons described above with respect to pH measurements made using dissolution testing, a pH calculation using Buffer Maker does not take into account the requirements of the local pH claim limitation and is therefore not a measurement of "local pH," as that term is used in the patent. Because Reckitt has not met its burden to prove the local pHs of Watson's and Par's ANDA Products, it is unnecessary to resolve the parties' dispute regarding the term "about." (*See* D.I. 407 at 9–10; D.I. 408 at 24–25).

That Reckitt relies on reported pH values of Par's prototype formulations rather than its ANDA Product is an additional reason to conclude that Reckitt has not met its burden to show that Par meets the local pH limitation of claims 1, 3, and 6 of the '832 patent. Even if dissolution pH could be correlated with local pH, Reckitt has not provided a dissolution pH of Par's ANDA Product within the claimed range. Reckitt relies on the dissolution pH reported in the "Quality Target Product Profile" in the development report section of Par's ANDA, but that section reports a pH based on the Suboxone® film product. (Tr. 950:7–951:10, 956:13–957:22, 1197:7–19; JTX269 at 4, 15, 16). Reckitt also relies on the dissolution pH reported by IntelGenx for a different formulation than Par's final ANDA formulation. (*See* D.I. 397 at 28; Tr. 922:18–923:9 (Dr. Davies stating that the formulation tested by IntelGenx had the same ingredients in the same proportions as Par's final ANDA Product). *But compare* JTX270 at 106–08 *with* JTX327 at 2; *see also* Tr. 955:23–956:11). Reckitt's evidence and argument that Par's ANDA Product "deliberately mimics the pH of the Suboxone film" is insufficient to prove that Par's final ANDA Product has the same dissolution pH as the earlier prototypes, especially because the earlier prototypes were not bioequivalent to the Suboxone® film. (*See* D.I. 397 at 28; Tr. 951:11–956:3). Par's ANDA does not contain dissolution pH measurements of its final formulation. (Tr. 955:23–956:3, 956:9–12). Thus, even if dissolution pH could be converted to local pH, Reckitt has failed to meet its burden to prove that Par's ANDA Product satisfies the local pH limitation of claims 1, 3, and 6 of the '832 patent.[11]

Reckitt therefore has not proven that the pH values reported in Watson's and Par's ANDAs and the IntelGenx pH testing of the Par prototype correspond to local pHs from about 3 to about 3.5 in the presence of saliva. Thus, I conclude that Watson's and Par's ANDA Products

[11] I do not reach whether Watson's ANDA Product meets the "sufficient to optimize absorption" limitation or whether Par's ANDA Product meets the "buffer" limitation.

do not meet the "local pH" limitation and consequently do not infringe claims 1, 3, and 6 of the '832 patent.

b) Claims 15–19

Par does not dispute that its ANDA Product satisfies the limitations of claims 15–19 of the '832 patent. (D.I. 407 at 7–15; *see* PFF307, PFF319). Watson does not dispute that the 2 mg/0.5 mg, 4 mg/1 mg, and 8 mg/2 mg dosage strengths of its ANDA Product satisfy the limitations of claims 15–19 of the '832 patent. (D.I. 408 at 26; *see* PFF232–PFF236, PFF247). Watson does dispute that the 12mg/3mg dosage strength of its ANDA Product satisfies the limitations of claims 15–19 of the '832 patent. (D.I. 408 at 26).

Claim 15, from which claims 16–19 depend, claims an orally dissolving film formulation "having a Cmax of between about 0.624 ng/ml and about 5.638 ng/ml for buprenorphine." ('832 patent, 24:56–59). Watson argues that the admitted mean buprenorphine Cmax of 5.77 ng/mL ± 0.47 ng/mL for its 12mg/3mg dosage strength does not fall within the claimed range. (D.I. 408 at 26). Dr. McConville testified that "[a]s you can see, for the 12-milligram, Watson's ANDA product, it falls outside of that claim range, clearly." (Tr. 1155:15–18). Dr. McConville also testified that a person of ordinary skill in the art would not take the standard deviation into account (*i.e.*, by concluding that 5.77 ng/mL ± 0.47 ng/mL falls within the claimed range because the mean value minus one standard deviation (5.30 ng/mL) falls within the claimed range. (Tr. 1146:14–1147:9, 1148:8–22).

Dr. Davies testified that that the mean Cmax value of 5.77 ng/mL ± 0.47 ng/mL is within the claimed range of "about 0.624 ng/ml and about 5.638 ng/ml." (Tr. 900:20–901:19). He explained that the mean Cmax value of 5.77 ng/mL ± 0.47 ng/mL is within the claimed range because: (1) a substantial portion of the standard deviation is within the range; (2) 5.77 ng/mL is

just 2.3% higher than 5.638 ng/mL; and (3) a person of ordinary skill would expect drugs having mean Cmax values of 5.638 ng/mL and 5.77 ng/mL to behave the same way clinically. (Tr. 901:9–902:4).

In light of the experts' competing assertions regarding whether a person of ordinary skill would take standard deviation into account in determining whether a mean Cmax value falls within a certain range, I conclude that Reckitt has failed to satisfy its burden to prove that the 12mg/3mg dosage strength of Watson's ANDA Product satisfies the Cmax limitation of claim 15. Dr. Davies' conclusory assertion that a person of ordinary skill would expect drugs having mean Cmax values of 5.638 ng/mL and 5.77 ng/mL to behave the same way clinically does not establish that Watson's ANDA Product infringes under the doctrine of equivalents. (*See* 901:20–902:4). Watson's 12mg/3mg dosage strength therefore does not infringe claims 15–19 of the '832 patent, either literally or under the doctrine of equivalents.

For the reasons stated above, Watson's and Par's ANDA Products do not infringe claims 1, 3, and 6 of the '832 patent; Watson's 12mg/3mg dosage strength does not infringe claims 15–19 of the '832 patent; the 2 mg/0.5 mg, 4 mg/1 mg, and 8 mg/2 mg dosage strengths of Watson's ANDA Product would infringe claims 15–19 of the '832 patent if they were valid; and the 2 mg/0.5 mg, 4 mg/1 mg, 8 mg/2 mg, and 12mg/3mg dosage strengths of Par's ANDA Product would infringe claims 15–19 of the '832 patent if they were valid.

IV. '514 PATENT

A. Validity

1. Findings of Fact

1. It is physically impossible for a cast film to be flowable.

2. A person of ordinary skill in the art in the context of the '514 patent would possess a bachelor's degree in pharmaceutical science, chemistry, or a related field, plus two to five years of relevant experience in developing drug formulations. Alternatively, a person of ordinary skill in the art could have a master's degree or Ph.D. and less practical experience. (Tr. 315:15–316:5; *see also* DFF37).

3. The following are prior art to the '514 patent: (1) WO 2000/42992 by LavPharm Laboratories, Inc. ("Chen") (JTX187) and (2) U.S. Patent No. 4,764,378 ("Bess").

4. The drug content uniformity of the entire range of samples subjected to dissolution testing reported in Figure 5 of Chen was not within 10% of the desired amount of active.

5. Drug content uniformity was a significant challenge in the manufacture of pharmaceutical films before and after the priority date of the '514 patent.

2. Conclusions of Law

a) Indefiniteness

Defendants argue that the asserted claims of the '514 patent are invalid for indefiniteness. (D.I. 396 at 22). "[T]he second paragraph of § 112 contains two requirements: first, the claim must set forth what the applicant regards as his invention, and second, it must do so with sufficient particularity and distinctness, *i.e.*, the claim must be sufficiently definite." *Allen Eng'g Corp. v. Bartell Indus., Inc.*, 299 F.3d 1336, 1348 (Fed. Cir. 2002) (alterations, citations, and internal quotation marks omitted). A claim is not sufficiently definite if, read in light of the intrinsic evidence, the claim fails to "inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2130 (2014).

The asserted claims of the '514 patent claim a "drug delivery composition comprising:" (1) a cast film, (2) a particulate active, and (3) a taste-masking agent. ('514 patent, 73:48–74:10). The claimed cast film further "compris[es] a flowable . . . film-forming matrix . . . and a desired amount of at least one active." (*Id.* at 73:49–52). Defendants argue that the asserted claims of the '514 patent are invalid for indefiniteness because "a pharmaceutical dosage form

that is a cast film cannot be flowable." (D.I. 396 at 22). Reckitt maintains that the asserted claims, read in light of the specification, are not indefinite because they require that the cast film be made from, and not include, a flowable matrix. (D.I. 406 at 8–12). Reckitt contends that the Court should reject Watson's and Par's interpretation of the claim because it is a physical impossibility. (D.I. 397 at 15). Reckitt argues that a reasonable interpretation is that the matrix must be flowable before drying, not once it is a cast film. (D.I. 411 at 7–8).[12]

Defendants rely on *Exxon Chemical Patents, Inc. v. Lubrizol Corp.*, 64 F.3d 1553 (Fed. Cir. 1995), and *PIN/NIP, Inc. v. Platte Chemical Co.*, 304 F.3d 1235 (Fed. Cir. 2002), in support of their argument that the asserted claims of the '514 patent are indefinite. (D.I. 396 at 22). In *Exxon Chemical Patents, Inc.*, the Federal Circuit held that claims directed to a pharmaceutical composition comprising specific amounts of five separate chemicals claimed "a composition that contains the specified ingredients at any time from the moment at which the ingredients are mixed together." 64 F.3d at 1558; *see also PIN/NIP, Inc.*, 304 F.3d at 1244 (interpreting claim language pursuant to the principles set forth in *Exxon Chemical Patents, Inc.*). Given that construction, the Federal Circuit held that "[u]nder the proper charge, the jury would not have been asked if [Defendant] used [patentee's] starting ingredients. Instead, the jury would have been asked to find whether . . . [Defendant's] products at some time contained each of the claimed recipe ingredients in the amounts specifically claimed." *Id.* Defendants argue that under *Exxon Chemical Patents, Inc.* and *PIN/NIP, Inc.*, the drug delivery composition claimed in the '514 patent exists when the claimed elements are present at the same time. (D.I. 396 at 22). Defendants maintain that, because the claims therefore require both a flowable matrix and a cast

[12] Reckitt argues, further, that Watson's and Par's noninfringement positions with respect to the cast film element are inconsistent with their positions regarding indefiniteness. (*See* D.I. 411 at 7–8; PFF527–532; Tr. 388:19–389:16).

film to be present at one time, the claims are nonsensical and therefore indefinite. (*Id.*). *Exxon Chemical Patents, Inc.* and *PIN/NIP, Inc.* do not support Defendants' position with respect to the asserted claims of the '514 patent, however, because the alleged indefiniteness does not arise from claim elements (*i.e.*, "cast film" and "flowable . . . matrix") required by the claims to be mixed together. Instead, claim 62 of the '514 patent is directed to a "drug delivery composition comprising" a single component, a "cast film," which in turn "compris[es] a flowable . . . matrix." ('514 patent, 73:48–52). Thus, *Exxon Chemical Patents, Inc.* and *PIN/NIP, Inc.* are inapposite.

The phrase "comprising" has a well-established meaning synonymous with "containing" and "including." *Mars, Inc. v. H.J. Heinz Co.*, 377 F.3d 1369, 1376 (Fed. Cir. 2004); *see also Invista N. Am. S.a.r.l. v. M&G USA Corp.*, 951 F. Supp. 2d 604, 613 (D. Del. 2013) (applying a well-established claim construction despite the fact that "the construction of a term in a patent claim is a highly contextual exercise that is dependent on the particular patent in which the term appears" (citations and internal quotation marks omitted)). When a claim is directed to a product "comprising" certain elements, those elements may be described in the claim in the state in which they exist during manufacture, before the final product exists. *See Gemtron Corp. v. Saint-Gobain Corp.*, 572 F.3d 1371, 1378 (Fed. Cir. 2009). In *Gemtron Corp.*, the Federal Circuit construed the claim term "relatively resilient" to mean that "the frame of [a] claimed shelf has the structural characteristic of having been temporarily deflected and subsequently rebounded . . . at the time of manufacture," not that the frame was required to remain resilient after the manufacturing process. 572 F.3d at 1380–81. Similarly, in *Norian Corp. v. Stryker Corp.*, the Federal Circuit held a patentee to its decision to claim a solution "in terms of the ingredients used to make the solution, rather than in terms of the ions found in the solution after

it was made." 432 F.3d 1356, 1362 (Fed. Cir. 2005). Relying on *Norian Corp.*, the Eastern District of Texas rejected a claim construction "specifying the existence of crystalline citric acid monohydrate in an aqueous solution" because "[a]lthough citric acid monohydrate in crystalline form is an ingredient in the mixture, a person of ordinary skill in the art would appreciate that it would be scientifically impossible for it to remain in crystalline form in an aqueous based environment" and because "the existence of citric acid monohydrate in crystalline form in a product for 'ophthalmic administration' would be inconsistent with the understanding of a person of ordinary skill in the art that a substance containing crystals could not be administered to the eye." *Allergan, Inc. v. Sandoz Inc.*, 2013 WL 139350, at *5 (E.D. Tex. Jan. 10, 2013).

Here, the asserted claims of the '514 patent require a cast film that "comprises" a flowable matrix. ('514 patent, 73:48–52). There is no dispute that it is physically impossible for a cast film to be flowable. (PFF132, DFF128; Tr. 349:11–351:1, 1267:17–21, 529:15–21). Consequently, a person of ordinary skill in the art would understand that the '832 patent's claimed cast film "comprises" a flowable matrix in the sense that it includes a flowable matrix as an ingredient, rather than as a final component. *See Allergan, Inc.*, 2013 WL 139350, *5; *see also Norian Corp.*, 432 F.3d at 1362. This interpretation is supported by the intrinsic evidence, which consistently describes the claimed final drug delivery composition as a cast film made from a wet film-forming matrix that is flowable before it is dried. ('514 patent, Abstract, 9:10–14, 22:26–30, 25:21–31; *see also* Tr. 527:20–533:4).

Because the asserted claims inform those of skill in the art about the scope of the inventions, the asserted claims are not indefinite under § 112, ¶ 2.

b) Obviousness

Defendants argue that the asserted claims of the '514 patent are obvious in view of the knowledge of those skilled in the art and two references disclosing drug content uniformity in pharmaceutical film formulations. (D.I. 396 at 23). Defendants argue that the purportedly inventive aspect of the '514 patent, active ingredient content uniformity (or "drug content uniformity") in a cast film, was both mandated by regulatory agencies and achieved by exercise of routine skill. (*Id.* at 23–24). Defendants further argue that secondary considerations do not render the asserted claims of the '514 patent non-obvious. (*Id.* at 30). Reckitt maintains that no prior art disclosed dosage units having an active ingredient that satisfies the drug content uniformity parameters in the asserted claims of the '514 patent. (D.I. 406 at 12).

Defendants rely on two prior art references in support of their argument that the asserted claims of the '514 patent are obvious: (1) WO 2000/42992 by LavPharm Laboratories, Inc. ("Chen") (JTX187) and (2) U.S. Patent No. 4,764,378 ("Bess") (JTX184). There is no dispute that Chen and Bess are prior art to the '514 patent. (*See* D.I. 353-1 at ¶¶ 130, 138). Reckitt also does not dispute that the Chen teaches: (1) "cast film[s] made from a flowable water-soluble or water swellable film-forming matrix comprising one or more substantially water soluble or water swellable polymers; and a desired amount of at least one active" ('514 patent, 73:49–52); (2) "a taste masking agent selected from the group consisting of flavors, sweeteners, flavor enhancers, and combinations thereof to provide taste-masking of the active" (*id.* at 73:58–60); (3) a "taste-masking agent [that] is present in the amount of about 0.1–30% by weight of the drug delivery composition" (*id.* at 74:31–32); and (4) an "active [that] is an opiate or opiate derivative" (*id.* at 74:51). (*See* Tr. 585:1–17; DFF48–DFF50, DFF55, DFF106, DFF109). Thus, the parties' dispute centers around whether the prior art disclosed dosage units having an active ingredient

that does not vary by more than 10% from the desired amount, and whether it would have been obvious to one of skill in the art to use particles with a size of "200 microns or less" in the claimed invention. (*See* D.I. 406 at 12, 16).

Chen does not disclose and would not have rendered obvious to one of skill in the art "uniformity subsequent to casting and drying of the matrix [that] is measured by substantially equally sized individual unit doses which do not vary by more than 10% of said desired amount of said at least one active." ('514 patent, 74:6–10). First, the statements in Chen about uniformity and homogeneity refer only to the wet matrix and not the final, dried film. (*See* Tr. 327:1–476:19–477:17, 504:16–22; *see, e.g.*, JTX187 at 15, 17). Second, Figure 5 of Chen, on which Defendants rely, does not disclose drug content uniformity within 10%. (*See* JTX187 at 43). Figure 5 of Chen is a graph of results of dissolution testing done to measure the release profile of certain films. (Tr. 334:2–9). Dr. Dyar testified that Figure 5 shows that after ten minutes, one hundred percent of active content had been released from the disclosed films and the variation "appear[ed] to be" within ten percent of the desired amount of active. (Tr. 335:17–22). Dr. Dyar acknowledged that "we don't have the actual data, so it is difficult to see what the precise numbers would be. But, again, the shape of these curves and the content uniformity that is being shown here are consistent with the product that could be developed and placed on the market." (Tr. 382:1–6; *see also* Tr. 336:23–337:2, 370:8–22). Dr. Langer testified, on the other hand, that even if one were to make all assumptions in Defendants' favor, Figure 5 does not disclose drug content uniformity within 10%. (Tr. 510:8–511:19). Dr. Langer recited the "3 sigma rule" to show that, looking at the entire range of sample measurements in the dissolution tests reflected in Figure 5, the drug content uniformity achieved in Chen would not have been within 10%. (Tr. 517:4–520:1). Dr. Dyar's testimony was equivocal regarding whether a person

of ordinary skill in the art would apply the "3 sigma rule" to determine drug content uniformity of a number of samples. (*See* Tr. 378:13–20, 382:7–16). In light of the experts' testimony, I find that Chen does not disclose drug content uniformity within the claimed range of 10%.

Defendants have not carried their burden to demonstrate a reasonable expectation of success in making the claimed invention. Dr. Dyar testified that, even if Figure 5 of Chen does not show drug content uniformity within ten percent, the content uniformity was close enough so that, with nothing more than routine experimentation, a person of skill in the art would have reasonably expected to achieve a film that had drug content uniformity within ten percent. (Tr. 338:4–9, 346:15–347:1). Dr. Dyar did not point to other evidence to support his opinion that a person of ordinary skill in the art could have achieved the claimed drug content uniformity with routine experimentation, and he did not explain what that experimentation would have entailed. (*See* Tr. 336:17–337:20, 365:20–366:3, 369:19–370:15). On the other hand, Dr. Langer testified, based on his own experience and literature in the field, to the considerable difficulties persons of skill in the art had faced in developing a cast film product with the claimed drug content uniformity. (Tr. 472:5–503:16). I find that achieving drug content uniformity was not something that could be accomplished before the priority date of the '514 patent by applying identified strategies to achieve predictable results.

Further, Defendants have not met their burden to prove that a person of ordinary skill in the art would have been motivated to combine the teachings of Chen and Bess to arrive at the claimed invention, which requires a particle size smaller than 200 microns.[13] (*See* '514 patent, 74:1–2). Bess discloses films containing particles between about 55 and 160 microns in size. (JTX184 at 11:53–65). Chen and Bess contain conflicting teachings regarding desired particle

[13] Or smaller than 100 microns, as recited in dependent claim 64. (*See* '514 patent, 74:13–14).

size. (*See* JTX187 at 2:17–20; JTX184 at 11:53–65; Tr. 387:16–388:16). Specifically, Chen disparages prior art in the form of "tablets contain[ing] particulates (>25 microns) which leave a 'gritty' and unpleasant taste in the mouth." (JTX187 at 2:17–20). The smallest particle size disclosed in Bess, however, is 55 microns. (JTX184 at 11:53–65). Dr. Dyar's conclusory testimony that "it goes without saying" that "you would want small particles within a film that is very thin" and that combining the teachings of patents is "what [he] always do[es]" and what he teaches his students to do "when it's appropriate" is insufficient to overcome Reckitt's evidence that a person of ordinary skill in the art would not have been motivated to combine Chen and Bess. (*See* Tr. 318:18–319:1, 347:21–24).

Reckitt argues that the asserted claims of the '514 patent are not obvious in light of objective considerations, including long-felt need, failure of others, and praise. (D.I. 406 at 18). Defendants effectively concede that there was a long-felt need for uniform pharmaceutical film formulations, but argue that Reckitt presented no evidence that the '514 patent met that need. (D.I. 396 at 30). Content uniformity, as Defendants note, continued to be a challenge in the context of cast films for years after the '514 patent's invention. (*See* Tr. 480:17–484:14; PTX215 at 1). Thus, long-felt need and failure of others do not support finding that the asserted claims are not obvious. The praise that MonoSol and Reckitt received once they began publishing their work on film technology does suggest that the asserted claims of the '514 patent were not obvious. (*See* Tr. 494:14–496:12; PTX213 at 191 (crediting the '514 patent inventors with discovering that the agglomeration of active particles that led to non-uniformity was caused by "relatively long drying times, which facilitated intermolecular attractive forces, convection forces, and air flow which aided in the formation of such conglomerates."); PTX215 at p.1038 (same)).

The Court finds that the asserted claims of the '514 patent are not invalid for obviousness for the following reasons: First, Chen and Bess do not disclose or render obvious the asserted claims' requirement that drug content uniformity of the matrix subsequent to casting and drying does not vary by more than 10% of the desired amount of active. Second, Defendants failed to meet their burden with respect to expectation of success in achieving drug content uniformity within 10%. Third, Defendants failed to meet their burden with respect to motivation to combine Chen and Bess. Fourth, Plaintiffs showed that the '514 patent and its drug content uniformity limitation garnered praise in the industry.

For the reasons stated above, the asserted claims are not invalid as indefinite under § 112, ¶ 2 and they are not invalid for obviousness under § 103.

B. Infringement

Watson and Par admit that their ANDA Products meet all but two elements of the asserted claims. (D.I. 353-1 at ¶¶ 91–106; PFF63, PFF65, PFF101– PFF103, PFF108– PFF109, PFF113, PFF115– PFF116, PFF121, PFF123– PFF124). Watson and Par dispute that their ANDA Products include "cast film[s] comprising a flowable water-soluble or water swellable film-forming matrix" (the "cast film element") and that they include matrices that have a "viscosity sufficient to aid in substantially maintaining non-self-aggregating uniformity of the active in the matrix" (the "viscosity element"). (D.I. 407 at 15, 17; D.I. 408 at 15, 18).

1. Findings of Fact

1. Watson's and Par's ANDA Products are cast films.

2. During the casting process and prior to drying, the matrix that is used to form the cast films of Watson's and Par's ANDA Products is a flowable liquid.

3. Viscosity of a film-forming matrix affects the self-aggregation of actives.

4. Film-forming matrix viscosities within the patent's preferred range are sufficient to aid in substantially maintaining non-self-aggregating uniformity of the active in the matrix.

2. Conclusions of Law

a) Cast Film Element

Reckitt argues that, because it is undisputed that Watson's and Par's ANDA Products are cast films that are made by casting flowable matrices, the ANDA Products satisfy the cast film element. (D.I. 397 at 12). Par argues that its ANDA Product does not infringe because there is no evidence that all of the claimed elements are satisfied at any single point in time. (D.I. 407 at 15). Par contends that the cast film in its ANDA Product does not "comprise a flowable . . . matrix" as required by the claims because the final film is solid. (*Id.*). Watson likewise argues that, "although Watson's ANDA products are made from a flowable matrix, they do not include a flowable matrix in their final form. Thus, because claim 62 requires a film that includes a flowable matrix, Watson does not infringe." (D.I. 408 at 18 (emphasis omitted)).

Watson's and Par's ANDA Products satisfy the cast film element of the asserted claims of the '514 patent. As discussed above, a person of ordinary skill in the art would understand that the '514 patent's claimed cast film "comprises" a flowable matrix in the sense that it is made from a flowable film-forming matrix, not in the sense that it contains a flowable matrix as a final component. (*See supra* Part IV.A.2.a). Watson's and Par's ANDA Products are formed by casting a polymer matrix onto a liner and then drying it. (Tr. 833:8–17, 834:2–14; 848:5–849:17). Watson and Par do not dispute that their ANDA Products are cast films. (PFF66, PFF125). Watson and Par also do not dispute that, during the casting process and prior to drying, their film-forming matrices are flowable liquids. (PFF66, PFF125). Thus, Watson's and Par's ANDA Products satisfy the claim limitation reciting "a cast film comprising a flowable water-soluble or water swellable film-forming matrix." ('514 patent, 73:49–52).

b) Viscosity Element

Independent claim 62 of the '514 patent, from which asserted claims 64, 65, 69, and 73 depend, includes the viscosity element. ('514 patent, 73:53–55). The Court construed the viscosity element to mean "viscosity sufficient to provide little to no aggregation of the active within the film." (D.I. 156 at 15). Plaintiffs had argued that the viscosity element should be construed to include the "individual dosage units [not varying] by more than 10% from the intended amount of active for that dosage unit" as a part of the construction. (*Id.*). The Court rejected that, explaining that "[t]his uniformity [limitation does not apply to this element, as it applies] subsequent to casting and drying, not . . . to each step along the way." (*Id.*).

Reckitt maintains, first, that Watson's ANDA Product meets the viscosity element because individual doses of Watson's final ANDA Product have drug content uniformity within 10%. (D.I. 397 at 16; *see* D.I. 353-1 at ¶¶ 92, 103, 104, 182). Reckitt maintains, second, that Watson's ANDA Product meets the viscosity element because the viscosity of the matrix used to make Watson's ANDA Product is within the preferred viscosity range disclosed in the patent. (D.I. 397 at 15; *see* JTX19 at 181, 183; Tr. 838:18–840:4).

Reckitt argues that the viscosity of the matrix used to make Watson's ANDA Product is sufficient to aid in maintaining uniformity because Watson's final ANDA Product is uniform (D.I. 353-1 at ¶ 182; *see also* PFF58(j)), and, if uniformity is lost at any point during manufacturing, it cannot be regained. (D.I. 397 at 16; Tr. 474:11–475:12, 829:24–830:13). Watson argues that the Court should reject Reckitt's attempt to rely on evidence of content uniformity to prove that Watson's ANDA Product meets the viscosity element. (D.I. 408 at 16). Relying solely on evidence of final drug content uniformity, a separate claim limitation, to establish satisfaction of the viscosity element, according to Watson, would read the viscosity

element out of the claim. (*See id.* (citing *Bicon, Inc. v. Straumann Co.*, 441 F.3d 945, 950–51 (Fed. Cir. 2006))). Watson thus maintains that Reckitt has failed to meet its burden to prove that "viscosity plays a role in maintaining uniformity in Watson's ANDA product[]." (*Id.*).

Evidence that Watson's ANDA Product is uniform is insufficient on its own to show that the viscosity element is met because, otherwise, the viscosity element would be duplicative of the content uniformity limitation. *See Symantec Corp. v. Computer Assocs Int'l, Inc.*, 522 F.3d 1279, 1289 (Fed. Cir. 2008) ("[T]he general assumption is that different terms [in the body of a claim] have different meanings.").

Reckitt also argues that Watson's ANDA Product meets the viscosity element because Watson's ANDA specifies that the matrix used to make its films has a viscosity that is within the most preferred range of viscosities recited in the '514 patent specification. (D.I. 397 at 15–16; '514 patent, 11:23–31; JTX19 at 181, 183; Tr. 839:6–840:4; PFF79). Watson argues that the fact that its casting dispersion has a viscosity that falls within the '514 patent's "preferred range" does not prove that the viscosity is sufficient to aid in maintaining uniformity because Reckitt's own evidence demonstrates that viscosity in the preferred range will not necessarily aid in maintaining uniformity. (D.I. 408 at 17). First, Watson points to Reckitt's argument that the Chen reference does not teach a uniform film even though Chen teaches a casting dispersion with a viscosity in the preferred range. (D.I. 406 at 13; JTX187 at 15). Second, Watson points to the testimony of Reckitt's expert, Dr. Langer, that a person of ordinary skill in the art would need to do routine experimentation to create a uniform film, even if she knew the '514 patent's preferred viscosity range. (Tr. 568:16–569:15). Watson thus argues that the fact that the viscosity of the matrix used to make its ANDA Product falls within the patent's preferred range is insufficient to show that it has a "viscosity sufficient to aid in substantially maintaining non-

self-aggregating uniformity of the active in the matrix." ('514 patent, 73:53–55; *see* D.I. 408 at 17). Additionally, Watson argues that it maintains the uniformity of its ANDA Product with mixing and immediate drying, not viscosity. (D.I. 408 at 18; Tr. 1158:4–8, 1158:17–1159:8, 1163:9–18). Reckitt contends that there is no evidence to support Watson's claim that immediate drying after casting contributes to drug content uniformity. (D.I. 411 at 8 n.2). Instead, Reckitt argues, Watson's expert Dr. McConville testified that, after mixing, the dispersion moves onto a heated roller, where Watson was "immediately trying to heat and dry the film." (D.I. 411 at 8; Tr. 1163:15–18).

Reckitt has met its burden to show that Watson's ANDA Product meets the viscosity element based on the viscosity ranges disclosed in Watson's ANDA. The viscosity of the matrix used to make Watson's ANDA Product is within the preferred range disclosed in the patent. (JTX19 at 181, 183; Tr. 838:18–840:4, 948:15–20). Watson presented evidence that other techniques besides viscosity—namely, mixing and immediate drying—yield the content uniformity of its ANDA Product. (Tr. 1158:4–8, 1158:17–1159:8, 1163:12–18, 1175:11–17; *see also* JTX187 at 15; Tr. 568:16–569:15). Mixing by itself, however, does not maintain uniformity throughout the casting and drying processes because no mixing occurs during casting and drying. (Tr. 843:14–844:14). Further, the claims state that the viscosity of the matrix must be sufficient to "aid" in maintaining uniformity and the specification indicates that factors other than viscosity may contribute to content uniformity. ('514 patent, 23:21–39, 36:61–37:2, 73:53–55; *see also* Tr. 841:12–844:14). Reckitt is thus correct that a product may satisfy the viscosity element even if factors other than viscosity contribute to the product's drug content uniformity. (*See* D.I. 397 at 18; '514 patent, 23:21–39, 36:61–37, 73:53–55). Viscosities within the patent's preferred range are sufficient to aid in preventing the self-aggregation of an active. (*See* Tr. 836:17–

838:17; '514 patent, 11:23–29, 23:21–35). There is no indication that the viscosity of the matrix used to make Watson's ANDA Product does not play a role in maintaining the uniformity of the active. Reckitt has therefore met its burden to show that Watson's ANDA Product meets the viscosity element.

Par admits that its final ANDA Product exhibits drug content uniformity within 5%. (PFF124). Like Watson, Par argues that relying solely on evidence of final drug content uniformity to establish satisfaction of the viscosity element would read the viscosity element out of the claim. (D.I. 407 at 17–18 (citing *Bicon, Inc.*, 441 F.3d at 950)). For the reasons stated above, I agree. Par also argues that Reckitt has presented no evidence of the viscosity of Par's wet blend matrix. (*Id.* at 17). Par maintains that, in any event, the evidence shows that the viscosity of Par's wet blend matrix is insufficient to provide little to no aggregation of the active. (*Id.* at 18). During development, Par reduced the viscosity of its wet blend matrix. (JTX269 at 25–26; Tr. 1271:13–23). Par's lower viscosity matrix formulation, the formulation that it uses in its final ANDA Product, initially failed to result in a film with the desired drug content uniformity. (JTX269 at 53; Tr. 1258:7–1262:14, 1264:4–1265:23). To address the uniformity problem, Par introduced a mixing step but did not increase the viscosity of the wet blend matrix. (JTX269 at 54; Tr. 1273:8–13). Par argues that this series of events shows that the viscosity of its wet blend matrix is insufficient to provide little to no aggregation of the active in the matrix. (D.I. 407 at 18–19). According to Par, Reckitt has provided no evidence that during casting and drying, the viscosity of Par's wet blend is what maintains drug content uniformity. (*Id.* at 19–20 (citing Tr. 848:21–855:24)).

Reckitt has met its burden to prove that Par's ANDA Product meets the viscosity element of the asserted claims of the '514 patent. Reckitt has not offered evidence of the numerical value

of the viscosity of the wet blend matrix used to make Par's ANDA Product or evidence that the viscosity is within the preferred range of the patent. Reckitt instead identifies statements in Par's ANDA to demonstrate that the viscosity of Par's ANDA Product is sufficient to provide little to no self-aggregation of the active in the matrix. (D.I. 397 at 16; *see* JTX327 at 23, 34, 40, 181–84; Tr. 848:22–850:20). Reckitt's expert, Dr. Davies, relies in part on Par's ANDA for the proposition that Par's ANDA Product "creates the viscosity required to suspend the buprenorphine uniformly in the wet blend and prevent precipitation during blending and coating." (JTX327 at 23; Tr. 848:22–849:19). JTX327 at 23 does not demonstrate that Par's ANDA Product meets the viscosity element, however, because that page of the ANDA discusses prototypes that included a 300,000 molecular weight polyethylene oxide ("PEO"), not the 200,000 molecular weight PEO present in Par's final ANDA Product. (JTX327 at 23). The change from 300,000 molecular weight PEO to 200,000 molecular weight PEO "implies a reduction in the viscosity of the blend." (*Id.* at 34). Thus, statements about the viscosities of prototypes that included a 300,000 molecular weight PEO are not relevant to whether Par's ANDA Product meets the viscosity element of the asserted claims of the '514 patent.

Dr. Davies also relies on portions of Par's ANDA that discuss prototypes 3 and 4. (*See* Tr. 848:22–855:8; JTX327 at 34, 40, 181–84). Prototype 3 contained a 200,000 molecular weight PEO and, after addition of EDTA disodium to improve drug product stability, was ultimately developed into Par's ANDA Product. (*See* JTX327 at 35, 40). Par's ANDA states that "the blend viscosity [of prototypes 3 and 4] must be sufficiently high to prevent precipitation of the active and ensure content uniformity of the drug product." (*Id.* at 34; *see also* Tr. 848:22–850:21). Additionally, Par's ANDA states that the data obtained in what the parties call a "holding study" conducted on prototypes 3 and 4 "verif[ied] that the viscosity of the wet blend

was high enough to prevent segregation of the buprenorphine HCl for at least 48 hours." (JTX327 at 34; *see, e.g.*, Tr. 1270:7–9). Par's ANDA states that the PEO "is also responsible for creating an environment viscous enough to avoid drug substance segregation during wet blend preparation and coating." (JTX327 at 40; *see also* Tr. 848:22–849:15). In-process uniformity measurements of Par's wet blend matrix indicated that the buprenorphine uniformity for all batches fell between 96.3% and 103.2%. (JTX327 at 181–84; Tr. 850:22–853:20).

Par argues that, despite the statements in its ANDA, empirical evidence demonstrates that Par's ANDA Product has insufficient viscosity to provide little to no aggregation of the active in the matrix. (D.I. 407 at 18–19; DPRF85). First, Par argues that the holding study discussed at JTX327 at 34 does not prove that Par's ANDA Product meets the viscosity element because the study was conducted on a prototype that did not contain a component of Par's final ANDA Product (EDTA disodium) and because the study measured only the impact of settlement on segregation of the active, disregarding other forces present during manufacturing. (D.I. 407 at 20; DPRF88). Second, Par's expert Dr. Park testified that Par's wet blend matrix had a viscosity insufficient to ensure content uniformity and that, to address that issue, Par introduced additional mixing but did not increase the viscosity. (Tr. 1259:14–1262:14, 1264:4–1266:21, 1272:16–1273:13; *see* JTX269 at 53–54). Par's ANDA, however, recognizes the importance of viscosity not only during the mixing phase, but also during the casting phase of the manufacturing process, when mixing can no longer contribute to preventing aggregation. (*See* JTX327 at 40 (discussing viscosity "during wet blend preparation and coating"); Tr. 849:8–15). Further, it is immaterial that the holding study measured only the impact of settlement rather than all of the forces present during manufacturing. Claim 62 requires that viscosity be "sufficient to aid" in maintaining drug content uniformity in the matrix. ('514 patent, 73:53–55; D.I. 156 at 15). That the viscosity of

prototype 3 was able to prevent dis-uniformity caused by settlement is evidence that it contributes to uniformity in the matrix, even if mixing also contributes significantly. Finally, there is no evidence that the addition of EDTA disodium affected the viscosity of the wet blend used to manufacture Par's ANDA Product. (*See* Tr. 1258:7–1262:14, 1269:24–1273:13 (not mentioning addition of EDTA disodium as a reason to reject Dr. Davies' reliance on the holding study conducted on the prototype 3 formulation)). The evidence summarized above proves that the viscosity of Par's wet blend matrix is intended to, and does, aid in maintaining non-self-aggregating drug content uniformity in the matrix. Reckitt has therefore met its burden to establish that Par's ANDA Product meets the viscosity element.

For the reasons stated above, I conclude that Defendants have not proven by clear and convincing evidence that the asserted claims of the '514 patent are invalid. I also conclude that Watson's and Par's ANDA Products infringe the asserted '514 patent claims.

V. '150 PATENT

A. Invalidity

1. Findings of Fact

1. A person of ordinary skill in the art would understand the term "molecular weight" in the patent to refer to viscosity average molecular weight as reported by the manufacturers of commercial PEOs.

2. The application that issued as the '150 patent was filed as a continuation-in-part tracing back to Provisional Application No. 60/473,902 (the "'902 Application"), which was filed on May 28, 2003.

3. The '902 Application discloses a film product wherein a PEO of low molecular weight "comprises about 60% or more in the polymer component."

4. The asserted claims of the '150 patent are entitled to a priority date of May 28, 2003.

2. *Conclusions of Law*

a) Indefiniteness

Defendants argue that the asserted claims of the '150 patent are invalid for indefiniteness because the patent does not state the appropriate measure for the claim term "molecular weight" and therefore "fail[s] to inform, with reasonable certainty, those skilled in the art about the scope of the invention." *Nautilus, Inc.*, 134 S. Ct. at 2124; (D.I. 396 at 31). The experts presented numerous methods to characterize the molecular weight of PEOs, including number average molecular weight, weight average molecular weight, Z-average molecular weight, and viscosity average molecular weight. (Tr. 428:8–429:1, 434:4–24, 671:12–674:17). The experts also presented two different experimental methods for obtaining the average molecular weight of PEOs: rheological measurements and gel permeation chromatography ("GPC") analysis. (Tr. 428:8–429:1, 672:11–673:1). Each method yields materially different numerical values for the molecular weight of the same PEO. (Tr. 434:4–435:19, 674:10–20). Reckitt maintains that the claims are not indefinite because a person of skill in the art would use GPC analysis to calculate viscosity average molecular weight. (D.I. 406 at 28–29).

Dow, the manufacturer of the PEO Polyox N80 that Watson and Par use in their ANDA Products, assigns an approximate viscosity average molecular weight to a sample based on measurements conducted using a viscometer. (Tr. 131:1–20, 134:7–19, 646:11–651:4, *see* JTX30 at 15). The patent recites a PEO, "[a]vailable from the Dow Chemical Company," in an example of the invention. ('150 patent, 48:40–58). Table 22 of the '150 patent lists values that represent the approximate viscosity average molecular weights assigned by Dow to different PEO grades. (*Id.* at 50:15–18; *see also* D.I. 156 at 7–9 ("Defendants, at the [*Markman* hearing], explained that a person skilled in the art would look at Table 22 of the patent and understand

those molecular weight PEOs as the type made by commercial companies, described with average weights. (D.I. 147 at 48). The Court agrees.")). The '150 patent does not explicitly describe a method to use to calculate molecular weight.

A person of ordinary skill in the art would understand the term "molecular weight" in the patent to refer to viscosity average molecular weight as reported by the manufacturers of commercial PEOs. Reckitt's expert, Dr. Mathias, testified that a person of skill in the art would conduct GPC analysis to determine whether a sample of PEO contains discrete sets of a low average molecular weight PEO and a higher average molecular weight PEO. (Tr. 115:17–119:7; *see also* Tr. 194:11–23 (testimony of Reckitt's expert Dr. Yau that GPC analysis is the "best way and also the only way [he] recommend[s] . . . look[ing] at the molecul[ar] weight distribution")). Defendants' experts testified, however, that a person of skill in the art would not perform GPC analysis to arrive at viscosity average molecular weight, but would instead rely on the molecular weight reported by the manufacturer of the PEO. (Tr. 253:5–254:7, 262:23–263:21, 301:23–302:23, 428:2–7, 1278:16–21). The claims are not indefinite merely because multiple methods of measuring molecular weight exist. *See Teva Phar. USA, Inc. v. Sandoz, Inc.*, 789 F.3d 1335, 1344–45 (Fed. Cir. 2015) (analyzing intrinsic evidence to determine whether claim is indefinite); *Akzo Nobel Coatings, Inc. v. Dow Chem. Co.*, 2016 WL 363443, at *8–9 (Fed. Cir. Jan. 29, 2016) (holding viscosity limitation not indefinite despite not reciting temperature at which viscosity is measured because room temperature was the only temperature mentioned). In the absence of a specified method to measure molecular weight and in light of the patent's references to molecular weight as reported by Dow, I find that the weight of the evidence demonstrates that one of skill in the art would understand that the patent relies on the molecular weight of Polyox N80 reported by Dow as the measure of "molecular weight." Defendants thus

failed to prove by clear and convincing evidence that a person skilled in the art would not know with reasonable certainty the meaning of "molecular weight" in the context of the '150 patent.

b) Obviousness

Defendants argue that the asserted claims of the '150 patent are invalid for obviousness over Yang. (D.I. 396 at 32–33). Reckitt argues that Yang is not prior art to the '150 patent. (D.I. 406 at 30). Reckitt does not dispute that, if it were prior art, Yang would render the asserted claims of the '150 patent obvious. (Tr. 687:5–13; *see also* D.I. 406 at 30–31).

Yang was published on February 17, 2005. (JTX178 at 1). The application that issued as the '150 patent was filed on April 22, 2008. ('150 patent, (22); Tr. 425:5–7). The application that issued as the '150 patent was filed as a continuation-in-part tracing back to Provisional Application No. 60/473,902 (the "'902 Application"), which was filed on May 28, 2003. ('150 patent, (60); JTX249 at 1–2; Tr. 443:14–444:3). Reckitt maintains that the '150 patent is entitled to a priority date of May 28, 2003. (D.I. 406 at 30–31). Defendants maintain that the '150 patent is entitled to a priority date of April 22, 2008. (D.I. 396 at 33).

The '150 patent claims are entitled to a priority date of May 28, 2003. To be entitled to the filing date of an earlier patent application, the earlier application must contain a disclosure that complies with 35 U.S.C. § 112, ¶ 1. *See* 35 U.S.C. § 120; *Lockwood v. Am. Airlines, Inc.*, 107 F.3d 1565, 1571 (Fed. Cir. 1997). Section 112, ¶ 1 provides that:

> The 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, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Independent claims 1 and 10 of the '150 patent, from which claims 4 and 13, respectively, depend, recite that the polymer component of the claimed films is comprised of about 60% or

greater of the low molecular weight PEO. ('150 patent, 57:37–54, 58:29–46; Tr. 442:8–11). The parties dispute whether this element is disclosed in the '902 Application. (D.I. 396 at 33; D.I. 406 at 30–31; Tr. 441:12–445:11, 661:12–668:24). The '902 Application discloses that

> certain film properties, such as fast dissolution rates and high tear resistance, may be attained by combining small amounts of high molecular weight PEOs with larger amounts of lower molecular weight PEOs. Desirably, such compositions contain about 60% or greater levels of the lower molecular weight PEO in the PEO-blend polymer component.

(JTX249 at 31). The "polymer component" referred to is all the polymers in the composition. (*See id.* at 3, 30–31, 80–83; Tr. 664:13–665:14, 688:11–689:18). Dr. Prud'homme testified that the '902 Application's disclosure of 60% or greater levels of the lower molecular weight PEO demonstrates that the inventors possessed the disputed claim element. (Tr. 664:13–665:14). Defendants' expert Dr. McConville testified that the statement that "[d]esirably, such compositions contain about 60% or greater levels of the lower molecular weight PEO in the PEO-blend polymer component" "really outlines the entire claim language in claim 1 [of the '150 patent.]" (Tr. 250:15–251:17 (testifying regarding the passage in the '150 patent (18:11–21) that appears, word-for-word, in the '902 Application (JTX249 at 31)). Thus, Defendants have not proven by clear and convincing evidence that the '902 Application did not provide an adequate written description of the disputed '150 patent claim limitation. Yang is therefore not prior art and the asserted claims of the '150 patent are not invalid as obvious.

For the reasons stated above, the asserted claims of the '150 patent are not invalid.

B. Infringement

1. Findings of Fact

1. Polyox N80 contains PEO molecules with a normal distribution of molecular weights.

2. A person of ordinary skill in the art would determine the average molecular weight of PEO by reference to the commercially reported average molecular weight.

3. A person of ordinary skill would not necessarily expect that a PEO made by combining one or more low molecular weight PEOs with one or more higher molecular weight PEOs would yield a bimodal distribution of molecular weights.

4. Dow reports a single approximate molecular weight for Polyox N80 of 200,000 daltons.

2. Conclusions of Law

Reckitt asserts independent claim 1 and dependent claim 4 of the '150 patent against Watson. (D.I. 353-1 at ¶ 39). Reckitt asserts independent claim 10 and dependent claim 13 of the '150 patent against Par. (D.I. 353-1 at ¶ 41; D.I. 372-1 at ¶ 228). Claim 1 and claim 10 of the '150 patent each claim "[a] mucosally-adhesive water-soluble film product comprising," among other things, polyethylene oxide, wherein:

> the polyethylene oxide comprises one or more low molecular weight polyethylene oxides and one or more higher molecular weight polyethylene oxides, the molecular weight of the low molecular weight polyethylene oxide being in the range 100,000 to 300,000 and the molecular weight of the higher molecular weight polyethylene oxide being in the range 600,000 to 900,000; and
>
> the polyethylene oxide of low molecular weight comprises about 60% or more in the polymer component.

(the "PEO limitation") ('150 patent, 57:46–54, 58:38–46). The Court construed the PEO limitation to mean that the polyethylene oxide comprises:

> (i) one or more polyethylene oxides having a lower average molecular weight in the range of 100,000 to 300,000; and (ii) one or more polyethylene oxides having a higher average molecular weight in the range of 600,000 to 900,000[;] and (iii) the polyethylene oxide having the lower average molecular weight comprises about 60% or more by weight in the polymer component.

(D.I. 156 at 6). The Court construed "molecular weight" as "average molecular weight." (*Id.* at 7). The Court also "agree[d] with Defendants that the product cannot be comprised of . . . only low average molecular weight PEOs with stray higher average molecular weight PEOs." (*Id.* at 9).

Watson's and Par's ANDA Products both include a commercial grade of PEO manufactured by Dow Chemical known as Polyox N80. (D.I. 353-1 at ¶ 110; D.I. 372-1 at ¶ 246; JTX30 at 15). As an inherent result of the synthesis process, commercial PEOs like Polyox N80 contain a distribution of molecules of different molecular weights. (Tr. 117:6–18, 150:23–151:13, 151:18–152:14). Dow assigns average molecular weights to its PEO product lots according to rheological measurements taken with a viscometer. (Tr. 207:21–208:14, 458:13–15, 460:12–19; JTX30 at 15). Dow specifies an average molecular weight of 200,000 daltons for PEO lots having a viscosity between 55–90 centipoise, as measured by a viscometer. (Tr. 207:21–208:14, 460:12–19; JTX30 at 15). Dow markets Polyox N80 as having an average molecular weight of 200,000 daltons. (JTX30 at 15; D.I. 353-1 at ¶ 186).

Watson and Par maintain that their ANDA Products comprise single, low average molecular weight PEOs and therefore do not meet the PEO limitation of the claims asserted against them, respectively. (D.I. 407 at 21; D.I. 408 at 9). Reckitt argues that Polyox N80 meets the PEO limitation of claims 1 and 10 and that Watson's and Par's ANDA Products therefore infringe the claims asserted against them. (D.I. 397 at 36). Watson and Par do not dispute that their ANDA Products meet the other limitations of the claims asserted against them. (D.I. 353-1 at ¶¶ 107–17; Tr. 776:11–16; *see also* PFF344, PFF405). The parties' central dispute is about how a person skilled in the art would determine the average molecular weight of PEOs in the context of the patent. It is Reckitt's burden to show that the claimed discrete sets of PEOs are present in the accused ANDA Products. Reckitt attempts to meet this burden in two ways: First, by reference to GPC partition analysis, and, second, by reference to Dow's manufacturing process, arguing that Dow blends PEOs of different molecular weights in manufacturing Polyox

N80. (D.I. 397 at 36 & n.12). Reckitt fails to meet its burden under either theory, as discussed below.

Reckitt obtained the molecular weight distribution of a sample of Polyox N80 to prove infringement. (Tr. 115:17–119:14, 193:20–194:23). Reckitt's expert, Dr. Yau, used GPC analysis to determine the molecular weight distribution of the components of a sample of Polyox N80. (Tr. 119:12–17). Reckitt's GPC analysis showed that the sample of Polyox N80 contained PEO molecules with a normal distribution of molecular weights. (Tr. 118:10–122:4, 151:23–153:21, 259:1–12).

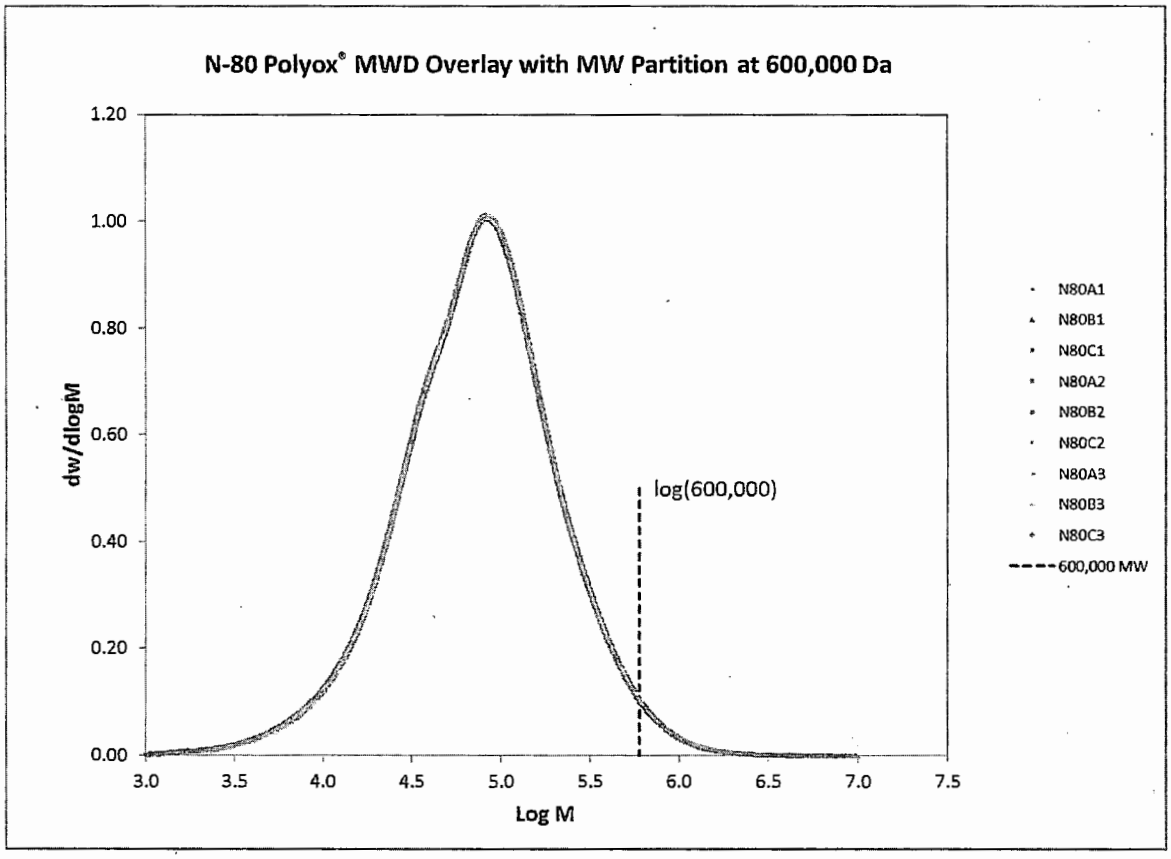

Figure 1: PTX526 at p.17

Reckitt's expert, Dr. Mathias, then analyzed the molecular weight distribution Dr. Yau obtained to determine whether the sample of Polyox N80 contained the claimed low and higher molecular weight PEOs in the claimed proportion. (Tr. 117:10–118:6, 124:8–129:7, 1277:16–

1279:1). Dr. Mathias mathematically "partitioned" the molecular weight distribution at 600,000 daltons and calculated the average molecular weights of the PEO molecules on each side of the partition. (Tr. 124:8–130:24, 197:5–199:2; PTX526G; PTX526H; PTX526I; PTX526J). Dr. Mathias calculated that the viscosity average molecular weight of the low average molecular weight set of PEO molecules in the sample of Polyox N80 was 95,895 daltons. (PTX526I). Dr. Mathias also calculated that the low average molecular weight set of PEO molecules made up 98.11% of the sample. (*Id.*). Dr. Mathias calculated that the viscosity average molecular weight of the higher average molecular weight set of PEO molecules in the sample of Polyox N80 was 900,318. (PTX526J). Dr. Mathias also calculated that the higher average molecular weight set of PEO molecules made up 1.9% of the sample. (*Id.*). Reckitt maintains that these analyses prove that Watson's and Par's ANDA Products contain both the low and higher average molecular weight PEOs as set forth in the PEO limitation; that at least 60% of the polymer component of Watson's and Par's ANDA Products consist of the low average molecular weight PEO as set forth in the PEO limitation; and that Watson's and Par's ANDA Products comprise more than a "stray" amount of higher average molecular weight PEO as required under the Court's construction of the PEO limitation. (D.I. 397 at 36–37). Thus, Reckitt argues, Watson's and Par's ANDA Products meet the PEO limitation of the asserted claims of the '150 patent. (*Id.* at 35).

Watson and Par argue that a person skilled in the art would determine the average molecular weight of PEOs in the context of the patent by reference to the commercially reported average molecular weight. (D.I. 407 at 21; D.I. 408 at 10; Tr. 253:5–254:7, 302:21–303:3, 1278:8–21). Watson and Par maintain that, because Polyox N80 is a single PEO, it does not comprise the "discrete sets of the low average molecular weight PEOs and the high average

[molecular] weight PEOs" that the Court ruled must be present in the product. (D.I. 156 at 9; D.I. 407 at 21; D.I. 408 at 10). Similarly, Watson and Par argue that because Polyox N80 has an average molecular weight of 200,000 daltons, their ANDA Products do not contain a PEO with a molecular weight within the range specified in the claims for higher molecular weight PEO. (D.I. 407 at 21–22; D.I. 408 at 10).

Reckitt's GPC partition analysis does not prove that Watson's and Par's ANDA Products contain the required "discrete sets" of PEOs because, for the reasons stated above, a person skilled in the art reading the patent would look to the commercially reported average molecular weight of PEOs. (*See supra* Part V.A.2.a; *see also* Tr. 262:23–263:21, 264:4–19, 457:9–12, 679:15–20; D.I. 156 at 7 (citing D.I. 147 at 48)). Thus, Watson's and Par's ANDA Products each contain a single, low average molecular weight PEO. Reckitt argues that looking to the commercially reported average molecular weight of a PEO is improper because it imports a process step into the asserted claims according to which infringement requires combining two commercial grades of PEO. (D.I. 411 at 14). I disagree. Finding that the patent uses "molecular weight" to mean commercially reported average molecular weights does not require that, to infringe, a party must itself combine two PEOs with different commercially reported molecular weights within the claimed ranges. Reckitt's GPC partition analysis is also inadequate to prove that Watson's and Par's ANDA Products contain the required "discrete sets" of PEOs because Dr. Mathias was unable to articulate any scientific rationale underlying the placement of the partition at 600,000 daltons. (Tr. 127:12–129:3, 149:6–8, 155:24–159:5, 160:11–161:20, 180:9–17, 181:17–183:12, 185:3–6). Alternatively, Reckitt argues that Polyox N80 comprises discrete sets of low and higher molecular weight PEOs because of blending during manufacturing. (D.I. 397 at 36 & n.12; Tr. 173:16–174:14). Dow's manufacturing process is proprietary and Dr.

Mathias did not support his opinion that Dow blends discrete sets of PEOs in manufacturing Polyox N80 with evidence of Dow's manufacturing process. (Tr. 174:15–175:2). Thus, Watson's and Par's ANDA Products contain a single PEO with a molecular weight of 200,000 daltons.

Reckitt argues that Polyox N80 contains the claimed discrete sets of PEOs despite having a unimodal molecular weight distribution. (D.I. 397 at 38). There is no dispute that Dr. Yau's GPC analysis yielded a unimodal molecular weight distribution for Polyox N80. (*See* Tr. 150:21–151:13). Par's expert, Dr. McConville, testified that, in view of the patent specification, a person of ordinary skill in the art would recognize a PEO product with a unimodal molecular weight distribution as a single PEO, rather than more than one discrete sets of PEOs. (Tr. 245:16–247:5, 259:1–6, 260:14–261:15). He further testified that he would expect the molecular weight distribution of a sample comprising a discrete PEO of low molecular weight combined with another discrete PEO of a higher molecular weight to have a bimodal distribution. (Tr. 246:20–247:5; *see* Tr. 277:19–282:3). Reckitt argues that a combination of discrete sets of PEOs could have a unimodal distribution. (D.I. 397 at 38; *see* Tr. 123:2–124:3; JTX31 at 3–4). Based on the evidence presented, I find that a person of ordinary skill would not necessarily expect a PEO containing one or more low molecular weight PEOs and one or more higher molecular weight PEOs to have a bimodal molecular weight distribution, but that a bimodal molecular weight distribution would indicate the presence of discrete sets of low and higher molecular weight PEOs.

I find that, although a person of ordinary skill would not necessarily expect a PEO containing one or more low molecular weight PEOs and one or more higher molecular weight PEOs to have a bimodal molecular weight distribution, there is nothing about Dr. Yau's and Dr.

Mathias's analyses or Dow's manufacturing process that proves that two discrete sets of PEOs are present in Polyox N80. Reckitt has therefore failed to establish that Watson's and Par's ANDA Products contain "one or more polyethylene oxides having a higher average molecular weight in the range of 600,000 to 900,000." (D.I. 156 at 6).[14] As a result, Watson's ANDA Product does not infringe claims 1 and 4 and Par's ANDA Product does not infringe claims 10 and 13 of the '150 patent.

For the reasons stated above, I conclude that the asserted claims of the '150 patent are valid but that Watson and Par do not infringe the claims asserted against them.

VI. CONCLUSION

For the foregoing reasons, the Court finds that: (1) the asserted claims of the '832 patent are invalid, that Watson's and Par's ANDA Products do not infringe claims 1, 3, and 6 of the '832 patent, the 12 mg/3 mg dosage strength of Watson's ANDA Product does not infringe claims 15–19 of the '832 patent, the 2 mg/0.5 mg, 4 mg/1 mg, and 8 mg/2 mg dosage strengths of Watson's ANDA Product would infringe claims 15–19 of the '832 patent if they were valid, and that Par's ANDA Product would infringe claims 15–19 of the '832 patent if they were valid; (2) the asserted claims of the '514 patent are valid and infringed by Watson's and Par's ANDA Products; and (3) the asserted claims of the '150 patent are valid but not infringed by Watson's or Par's ANDA Products.

Reckitt is directed to submit an agreed-upon form of final judgment within two weeks.

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[14] Because I conclude that a person of ordinary skill in the art would look to the commercially reported average molecular weight rather than GPC partition analysis to determine whether a product satisfies the '150 patent claim limitations, I do not reach Watson's and Par's arguments that even under the partition analysis, Reckitt failed to prove that Watson's and Par's ANDA Products contain more than "stray" amounts of higher molecular weight PEO or that the viscosity average molecular weights calculated using GPC partition analysis fall within the claimed ranges. (*See* D.I. 407 at 23–24; D.I. 408 at 13–15). Consequently, I also do not reach Reckitt's argument in the alternative that the viscosity average molecular weights calculated using GPC partition analysis are equivalent to the claimed ranges under the doctrine of equivalents. (*See* D.I. 397 at 42; D.I. 411 at 15).