IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ENDO PHARMACEUTICALS INC. and MALLINCKRODT LLC, Plaintiffs, v. ACTAVIS INC., ACTAVIS SOUTH ATLANTIC LLC, ACTAVIS PHARMA, INC., ACTAVIS ELIZABETH LLC, ACTAVIS HOLDCO U.S., INC., and TEVA PHARMACEUTICALS USA, INC. Defendants.	Civil Action No. 14-1381-RGA

TRIAL OPINION

Jack B. Blumenfeld, Esq., MORRIS NICHOLS ARSHT & TUNNELL LLP, Wilmington, DE; Derek J. Fahnestock, Esq., MORRIS NICHOLS ARSHT & TUNNELL LLP, Wilmington, DE; Stephen J. Kraftschik, Esq., MORRIS NICHOLS ARSHT & TUNNELL LLP, Wilmington, DE; Jonathan D. Loeb, Esq., DECHERT LLP, Mountain View, CA; Martin J. Black, Esq., DECHERT LLP, Philadelphia, PA; Sharon K. Gagliardi, Esq., DECHERT LLP, Philadelphia, PA; Julie Latsko, Esq., DECHERT LLP, Philadelphia, PA; Joseph Gribbin, Esq., DECHERT LLP, Philadelphia, PA; Robert D. Rhoad, Esq., DECHERT LLP, Princeton, NJ; Brian M. Goldberg, Esq., DECHERT LLP, Princeton, NJ.

Attorneys for Plaintiff Endo Pharmaceuticals Inc.

Jack B. Blumenfeld, Esq., MORRIS NICHOLS ARSHT & TUNNELL LLP, Wilmington, DE; Derek J. Fahnestock, Esq., MORRIS NICHOLS ARSHT & TUNNELL LLP, Wilmington, DE; Stephen J. Kraftschik, Esq., MORRIS NICHOLS ARSHT & TUNNELL LLP, Wilmington, DE; Jeffrey J. Toney, Esq., KASOWITZ, BENSON, TORRES & FRIEDMAN LLP, Atlanta, GA; Rodney R. Miller, Esq., KASOWITZ, BENSON, TORRES & FRIEDMAN LLP, Atlanta, GA; Paul G. Williams, Esq., KASOWITZ, BENSON, TORRES & FRIEDMAN LLP, Atlanta, GA; Marcus A. Barber, Esq., KASOWITZ, BENSON, TORRES & FRIEDMAN LLP, Redwood Shores, CA.

Attorneys for Plaintiff Mallinckrodt LLC.

Adam W. Poff, Esq., YOUNG CONAWAY STARGATT & TAYLOR LLP, Wilmington, DE; Robert M. Vrana, Esq., YOUNG CONAWAY STARGATT & TAYLOR LLP, Wilmington, DE; Charles A. Weiss, Esq., HOLLAND & KNIGHT LLP, New York, NY; Howard S. Suh, Esq., HOLLAND & KNIGHT LLP, New York, NY; Eric H. Yecies, Esq., HOLLAND & KNIGHT LLP, New York, NY; Nicholas P. Chiara, Esq., HOLLAND & KNIGHT LLP, New York, NY.

Attorneys for Defendants Actavis Inc., Actavis South Atlantic LLC, Actavis Pharma, Inc., Actavis Elizabeth LLC, and Actavis Holdco U.S., Inc.

Adam W. Poff, Esq., YOUNG CONAWAY STARGATT & TAYLOR LLP, Wilmington, DE; Robert M. Vrana, Esq., YOUNG CONAWAY STARGATT & TAYLOR LLP, Wilmington, DE; James F. Hurst, Esq., KIRKLAND & ELLIS LLP, Chicago, IL; Jeanna M. Wacker, Esq., KIRKLAND & ELLIS LLP, New York, NY; John C. O'Quinn, Esq., KIRKLAND & ELLIS LLP, Washington, DC.

Attorneys for Defendant Teva Pharmaceuticals USA, Inc.

August 30, 2017

ANDREWS, U.S. DISTRICT JUDGE:

Plaintiffs brought this patent infringement action against two Actavis defendants on November 7, 2014, alleging that they had infringed U.S. Patent No. 8,871,779 ("the '779 patent") by filing Abbreviated New Drug Application ("ANDA") No. 20-3930 seeking to enter the market with a generic version of Plaintiffs' Opana ER product, which is an extended-release oxymorphone tablet. (D.I. 1). On the same day, Plaintiffs also filed suit separately against Defendant Teva, alleging infringement of the '779 patent through Defendant Teva's filing of ANDA No. 20-4324, which also sought approval for a generic version of extended-release oxymorphone tablets. (Civ. Act. No. 14-1389, D.I. 1). The parallel case against Defendant Teva proceeded to a bench trial in July 2016 at which Defendant Teva stipulated to infringement but asserted several defenses, including invalidity on the basis of obviousness. (Civ. Act. No. 14-1389, D.I. 192 at 6). On October 7, 2016, the Court issued a trial opinion holding that Defendant Teva had not proved by clear and convincing evidence that any of the asserted claims of the '779 patent were invalid. (*Id.* at 30).

On October 31, 2016, the Actavis Defendants filed an amended disclosure statement, notifying the Court that they had been acquired by Defendant Teva and that, as a result, the Actavis Defendants operate as wholly-owned subsidiaries of Defendant Teva. (D.I. 125 at 1). In light of this disclosure, Plaintiffs requested that the schedule in the instant case be extended so that they could amend their complaint to name Teva as a defendant, conduct additional discovery related to the acquisition, and pursue summary judgment on the basis of res judicata and/or collateral estoppel. (D.I. 128). On December 8, 2016, I issued an order denying the request to postpone the trial, but allowing Plaintiffs to file an amended complaint and granting Plaintiffs a two-month period in which to conduct fact discovery related to the acquisition. (D.I. 139).

Plaintiffs filed an amended complaint naming five Actavis entities and Teva as defendants, which included a new Count VII seeking a declaratory judgment that all defendants were precluded from litigating the validity of the '779 patent on the basis of the Court's decision in Civ. Act. No. 14-1389. (D.I. 140). The Actavis Defendants and Defendant Teva separately moved to dismiss Count VII on the bases that Plaintiffs had not plead privity of the parties or identical causes of action and/or issues. (D.I. 147). The Court granted the motion to dismiss Count VII as to all defendants on the basis that claim and/or issue preclusion did not provide an independent basis for relief. (D.I. 172).

This case concerns two molecules. The first is 14-hydroxydihydromorphinone, also referred to as "oxymorphone" or "oxymorphone HCl."[1] The other is 14-hydroxymorphinone, also referred to as "oxymorphone ABUK." ABUK, which stands for alpha,beta-unsaturated ketones, is a term used to describe a double bond between the alpha and beta carbons in a ketone. (Trial Transcript ("Tr.") at 37:14-38:6). The difference between oxymorphone and oxymorphone ABUK, then, is that oxymorphone is saturated, meaning there is only a single bond between the alpha and beta carbons. Oxymorphone ABUK is considered a precursor of oxymorphone because it can be made into oxymorphone by adding a hydrogen, resulting in a single bond. (Tr. 76:19-79:19).

Oxymorphone is an opioid that has been known and used as a pain reliever for over fifty years. (Tr. 34:8-14). Prior to 2002, manufacturers of oxymorphone were aware of the impurity now known as oxymorphone ABUK. (Tr. 222:12-21). During the period before 2002, manufacturers regularly sold oxymorphone HCl with oxymorphone ABUK levels in the range of

[1] Oxymorphone and oxymorphone HCl are actually different compounds, in that the latter is a salt formed when chloride is added. In this opinion, however, they are used interchangeably, as the key distinction in this case is between oxymorphone ABUK and oxymorphone without the ABUK double bond.

thousands of parts per million ("ppm"). (Tr. 329:7-14). In 2002, the FDA informed Mallinckrodt and several other manufacturers that it was concerned about the levels of ABUK in certain products. (Tr. 223:7-225:10). The FDA informed Mallinckrodt that it intended to impose limits on the levels of ABUK, and that it might require limits as low as 0.001 percent (or 10 ppm) ABUK. (*Id.*). In 2004, the FDA mandated that opioid manufacturers lower the levels of ABUK in opioid pharmaceuticals to less than 10 ppm. (Tr. 224:16-19). For the purposes of this opinion, oxymorphone HCl which contains less than 10 ppm of oxymorphone ABUK—and thus complies with FDA's mandate—will be referred to as "low-ABUK oxymorphone."

In 2005, Mallinckrodt succeeded in reaching the low ABUK levels mandated by the FDA for oxymorphone HCl. Mallinckrodt applied for a patent on its new low-ABUK oxymorphone product. The application ultimately issued as the '779 patent. The asserted claims of the '779 patent[2] are all product claims directed to low-ABUK oxymorphone.

Independent claim 1 of the '779 patent reads:

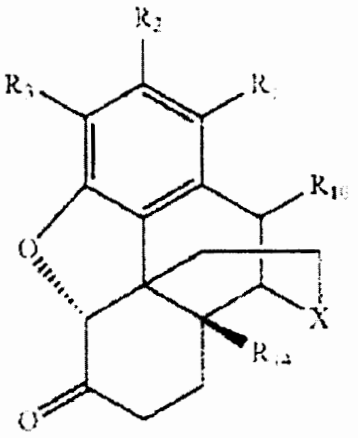
> A hydrochloride salt of oxymorphone comprising less than 0.001% of 14-hydroxymorphinone.

('779 patent, claim 1). Dependent claim 2 limits the level of 14-hydroxymorphinone to less than 0.0005%. (*Id.* at claim 2). Dependent claim 3 claims a pharmaceutically acceptable form of the hydrochloride salt in claim 1. (*Id.* at claim 3). Independent claim 4 reads:

> A hydrochloride salt of a morphinan-6-one compound corresponding to Formula (2):

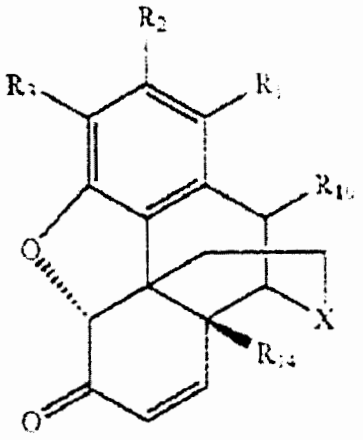
[2] Plaintiffs assert that all six claims of the '779 patent are infringed.

(2)



comprising less than 0.001% measured by HPLC of an α,β-unsaturated ketone compound corresponding to Formula (3):

(3)



wherein the morphinan-6-one compound is oxymorphone and wherein X is —N(R_{17})—;
R_1 and R_2 are hydrogen;
R_3 is hydroxy;
R_{10} is hydrogen;
R_{14} is hydroxy; and
R_{17} is methyl.

(*Id.* at claim 4). Dependent claim 5 limits the level of 14-hydroxymorphinone to 0.0005%. (*Id.* at claim 5). Dependent claim 6 claims a pharmaceutical formulation of the oxymorphone chloride in claim 4. (*Id.* at claim 6).

The Court held a bench trial on February 21-23, 2017. The Actavis Defendants concede that their proposed products meet all limitations of the '779 patent. (D.I. 170-1 at 2). The Actavis Defendants argue that the '779 patent is invalid as obvious, anticipated, and lacking written description.[3]

I. COLLATERAL ESTOPPEL

Plaintiffs have raised, and I have rejected, a variety of preclusion arguments twice since Defendants notified the court of Teva's acquisition of Actavis. (D.I. 128, 139, 140, 171). In post-trial briefing, Plaintiffs again assert that all Defendants are collaterally estopped from challenging validity on the basis of the judgment entered against Teva in Civ. Act. No. 14-1389.

Collateral estoppel requires a finding that "(1) the identical issue was previously adjudicated; (2) the issue was actually litigated; (3) the previous determination was necessary to the decision; and (4) the party being precluded from relitigating the issue was fully represented in the prior action." *Raytech Corp. v. White*, 54 F.3d 187, 190 (3d Cir. 1995).

Plaintiffs argue that because obviousness was tried in the earlier case and obviousness is "the only remaining validity issue" in the instant case, the identical issue element of collateral estoppel is met. (D.I. 199 at 11). Plaintiffs assert that this is the only dispute as to whether collateral estoppel applies to bar Defendant Teva from challenging the validity of the '779 patent. (*Id.*). According to Plaintiffs, "validity is a single, overarching issue for collateral estoppel purposes." (*Id.* at 12).

Defendants first respond that Defendant Teva did not contest validity at trial. (D.I. 216 at 9). Plaintiffs seize on this as a purported admission that mandates judgment as a matter of law of

[3] Plaintiffs have also filed a Motion for Leave to File a 5-Page Surreply in Response to New Arguments in Defendants' Post-Trial Reply Brief. (D.I. 228). Because I find that Defendants have raised at least one new argument in their reply brief, I will grant Plaintiffs' motion and consider the arguments made in the surreply.

non-obviousness against Defendant Teva. (D.I. 220 at 6). I disagree. The ANDA at issue in this case, the filing of which represents the act of infringement providing the jurisdictional basis for this suit, was filed not by Defendant Teva, but by the Actavis Defendants. Therefore, Plaintiffs' argument that Defendant Teva is collaterally estopped from doing anything first requires a finding that Defendant Teva and the Actavis Defendants are the same party.

I do not think Plaintiffs have demonstrated the requisite privity between Defendant Teva and the Actavis Defendants to invoke collateral estoppel to preclude any Defendant from challenging the validity of the '779 patent. The Actavis Defendants were not a party to the earlier suit, were not represented in that suit, and did not participate in that litigation. Furthermore, the ANDA that provides the jurisdictional basis for this suit is different from the ANDA being challenged in the previous suit and each of these two ANDAs were filed by different parties. I fail to see how I could preclude the Actavis Defendants from challenging the validity of this patent on the basis that a different party, who happened to acquire the Actavis Defendants long after this suit was filed, previously litigated the validity of the patent. This is not a case of Defendant Teva getting a second opportunity to challenge validity. Rather, it is a case of the Actavis Defendants getting their own opportunity to litigate their own suit predicated on their own ANDA. I hold that the Actavis Defendants are not collaterally estopped from litigating the validity of the '779 patent. As Defendant Teva did not present evidence at trial challenging the validity of the '779 patent, there is no reason to apply collateral estoppel as to Defendant Teva.

II. DATE OF INVENTION

Before I can determine whether Defendants' asserted references are prior art to the '779 patent, I must first determine the invention date of each of the claims. The provisional

application which ultimately matured into the '779 patent was filed on March 2, 2006, and this is the priority date referenced on the face of the patent. At trial, Plaintiffs presented evidence they claim establishes that the invention was conceived of and reduced to practice no later than February 2, 2005. (Tr. 616:18-618:11). As part of their invalidity case, Defendants presented the Casner reference. (Tr. 119:16-121:6). Casner is a U.S. Patent Application filed on September 23, 2005. (DTX-008). Plaintiffs do not dispute that Casner qualifies as prior art unless Plaintiffs can establish conception and reduction to practice prior to September 23, 2005.

As an initial matter, I note that Defendants incorrectly state the burden of proof for establishing conception and reduction to practice. Defendants assert that it is the Plaintiffs' burden to prove the earlier priority date. (D.I. 201 at 42). This is incorrect. Defendants rely on *PowerOasis* as support for the proposition that the "burden is on patentee to prove earlier priority date once prior art is identified." (*Id.* (citing *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1305-06 (Fed. Cir. 2008))). Defendants misstate the Federal Circuit's holding in *PowerOasis*. The court stated that once the challenger had "established by clear and convincing evidence" that the asserted reference qualified as prior art, "the burden was on [Plaintiff] to come forward with evidence to the contrary." *PowerOasis, Inc. v. T-Mobile USA, Inc.*, 522 F.3d 1299, 1305 (Fed. Cir. 2008). As the court later clarified, *PowerOasis* does not mean the patentee has the burden of persuasion; rather, the patentee has only a burden of production. *Tech. Licensing Corp. v. Videotek, Inc.*, 545 F.3d 1316, 1329 (Fed. Cir. 2008). As the court explained,

> once a challenger (the alleged infringer) has introduced sufficient evidence to put at issue whether there is prior art alleged to anticipate the claims being asserted, prior art that is dated earlier than the apparent effective date of the asserted patent claim, the patentee has the burden of going forward with evidence and argument to the contrary

Id. Once Plaintiffs meet their burden of production, the burden shifts back to Defendants to

prove by clear and convincing evidence that Plaintiffs are not entitled to the earlier date of invention. *Id.* at 1327-28.

Defendants do not contest conception, but, rather, contend only that Plaintiffs did not establish reduction to practice by February 2, 2005. (D.I. 201 at 42). Reduction to practice is a question of law "based on subsidiary factual findings." *Teva Pharm. Indus. v. AstraZeneca Pharm. LP*, 661 F.3d 1378, 1381 (Fed. Cir. 2011). Reduction to practice requires the inventor demonstrate that he "(1) constructed an embodiment or performed a process that met all the claim limitations and (2) determined that the invention would work for its intended purpose." *Teva Pharm.*, 661 F.3d at 1383. "An inventor need not understand precisely why his invention works in order to achieve an actual reduction to practice." *Id.*

As to the chemical composition claims, claims 1, 2, 4, and 5, Defendants argue that Plaintiffs did not have in February 2005 "a workable invention that was suitable for its intended purpose of reducing ABUK levels in oxymorphone HCl to less than 10 or less than 5 ppm." (D.I. 201 at 43). At trial, Plaintiffs presented the results of experiments designed "to remove the oxymorphone ABUK." (Tr. 362:8-22). The analysis Plaintiffs presented was dated February 2, 2005. (Tr. 364:14-22; JTX-23 at 108). Plaintiffs' expert, Dr. Buehler, described experiments and analysis of a research sample which were recorded in dated and signed lab notebooks, the results of which showed "that the sample had less than five parts per million of the ABUK in question." (Tr. 362:23-365:1; PTX-223 at 6; JTX-23 at 106, 108).

Dr. Buehler reached this conclusion by analyzing the results of the experiments in conjunction with his knowledge of the sensitivity of the instrument used to measure the ABUK impurities. The lab notebook Plaintiffs presented states that no ABUK was detected. (JTX-23 at 108). Plaintiffs presented evidence that the mass spectrometer instrument used to perform the

analysis could detect ABUK levels at least as low as five ppm. (Tr. 477:8-14, JTX-52 at MAL-OPA0043288-290). Plaintiffs also presented additional validation studies confirming the sensitivity of the instrument and also confirming the ABUK levels in the research sample were less than five ppm. (Tr. 480:20-482:20; JTX-52 at MAL-OPA0043281, MAL-OPA0043290).

At trial, Defendants attempted to rebut this evidence by presenting calculations made by their expert, Dr. Gokel. (Tr. 185:18-186:21). Dr. Gokel concluded that the data Plaintiffs rely on to show that they produced a sample of oxymorphone with less than five ppm of ABUK impurities was unreliable. (*Id.*). Plaintiffs countered by showing that Dr. Gokel had made an error in his calculations and that the same calculations made without the error lead to the conclusion that the data was, in fact, reliable. (Tr. 625:23-628:24). Defendants chose not to rebut this testimony and appear to have abandoned their argument that the data from these experiments were unreliable.

Instead, Defendants assert that the experiments Plaintiffs rely on were unreliable because these experiments used a "decomposed sample of sodium hydrosulfide" and were later abandoned as being "unworkable." (D.I. 201 at 43). I am not persuaded. The decomposed sodium hydrosulfide contained a different compound, bisulfite, which is actually responsible for lowering ABUK levels. (D.I. 215 at 18). Plaintiffs do not contest the fact that bisulfite is the key to lowering ABUK in oxymorphone, nor do they contest the fact that the experiments they rely on used what the experimenters believed to be sodium hydrosulfite. (Tr. 372:15-374:12; D.I. 215 at 18). Plaintiffs presented expert testimony, supported by lab notebooks detailing experiments and analysis, that supports a conclusion that the inventors knew, at least as early as 2004, that bisulfite was the active agent in lowering ABUK. (Tr. 367:7-369:6; 408:4-22). I think this is sufficient to establish that the inventors had produced oxymorphone HCl with less

than five ppm of oxymorphone ABUK and knew how to reproduce that result. I find that the date of invention for claims 1, 2, 4, and 5 of the '779 patent is February 2, 2005.

Claims 3 and 6 of the '779 patent claim "[a] pharmaceutically acceptable form" and "[a] pharmaceutical formulation" of oxymorphone HCl, respectively. Defendants argue that even if Plaintiffs establish a date of invention of February 2, 2005 for the low-ABUK oxymorphone HCl, claims 3 and 6 require additional elements and Plaintiffs have not shown that "their crude sample of oxymorphone HCl" met those additional limitations. (D.I. 201 at 44). Plaintiffs counter that they presented evidence that the February 2, 2005 sample "met FDA purity requirements" for an active pharmaceutical ingredient. (D.I. 215 at 19). I think this is sufficient. "Reduction to practice . . . does not require actual use, but only a reasonable showing that the invention will work to overcome the problem it addresses." *Scott v. Finney*, 34 F.3d 1058, 1063 (Fed. Cir. 1994). Pharmaceutical formulations involving oxymorphone HCl existed in the art prior to 2005. The novelty of Plaintiffs' invention lies only in the reduced levels of ABUK impurities. Plaintiffs established that they possessed the low-ABUK oxymorphone HCl of sufficient purity for use in a pharmaceutical formulation on February 2, 2005. I find this is sufficient to establish an invention date of February 2, 2005 for claims 3 and 6 of the '779 patent.

III. OBVIOUSNESS

Defendants argue that claims 1-6 of the '779 patent are invalid as obvious over the prior art. Specifically, Defendants argue that a person of ordinary skill in the art would have been able to use routine methods known in the art to produce low-ABUK oxymorphone at the levels required by the FDA mandate. (*Id.* at 21). Defendants present three "commonplace organic techniques" that they contend could be performed by "any graduate student" to produce low-ABUK oxymorphone: 1) catalytic hydrogenation of the ABUK impurities; 2) sulfur addition to

separate out the ABUK impurities; and 3) O-demethylation of low-ABUK oxycodone into low-ABUK oxymorphone. (*Id.*).

A. Legal Standard

A patent claim is invalid as obvious "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). The determination of obviousness is a question of law with underlying factual findings. *See Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1359-60 (Fed. Cir. 2012). "The underlying factual inquiries include (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; (3) the level of ordinary skill in the art; and (4) any relevant secondary considerations . . . ." *Western Union Co. v. MoneyGram Payment Sys., Inc.*, 626 F.3d 1361, 1370 (Fed. Cir. 2010) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966)).

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*, 383 U.S. at 17-18; *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). Secondary considerations of nonobviousness are important because they "serve as insurance against the insidious attraction of the siren hindsight...." *W.L. Gore & Assocs., Inc. v.*

Garlock, Inc., 721 F.2d 1540, 1553 (Fed. Cir. 1983).

A patentee is not required to present evidence of secondary considerations. *See Prometheus Labs., Inc. v. Roxane Labs., Inc.*, 805 F.3d 1092, 1101 (Fed. Cir. 2015). That said, if the patent challenger establishes a prima facie case of obviousness, "the patentee would be well advised to introduce evidence sufficient to rebut that of the challenger." *Id.* (quoting *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1360 (Fed. Cir. 2007)). There must be enough evidence, however, for a finding that a given secondary consideration exists by a preponderance of the evidence. *See Apple, Inc. v. Samsung Elec. Co., Ltd.*, 839 F.3d 1034, 1053 (Fed. Cir. 2016) (en banc). If there is, then the probative value of each secondary consideration will be considered in light of the evidence produced. That does not mean, though, that the burden of persuasion on the ultimate question of obviousness transfers to the proponent of the secondary consideration. *Pfizer, Inc.*, 480 F.3d at 1359. That burden stays always with the patent challenger. *Id.* at 1359–60.

A party asserting that a patent is invalid as obvious must "show by clear and convincing evidence that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so." *Pfizer, Inc. v. Apotex, Inc.*, 480 F.3d 1348, 1361 (Fed. Cir. 2007). That "expectation of success need only be reasonable, not absolute." *Id.* at 1364. "Whether an ordinarily skilled artisan would have reasonably expected success . . . . is measured as of the date of the invention[] . . . ." *Amgen Inc. v. F. Hoffman-La Roche Ltd*, 580 F.3d 1340, 1362 (Fed. Cir. 2009).

B. Findings of Fact

1. The level of ordinary skill in the art is either (1) a person with a Ph.D. in organic

chemistry, medicinal chemistry, or a closely related field, and several years of experience in organic synthesis; or (2) a person with a lesser degree in one of these fields, but commensurately greater experience.

2. Casner and the FDA communications are not prior art.

3. Weiss, Chapman, and Rapoport are prior art.

4. Weiss, Chapman, and Rapoport do not teach a person of ordinary skill in the art how to produce low-ABUK oxymorphone.

5. There was no simultaneous invention of low-ABUK oxymorphone.

6. Low-ABUK oxymorphone would not have been obvious to a person of ordinary skill in the art.

C. Conclusions of Law

1. Scope and Content of the Prior Art

i. The FDA Communications

Defendants offer as prior art three documents that represent confidential communications between the FDA and Mallinckrodt, Noramco, and Johnson Matthey. (DTX-242, 138, 134). These communications summarize meetings held between the FDA and each of these companies at which the parties discussed the FDA's mandate that ABUK impurities in oxycodone and oxymorphone be reduced to less than ten ppm. Defendants contend that these private, confidential communications qualify as § 102(b) prior art "because they were disseminated to the interested public." (D.I. 219 at 6).[4] I disagree. To establish that these documents are prior art,

[4] Defendants also argue that the mandate qualifies as prior art under §§ 102(a) & (f) because "the inventors obtained the concept of low-ABUK oxymorphone from the FDA communication before they did any of their own work." (D.I. 219 at 6). I am not persuaded. If someone declares a desire to have a product that has a particular characteristic, but does nothing to provide any teachings on how to achieve that goal, that person has not contributed to the prior art. Defendants additionally point to the court's discussion of the FDA mandate in a different suit as evidence that these communications are § 102(b)

Defendants must prove, by clear and convincing evidence, facts showing that the documents meet the requirements of § 102(b). *N. Telecom, Inc. v. Datapoint Corp.*, 908 F.2d 931, 936 (Fed. Cir. 1990). Defendants established only that confidential communications were sent to three interested parties; this is not sufficient to make the documents "generally available" as required for them to be § 102(b) prior art. *Id.*

Even if I were to find these communications to qualify as prior art, their relevance is dubious at best. At most, these communications disclose a directive from the FDA that ABUK impurities in oxycodone and oxymorphone be reduced. These communications do not disclose how to achieve this result, nor do they disclose that this result had ever been achieved in the past. The focus of the communications is on the reason for the mandate, the mutagenic properties of ABUK impurities, and discussions of how the FDA would assess the impurity levels. There is simply no disclosure of anything substantive relevant to obviousness in these communications.

ii. Casner

The parties dispute whether Casner is prior art. Casner is a U.S. Patent Application filed on September 23, 2005. (DTX-8 at cover). Since I have already determined that all of the claims of the '779 patent are entitled to an invention date of February 2, 2005, I find that Casner does not qualify as prior art.

iii. Weiss

Weiss generally describes the process of hydrogenating oxymorphone ABUK, thereby converting it into oxymorphone HCl. (JTX-3). Weiss does not provide all of the reaction conditions required to reproduce the described reaction. (Tr. 540:4-14; *see also* JTX-3 at p. 1507). Specifically, Weiss lacks details about hydrogen pressure, amount of acid, amount and

---

prior art. (D.I. 201 at 21). I reject Defendants' attempt to use the opinion from a different case as factual evidence in this case.

composition of catalyst, and reaction time.[5] (*Id.*). Weiss discloses "pure" oxymorphone obtained by catalytic hydrogenation of 14-hydroxymorphinone. (Tr. 86:22-89:12; JTX-3 at 1507). It is undisputed, however, that Weiss does not quantify the amount of oxymorphone ABUK or other impurities remaining after hydrogenation. (Tr. 89:13-19, 542:21-543:1; *see also* JTX-3 at p. 1507). Weiss used a melting point analysis for determining the level of impurities present in the sample, a technique that was not capable of determining ABUK levels of ten ppm or lower. (Tr. 204:14-206:13, 504:5-505:10, 506:1-22, 527:7-18; JTX-3 at p. 1507; PTX-30 at p. 396). Weiss also teaches that oxymorphone ABUK and oxycodone ABUK have significant reactivity differences. (Tr. 550:15-552:18; JTX-3 at p. 1506). Between the publication of Weiss in 1957 and the date of invention in 2005, no other prior art reference mentioned hydrogenation of oxymorphone ABUK. (Tr. 527:19-24).

iv. Chapman

The parties dispute whether the Chapman reference is prior art. The Chapman reference is a United States patent application filed on March 30, 2005. (DTX-9 at cover). Chapman claims the benefit of the filing date of a provisional application filed on March 30, 2004. (*Id.*).

Defendants argue that Chapman qualifies as 35 U.S.C. § 102(e) prior art. That section provides that "an invention described in . . . an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent" is prior art. Since § 102(e) requires that the application predate "the invention," a patentee may "swear behind" a potential § 102(e) reference. Plaintiffs contend that under Defendants' obviousness theory, the claims of the '779 patent are entitled to a priority date of March 12,

[5] Defendants do not contest the fact that Weiss lacks these parameters. Defendants' expert, Dr. Gokel, opined that these were all "relatively standard" conditions and that a person of ordinary skill "could easily adjust the pH change to see if that was too acidic or not." (Tr. 89:20-90:18).

2004, when the inventors first produced low-ABUK oxycodone HCl. (D.I. 215 at 40). I am not persuaded by Plaintiffs' argument that a patent claim's priority date depends on the particular obviousness theory espoused by the patent's challenger. I have already determined that claims 1-6 of the '779 patent are entitled to a priority date of February 2, 2005. Since Chapman has a priority date of at least as early as March 30, 2004, Chapman qualifies as prior art.

Chapman does not discuss oxymorphone. Instead, Chapman describes a process for using hydrogenation to convert 14-hydroxycodeinone ("oxycodone ABUK") into oxycodone using a "double hydrogenation" process. (Tr. 92:3-21, 528:1-529:14). This process involves an initial step of hydrogenating oxycodone ABUK, resulting in oxycodone which still contains relatively high levels of oxycodone ABUK. (Tr. 529:1-4; DTX-9 at fig. 1, ¶ 13). Then, the oxycodone product from the first step is hydrogenated again under specific parameters, producing oxycodone with less than 25 ppm of oxycodone ABUK. (Tr. 529:5-14; DTX-9 ¶ 20).[6]

iv. Rapoport

The Rapoport reference is an article published in the Journal of the American Chemical Society in 1967. (DTX-421). Rapoport discloses the use of bisulfite addition to remove ABUK impurities. (Tr. 133:13-134:5; DTX-421 at p. 1942). Sulfur addition is a method that allows the ABUK impurities to be separated from the fully saturated compound by taking advantage of differences in solubility. (Tr. 134:12-135:9; DTX-421 at p. 1942). Once the solubility difference has been achieved, another method must be used to separate the saturated compound from its ABUK; Rapoport teaches the use of extraction to accomplish this. (Tr. 135:22-136:6).

Rapoport does not address the use of this method to separate ABUK impurities in

[6] Chapman also states that the process may reduce the levels of oxycodone ABUK to below 15 ppm, 10 ppm, or 5 ppm. (DTX-9 ¶ 16). In Example 3, Chapman stated that two different analytical methods showed levels of oxycodone ABUK at 5 ppm and 10 ppm. (Tr. 96:15-97:8; DTX-9 ¶¶ 197-98).

oxymorphone. (Tr. 531:11-14, 531:19-24). In fact, all of the examples discussed in Rapoport involve anisoles, such as oxycodone; unlike oxycodone, oxymorphone is not an anisole. (Tr. 531:4-10). Rapoport also does not report the precise level of impurities remaining at the end of the extraction, but indicates that the method is of limited effectiveness, as up to 25% of the ABUK impurities will remain after separation. (Tr. 141:6-11, 600:4-10; DTX-421 at p. 1945).

2. Comparing Prior Art and Claimed Subject Matter

Defendants first argue that it would have been obvious to a person of ordinary skill in the art to use catalytic hydrogenation to selectively hydrogenate the double bond in oxymorphone ABUK to form saturated oxymorphone. (D.I. 201 at 22). Defendants' expert, Dr. Gokel, opined that a catalytic hydrogenation reaction, like the type of reaction disclosed in Weiss, would result in reduction of ABUK impurities in oxymorphone to extremely low levels if driven to completion. (*Id.*; Tr. 82:3-84:3; DTX-164 at p. 607).

Dr. Gokel further opined that Chapman confirmed that catalytic hydrogenation could result in ABUK levels less than five ppm. (D.I. 201 at 23; Tr. 92:13-97:16; DTX-9 at ¶¶16, 22, 191-98). According to Defendants, a critical aspect of the Chapman reference was the identification of the reappearing ABUK problem, wherein diols, byproducts of the opioid synthesis, dehydrate in the presence of acid to form additional ABUK. (D.I. 201 at 23; Tr. 99:3-100:12; DTX-9 at ¶13, Fig. 2). According to Dr. Gokel, since oxymorphone ABUK and its diol react in the same way as oxycodone ABUK and its diol, Chapman's solution to the reappearing ABUK problem, removing the diol by dehydrating it to ABUK at the outset of the reaction, could be applied to achieve low-ABUK oxymorphone. (Tr. 99:21-101:24; DTX-9 at ¶¶ 61, 62).[7]

Plaintiffs respond that while Weiss "discloses the general concept of hydrogenating

[7] Defendants also argue that Casner confirms the solution to the diol problem described in Chapman. (D.I. 201 at 25). As I have determined that Chapman is not prior art, I will not address this argument.

oxymorphone ABUK to form oxymorphone," it does not disclose several "key reaction conditions." (D.I. 215 at 21; Tr. 526:17-23; 527:19-24). Plaintiffs also point out that Weiss does not disclose the level of ABUK impurities in the final product. (D.I. 215 at 21; Tr. 527:7-18). Plaintiffs' expert, Dr. Davies, explained that a person of ordinary skill would have read Weiss to teach that oxymorphone ABUK is easily converted to its diol form and that the diol could be converted back into oxymorphone ABUK under the hydrogenation reaction conditions. (Tr. 561:4-562:1). Dr. Davies opined that a person of ordinary skill would have expected some conversion of oxymorphone diol to oxymorphone ABUK to occur in many of the reaction steps Defendants' expert, Dr. Gokel, proposed for producing low-ABUK oxymorphone under the teachings of Weiss. (Tr. 563:8-564:3).

Plaintiffs also argue that Chapman does not render low-ABUK oxymorphone obvious because it is directed to a different compound, oxycodone and its ABUK, and discloses a different process, double hydrogenation, not the single hydrogenation of Weiss. (D.I. 215 at 22; DTX-9 at Fig. 1, ¶¶ 13, 20; Tr. 528:1-529:14). As to Defendants' assertion that Chapman "solved" the reappearing ABUK problem, Dr. Davies opined that Chapman did not disclose how to completely remove diol from oxycodone. (Tr. 567:24-568:6). In fact, Dr. Davies explained that Chapman's experiment resulted in 400 ppm of oxycodone diol remaining after the second hydrogenation step ran for almost twenty-two hours. (Tr. 567:2-23; DTX-9 at ¶ 192). According to Dr. Davies, therefore, a person of ordinary skill would not view Chapman as teaching how to remove diols or to produce low-ABUK oxycodone. (Tr. 567:2-568:6).

I find Dr. Davies testimony credible and more convincing than Dr. Gokel's testimony. It seems to me that even if a person of ordinary skill would view the oxycodone art as informative in researching possible solutions to reducing ABUK levels in oxymorphone, he would not find a

definitive solution in Chapman. Much of Dr. Gokel's testimony was hypothetical and, it seems to me, was colored by impermissible hindsight bias. His assertion that the reaction in Chapman could simply be run to completion in order to remove more diols is not credible in light of Dr. Davies' explanation of what would happen if the experiment were allowed to run for an extended period of time. Dr. Davies explained that the longer the experiment runs, "the slower the reaction to remove the last bit of the material is going to be." (Tr. 570: 18-21). Running the experiment for longer allows for side reactions to compete with the primary reaction and then "you'll start to hydrogenate other parts of the molecule and introduce other material." (Tr. 571:1-2). According to Dr. Davies, "If you run it forever, then you'll have – you won't have any product you want left at all." (Tr. 571:2-4). I find Dr. Davies explanation credible and believe that a person of ordinary skill in the art would have understood that it would not be feasible to simply run the reaction to completion as Dr. Gokel suggested.

Defendants' second argument is that a person of ordinary skill would have known to try sulfur addition and separation as a method of producing low-ABUK oxymorphone. (D.I. 201 at 27). Dr. Gokel explained that Rapoport taught that this method could be used to separate hydrocodone from its ABUK. (Tr. 133:13-136:23; DTX-421 at p. 1942). Dr. Gokel opined that a person of ordinary skill could have combined Rapoport's bisulfite separation method with either extraction, precipitation, or chromatography, all of which were well-known in the art, to achieve separation. (Tr. 145:21-146:19). Defendants contend that the viability of this method for producing low-ABUK oxymorphone was confirmed in 2014 when Johnson Matthey's subsidiary MacFarlan Smith used bisulfite addition to produce oxycodone with zero ppm ABUK impurity. (D.I. 201 at 27).[8]

[8] Defendants assert that a finding of fact from the European Opposition Division should be admissible to show "how a POSA views a piece of prior art." (D.I. 201 at 28 n.26). I disagree. As discussed at trial,

Plaintiffs respond that all of the examples disclosed in Rapoport involve anisole compounds, such as oxycodone. (D.I. 215 at 33-34; Tr. 598:4-5). Oxymorphone is a phenol, not an anisole. (Tr. 550:21-551:12). Plaintiffs further argue that Rapoport does not provide purity levels and there is no evidence that Rapoport, or anyone since, used this method to achieve ABUK levels below ten or five ppm. (D.I. 215 at 34; Tr. 598:8-9, 605:1-5). Plaintiffs contend that Rapoport teaches away from using the bisulfite addition method because it discloses that "approximately 25% of the ABUK will partition with the saturated ketone." (D.I. 215 at 34; Tr. 599:23-600:10). Dr. Davies testified that this was "not a very good partition ratio." (Tr. 600:9-10). Plaintiffs note that Defendants did not provide a single example where bisulfite extraction was used to achieve ABUK levels in any compound below ten ppm. (D.I. 215 at 34).

Plaintiffs also argue that a person of ordinary skill would not reasonably have expected that combining bisulfite addition with extraction, precipitation, or chromatography would produce low-ABUK oxymorphone. (D.I. 215 at 34). Rapoport only discloses bisulfite addition combined with extraction. (Tr. 598:6-7). According to Plaintiffs, Defendants have not provided any "detail about why a POSA would have been motivated to combine Rapoport with these other technologies and how, or indeed if, the combination . . . would work in practice." (D.I. 215 at 34-35).

I agree with Plaintiffs. As an initial matter, I do not think Rapoport teaches that low-ABUK oxymorphone can be achieved through bisulfite addition combined with extraction. It seems to me that the poor partition ratio, combined with the lack of any examples of this method being used successfully, would not inform a person of ordinary skill that this was a promising

---

the fact-finding body in question operates under a different standard of proof than the clear and convincing standard that applies here. (Tr. 155:22-156:8). I declined to admit this document into evidence at trial and my opinion on its relevance has not changed. (Tr. 156:11-19).

method. Furthermore, I find Dr. Gokel's suggestion that it would have been obvious to a person of ordinary skill to combine Rapoport with precipitation or chromatography to be purely hypothetical. There is no evidence that anyone ever combined these methods prior to the invention date and Dr. Gokel himself never did any experiments to show that they would work; he merely opined that a person of ordinary skill would have thought to try it and would have expected it to work. Given the substantial evidence Plaintiffs presented that Rapoport disclosed such a poor partition profile, coupled with Dr. Davies' testimony that a person of ordinary skill would not have thought to combine Rapoport with precipitation or chromatography, it seems to me that Dr. Gokel's suggestion lacks credibility.

Defendants' only evidence that the technique purportedly worked is the experiment performed by Macfarlan Smith. This experiment, however, was performed on oxycodone, not oxymorphone, and Dr. Davies testified that there was no evidence that the experiment achieved ABUK reduction below ten ppm, as the instrumentation used to make the measurements was not disclosed. (Tr. 663:22-666:11). Furthermore, there is no evidence of record that shows the details of how this experiment was performed, i.e., whether the experimenter coupled bisulfite addition with precipitation, for example. (Tr. 667:23-668:5). I do not think this single experiment on a different compound indicates that Dr. Gokel's hypothetical processes would have been obvious to a person of ordinary skill in the art.

Defendants' third argument is that a person of ordinary skill in the art would have known that oxycodone could be converted to oxymorphone using O-demethylation, a process that was known in the prior art. (D.I. 201 at 29; Tr. 159:8-13). Since low-ABUK oxycodone was in the prior art, Defendants contend that a person of ordinary skill in the art would have known to use O-demethylation to convert low-ABUK oxycodone into low-ABUK oxymorphone. (D.I. 201 at

29). Defendants further contend that Mallinckrodt successfully used this process to produce oxymorphone having only six ppm of oxymorphone ABUK. (*Id.* at 30; Tr. 262:6-265:18).

Plaintiffs respond that the Mallinckrodt experiments are not confirmation of low-ABUK oxymorphone for at least two reasons. First, Plaintiffs note that Defendants rely on prior art oxycodone references in which the low-ABUK oxycodone was made using hydrogenation. (D.I. 215 at 36). The low-ABUK oxycodone used in the Mallinckrodt experiment, on the other hand, "was produced using Mallinckrodt's proprietary sulfur chemistry and therefore was not in the prior art." (*Id.*). Plaintiffs contend that the different processes result in different impurities and, therefore, the impurity profile of the starting material was not representative of the impurity profile of the prior art oxycodone on which Defendants rely. (*Id.* at 37).

I agree with Plaintiffs that the starting material matters in evaluating whether a person of ordinary skill would have found low-ABUK oxymorphone obvious because O-demethylation was available as a known method for converting oxycodone into oxymorphone. The person of ordinary skill at the time of invention would not have had access to the low-ABUK oxycodone Mallinckrodt used. As Plaintiffs point out, the prior art low-ABUK oxycodone had a different impurity profile that would result in differences in the final product of an O-demethylation reaction. Therefore, Mallinckrodt's experiment is not relevant to the obviousness analysis. This is significant because of the high quantities of diol present in the prior art low-ABUK oxycodone products that would be converted to ABUK during the O-demethylation process, resulting in more than ten ppm of oxymorphone ABUK in the final product. (Tr. 591:3-593:23).

Defendants' argument that a person of ordinary skill would have been able to eliminate the diol ABUK precursors at the outset to prevent this problem fails in light of the fact that there were no teachings in the prior art about how to eliminate diols. (D.I. 201 at 30; D.I. 215 at 38;

Tr. 567:10-14). It seems to me that Defendants' argument trivializes the many obstacles faced by the inventors in attempting to produce low-ABUK oxymorphone, is purely hypothetical in nature, and is also tinged with impermissible hindsight bias.

As to expectation of success, Defendants first argue that they need not prove reasonable expectation of success to prevail on their obviousness argument. (D.I. 201 at 31). Defendants further argue that reasonable expectation of success is probative of motivation. (*Id.*). I disagree on both points. The Federal Circuit has made clear that motivation to combine references and reasonable expectation of success are separate and distinct elements of the obviousness analysis: "one must have a motivation to combine accompanied by a reasonable expectation of achieving what is claimed in the patent-at-issue." *Intelligent Bio-Systems, Inc. v. Illumina Cambridge, Ltd.*, 821 F.3d 1359, 1367 (Fed. Cir. 2016).

Defendants cite to a single Federal Circuit case as support for their assertion that the FDA mandate can serve as motivation.[9] (D.I. 201 at 21 n.23). It is true "that FDA approval may be relevant to the obviousness inquiry." *Allergan, Inc. v. Sandoz, Inc.*, 726 F.3d 1286, 1291 (Fed. Cir. 2013). As defendants note, the Federal Circuit has stated that, "The potential for FDA approval also may properly be considered . . . in determining whether one of ordinary skill would be motivated to develop a drug product and whether there was skepticism regarding the efficacy

[9] Defendants also cite to a district court opinion from the Southern District of New York in support of their argument. (D.I. 201 at 21 n.23). Not only is this decision not binding precedent, Defendants overstate the court's findings. The court did not find only that the industry "had a reason to develop low-ABUK oxycodone" because of the possibility of regulatory action. *In re OxyContin Antitrust Litig.*, 994 F. Supp. 2d 367, 404 (S.D.N.Y. 2014), aff'd sub nom. Purdue Pharma L.P. v. Epic Pharma, LLC, 811 F.3d 1345 (Fed. Cir. 2016). The court did not state that this was anything more than generalized motivation or identification of a problem to be solved and did not purport to hold that the FDA communications in that case constituted prior art. *Id.* Nor did the court reference the FDA communications in its discussion of whether a person of ordinary skill would have been motivated to combine prior art references. *Id.* at 405-06. I find this case to be neither persuasive nor relevant to Defendants' argument.

of such a product." *Id.* at 1291-92. Defendant misconstrues the meaning of this statement by taking it out of context, however. The court was not referring to a directive from the FDA as a source of motivation. In *Allergan*, the court found that a prior art reference provided motivation to formulate a combination product composed of two commercially available drugs, "in order to increase patient compliance." *Id.* at 1291. The court found error with the trial court's conclusion that a person of ordinary skill would not have been motivated to pursue the particular drug combination at issue "because the FDA did not consider improving patient compliance as a factor in its approval decision." *Id.* (quoting *Allergan, Inc. v. Sandoz Inc.*, 818 F.Supp.2d 974, 1016 (E.D.Tex.2011)). The court concluded, "Motivation to combine may be found in many different places and forms; it cannot be limited to those reasons the FDA sees fit to consider in approving drug applications." *Id.* at 1292. In other words, the motivation in *Allergan* came from a prior art reference, not from the FDA.

Since the FDA mandate was nothing more than a directive and provided no substantive teachings on how to produce low-ABUK oxymorphone, it cannot serve as a "motivation to combine" in an obviousness analysis. The FDA mandate may have provided motivation for pharmaceutical companies to pursue this invention, but that could only be relevant in the context of the prior art. "[K]nowledge of a problem and motivation to solve it are entirely different from motivation to combine particular references." *Innogenetics, N.V. v. Abbott Labs.*, 512 F.3d 1363, 1373 (Fed. Cir. 2008). The FDA mandate provides nothing more than knowledge of the low-ABUK problem and motivation to solve it. It provides nothing substantive in the way of motivation to combine any prior art reference relevant to solving the problem.

Defendants also argue that the FDA mandate, coupled with the prior art references they presented at trial, together would have provided a person of ordinary skill with a reasonable

expectation of success. (D.I. 201 at 31-32). Defendants assert that "[t]he FDA does not issue unachievable directives." (*Id.* at 32). Defendants further argue that the fact that no one in the industry "protested the FDA's mandate" also demonstrates a reasonable expectation of success. (*Id.* at 34; Tr. 272:15-274:6).

I also do not think the FDA mandate provided a person of ordinary skill in the art with a reasonable expectation of success. Again, the communications from the FDA to the pharmaceutical companies were in the form of directives. These communications were not teachings and provided no substantive information about how the companies were to go about producing low-ABUK oxymorphone. In fact, the communications reveal that the FDA recognized the challenge the mandate posed for the companies. Simply because the companies did not protest the mandate does not, as Defendants argue, demonstrate a reasonable expectation of success. (D.I. 201 at 34).

3. Secondary Considerations

"[S]econdary considerations, when present, must be considered in determining obviousness." *Ruiz*, 234 F.3d at 667; *see also Cyclobenzaprine*, 676 F.3d at 1076 ("[E]vidence on these secondary considerations is to be taken into account *always*, not just when the decisionmaker remains in doubt after reviewing the art." (quoting *Cable Elec. Prods. v. Genmark, Inc.*, 770 F.2d 1015, 1026 (Fed. Cir. 1985))). Here, Plaintiff did not present any evidence on any secondary considerations. Defendants, however, argue that there is evidence of near-simultaneous invention by others in the industry. (D.I. 201 at 34). "Independently made, simultaneous inventions, made 'within a comparatively short space of time,' are persuasive evidence that the claimed apparatus 'was the product only of ordinary mechanical or engineering skill.'" *Geo. M. Martin Co. v. Alliance Mach. Sys. Int'l LLC*, 618 F.3d 1294, 1305 (Fed. Cir.

2010) (quoting *Concrete Appliances Co. v. Gomery*, 269 U.S. 177, 184 (1925)).

Defendants argue that the Dung patent confirms that catalytic hydrogenation works to achieve low-ABUK oxymorphone. (D.I. 201 at 25). Defendants agree that Dung is not prior art. (Tr. 696:5-6). Rather, Defendants argue that "[t]he Dung patent is evidence of near-simultaneous invention." (*Id.* at 26). Dung's priority date, December 14, 2006, post-dates the invention date of the '779 patent by almost two years. (DTX-16 at cover). Defendants argue that the invention claimed in the Dung patent was conceived of in January, 2006, or a little less than a year after the invention date of the '779 patent. (D.I. 219 at 17).

I do not think it matters whether the Dung patent is entitled to the earlier invention date. I do not think there was simultaneous invention under either invention date. It is true that the Federal Circuit has found simultaneous invention where the invention dates were separated by only about a year. *Geo. M. Martin Co.*, 618 F.3d at 1305. In that case, however, there was additional evidence of simultaneous invention by two other inventors, three and five years prior to the claimed invention's date of invention. *Id.* at 1305-06. As the Federal Circuit has cautioned, whether near simultaneous invention is an indication of obviousness must be considered in light of all of the circumstances. *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1460 (Fed. Cir. 1984). Here, it is clear that a number of different pharmaceutical companies were attempting to produce low-ABUK oxymorphone in order to comply with the FDA mandate. I do not think that the fact that one other company was successful in doing so either one or two years after Plaintiffs is persuasive evidence of "near simultaneous" invention. I find that there was no simultaneous invention of any of claims 1-6 of the '779 patent.

For the reasons given above, I find that Defendants have not met their burden of proving

by clear and convincing evidence that any of claims 1-6 of the '779 patent are obvious.

IV. ANTICIPATION

Defendants' sole anticipation argument is predicated on adoption of their proposed claim construction; if I adopt Plaintiffs' proposed construction, there can be no anticipation under Defendants' theory.[10] The term in question is "14-hydroxymorphinone." Claim 1 is representative and reads as follows:

> 1. A hydrochloride salt of oxymorphone comprising less than 0.001% of *14-hydroxymorphinone.*

('779 patent, claim1) (disputed term italicized).

A. Legal Standard

"It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). "'[T]here is no magic formula or catechism for conducting claim construction.' Instead, the court is free to attach the appropriate weight to appropriate sources 'in light of the statutes and policies that inform patent law.'" *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (quoting *Phillips*, 415 F.3d at 1324) (alteration in original). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). Of these sources, "the specification is always highly relevant to the claim construction

[10] At trial, Defendants presented a second anticipation argument based on Weiss's disclosure of "pure oxymorphone," which Defendants argued meant Weiss disclosed oxymorphone HCl with less than five parts per million of the ABUK impurity. (Tr. 42:2-21). Defendants failed to present this second argument in post-trial briefing. Therefore, this argument is deemed waived.

analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (internal quotation marks omitted).

"[T]he words of a claim are generally given their ordinary and customary meaning. . . . [Which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1312–13 (citations and internal quotation marks omitted). "[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent." *Id.* at 1321 (internal quotation marks omitted). "In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314.

When a court relies solely upon the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court's construction is a determination of law. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317–19 (internal quotation marks omitted). Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id.*

"A claim construction is persuasive, not because it follows a certain rule, but because it defines terms in the context of the whole patent." *Renishaw PLC v. Marposs Societa' per*

Azioni, 158 F.3d 1243, 1250 (Fed. Cir. 1998). It follows that "a claim interpretation that would exclude the inventor's device is rarely the correct interpretation." *Osram GMBH v. Int'l Trade Comm'n*, 505 F.3d 1351, 1358 (Fed. Cir. 2007) (citation and internal quotation marks omitted).

B. Discussion

Defendants argue that this term should be construed to mean, simply, 14-hydroxymorphinone, the ABUK of the oxymorphone base. (D.I. 201 at 36). Plaintiffs contend that "14-hydroxymorphinone," properly construed in the context of the patent, would be understood by a person of ordinary skill in the art to mean "14-hydroxymorphinone hydrochloride," the HCl salt form of 14-hydroxymorphinone. (D.I. 215 at 45).

Defendants contend that the intrinsic evidence supports their reading of this claim term. (D.I. 201 at 36). Specifically, Defendants point to Reaction Scheme 4 ('779 patent, col. 9-10) and Example 3 ('779 patent at 37:16-39). (D.I. 201 at 36). Plaintiffs respond that Reaction Scheme 4 is "directed to 14-hydroxymorphinone within oxymorphone free base" and does nothing to inform the meaning of 14-hydroxymorphinone within the oxymorphone salt. (D.I. 215 at 46). As to Example 3, Plaintiffs note that Defendants' own expert, Dr. Gokel, admitted that a person of ordinary skill in the art would understand the reference to "14-hydroxymorphinone (14-OHM) impurity," read in the context of the patent, to mean the hydrochloride salt of 14-hydroxymorphinone. (*Id.*; '779 patent at 37:24-25; Tr. 200:16-201:16).

Plaintiffs argue that a person of ordinary skill in the art would understand that the ABUK impurity found in oxymorphone HCl necessarily must be itself in the HCl salt form. (D.I. 215 at 45). Plaintiffs further argue that because the patent is directed to oxymorphone with reduced ABUK impurity levels, and because the ABUK impurity only exists in the salt form, and not in the free base form, the term must be read to mean "14-hydroxymorphinone hydrochloride" to

avoid "absurd result[s]." (D.I. 215 at 46). Plaintiffs point out that the specification omits "HCl" when describing ABUK impurities. (*Id.*). Plaintiffs further point out that Defendants' own prior art references omit "HCl" when describing ABUK impurities in opioid HCl compounds. (*Id.*).

I agree with Plaintiffs that a person of ordinary skill would understand "14-hydroxymorphinone" as used in the claims of the '779 patent to mean the HCl salt form. It seems clear to me that both parties' experts, as well as other experts in the field, sometimes omit "HCl" or "hydrochloride" when referring to the hydrochloride salt form of ABUK impurities in opioid hydrochloride compounds. This is evident from the testimony of Defendants' own expert, Dr. Gokel, as to Example 3 of the '779 patent. (Tr. 200:16-201:16). This is also evident from contemporaneous references, including Chapman, Casner, and Dung. (DTX-9 at claim 1; DTX-8 at ¶36; DTX-16 at claim 1). Defendants have not cited to any evidence that rebuts the abundance of intrinsic and extrinsic evidence supporting Plaintiffs' proposed construction.

I will construe "14-hydroxymorphinone" to mean "14-hydroxymorphinone hydrocholoride." Defendants have made no argument that the asserted claims are anticipated under Plaintiffs' proposed construction. Therefore, since I adopt Plaintiffs' proposed construction, I need not address Defendants' asserted prior art. I hold that claims 1-6 of the '779 patent are not anticipated by the prior art.

V. WRITTEN DESCRIPTION

The written description requirement contained in 35 U.S.C. § 112, ¶ 1 requires that the specification "clearly allow persons of ordinary skill in the art to recognize that [the inventor] invented what is claimed." *Ariad Pharm., Inc., v. Eli Lilly & Co.*, 598 F.3d 1336, 1351 (Fed. Cir. 2010) (en banc) (alteration in original). "In other words, the test for sufficiency is whether the disclosure of the application relied upon reasonably conveys to those skilled in the art that the

inventor had possession of the claimed subject matter as of the filing date." *Id.* "A party must prove invalidity for lack of written description by clear and convincing evidence." *Vasudevan Software, Inc. v. MicroStrategy, Inc.*, 782 F.3d 671, 682 (Fed. Cir. 2015).

Defendants argue that the specification of the '779 patent does not have adequate written description support for the less than ten and less than five ppm limitations that were added during prosecution. (D.I. 201 at 39). Defendants contend that the only mention of impurity levels in oxymorphone in the specification is a single statement in Example 3 that "the sample contained no detectable amount of" the ABUK impurity. (*Id.*; '779 patent at 37:35-36). According to Defendants, this single statement, without any discussion of the detection limits of the experiment performed to measure impurities, is insufficient to show that the inventors possessed the low-ABUK oxymorphone claimed in the patent. (D.I. 201 at 40).

Plaintiffs respond by pointing to a portion of the specification they claim "clearly defines" the phrase "no detectable amount." (D.I. 215 at 48). The specification explains that the invention is directed to reducing the concentration of ABUK impurities, resulting in "a highly pure" oxymorphone product. ('779 patent at 27:25-30). The specification goes on to state that the product preferably comprises "less than about 0.001%," or ten ppm, or "may comprise less than about 0.0005%," or five ppm, of the ABUK impurity. (*Id.* at 27:42-7). The specification continues, "[s]till more preferably, no detectable amount of an [ABUK] compound is present in the" oxymorphone product. (*Id.* at 27:47-49). It seems clear to me that this disclosure indicates that "no detectable amount" is intended to mean at least less than five ppm in the context of the patent.

Plaintiffs also point to data reported in the specification obtained using the same mass spectrometry method used in Example 3, the oxymorphone example Defendants criticize for not

specifying a detection limit. (D.I. 215 at 48). As Plaintiffs note, using this same method, the inventors disclosed ABUK levels in oxycodone as low as 0.5 ppm. (*Id.*; '779 patent at 30:35-46). Defendants argue that this measurement of impurity levels in oxycodone is insufficient disclosure as to measurements of impurity levels in oxymorphone. (D.I. 201 at 40-41). I disagree. The specification discloses a measurement technique that is not unique to either oxymorphone or oxycodone. Plaintiffs' expert, Dr. Davies, testified that the instrument is "simply a counting device" and that any difference in the reactivity of the two molecules, which is relevant for eliminating the ABUK impurities, is not relevant for counting the molecules. (Tr. 637:3-638:13). I find Plaintiffs' expert credible. Even Defendants' expert, Dr. Gokel, testified that while the detection limits for the ABUKs of these two compounds were "not necessarily identical," a person of ordinary skill in the art would expect them to be similar. (Tr. 175:4-176:5).

I find that the disclosure of "no detectable amount" is sufficient to show that the inventors possessed oxymorphone with less than five ppm of 14-hydroxymorphinone. Therefore, Defendants have not proved by clear and convincing evidence that claims 1-6 of the '779 patent are invalid for lack of written description.

VI. CONCLUSION

Defendants failed to prove by clear and convincing evidence that claims 1-6 of the '779 patent are invalid.

Plaintiffs should submit an agreed upon form of final judgment within two weeks.[11]

[11] Notwithstanding that Teva and some of the Actavis Defendants did not participate in the trial, they will still be bound by the final judgment. (D.I. 186 at 5:18-6:13; D.I. 175).