UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SILICON STORAGE TECHNOLOGY, INC.

Plaintiff,

v.

XICOR LLC

Defendant.

_____/

No. C 10-1515 MHP

MEMORANDUM & ORDER

Re: Cross-Motions for Summary Judgment

Plaintiff Silicon Storage Technology, Inc. ("SST") brought this action against defendant Xicor LLC, seeking a declaration that claims 12 and 13 of U.S. Patent No. RE38,370 ("the '370 patent) are invalid and that it has not infringed Xicor's patent. Xicor filed a counterclaim alleging infringement of the '370 patent. Now before the court are the parties' cross-motions for summary judgment as to whether claims 12 and 13 of the '370 patent are invalid under the rule against recapture. Having considered the parties' arguments and submissions, and for the reasons set forth below, the court enters the following order.

BACKGROUND

I. Technology Addressed by the Patent-in-Suit

The patent at issue relates to the "tunneling oxide layer" of a computer memory chip and a method for forming that region. *See* Docket No. 50 (Evans Decl.) Exh. C ('370 patent) at 1:12-16. Electrically erasable read-only memory devices ("EEPROM") contain "floating gates" which store electric charge and indicate the presence or absence of such charge with a binary 1 or 0. *Id*. at 1:19-

22. The floating gate is electrically insulated from the other electrodes of the EEPROM device by one or more layers of a "tunneling" oxide, which under certain conditions allow electrons to "tunnel" through to the floating gate *Id*. at 1:25-31. The tunneling oxide can only conduct a limited amount of charge before it breaks down. The life of a tunneling oxide can be further limited by the presence of structural defects and by the high levels of stress that develop in the tunneling oxide during the production of the tunneling layer. *Id*. at 1:31-53. The '370 patent attempts to increase the reliable, useful life cycle of a EEPROM device by producing a tunneling oxide layer that lacks the defects and high levels of stress present in the prior art. *Id*. at 2:15-31. The patent discloses a method and means of depositing a tunneling oxide using a low pressure, low temperature chemical vapor deposition ("LPCVD") process. *Id*. at 1:59-62. The patent identifies tetraethylorthosilicate ("TEOS") as the preferred chemical for the LPCVD process. *Id*. at 1:63-64.

Independent claim 1 of the '370 patent recites, in pertinent part:

> An improved tunneling region for use with an integrated circuit comprising:
>
> a first layer of polysilicon;
>
> a first electron tunneling layer of thermal oxide formed over said first layer of polysilicon;
>
> a second electron tunneling layer of annealed deposited silicon dioxide formed over said first tunneling layer having a thickness less than 2000 Angstroms thick, said silicon dioxide layer being formed by low pressure chemical vapor deposition **comprising the use of tetraethylorthosilicate**; and
>
> a second layer of polysilicon formed over said layer of deposited silicon dioxide . . .

Id. at 5:4-22 (emphasis added). Independent claim 4 recites, in pertinent part:

> A semiconductor device including means for electron tunneling, comprising:
>
> a first conductive layer;
>
> an annealed silicon dioxide tunneling layer having a thickness less than 2000 Angstroms formed on top of said conductive layer, said silicon dioxide layer being formed by low pressure chemical vapor deposition **comprising the use of tetraethylorthosilicate**;
>
> a second conductive layer formed on top of said silicon dioxide layer . . .

Id. at 5:30-43. Claims 12 and 13 were added to the '370 patent in reissue. These claims are identical to claims 1 and 4, respectively, except that claims 12 and 13 delete the language

"comprising the use of tetraethylorthosilicate" present in the earlier claims. *Id*. at 6:16-46. The genesis and subsequent deletion of these TEOS limitations is the focus of this dispute.

II. Prosecution History

The '370 patent, issued at the very end of 2003, has its origins in a patent application filed in the year 1988, and the relevant prosecution history, stretched out over four different related applications, is voluminous. The following summarizes this history and sets forth in detail only those aspects of the prosecution history that are directly relevant to resolving the parties' summary judgment motions.

A. The Original Application

Xicor's predecessor-in-interest[1] filed patent application No. 07/195,766 ("the '766 application") on May 17, 1988. The '766 application contained method claims 1-12 and an apparatus claim 13. Each of the independent claims 1, 6, 7, 9, and 13 included the deposition of silicon dioxide by LPCVD, but none of these claims were limited to the use of TEOS in that LPCVD process. Evans Decl. Exh. E at INT0001015-17. In an office action dated January 19, 1989, the examiner found that the '766 application claimed two distinct inventions and ordered the applicant to restrict the application to either the method or the apparatus claims. *Id.* at 1043. The examiner reasoned, *inter alia*, that the apparatus recited in claim 13 "could be made by processes materially different than those" in claims 1-12 and accordingly unpatentability of the [apparatus] would not necessarily imply unpatentability of the [processes]." *Id*. The applicant traversed the restriction requirement but elected to proceed with the method claims 1-12 should the restriction become final. *Id*. at 1047-51. The examiner made the restriction requirement final on August 2, 1989. *Id.* at 1053-54.

B. The '774 Patent Prosecution

On June 26, 1990, the applicant filed a continuation application, No. 07/545,122 ("the '122 application"), which contained solely the method claims 1-12 of the '766 application. On October 9, 1990, Claims 1-3 and 9 were rejected, *inter alia*, as anticipated by the prior art "Peek" reference. *Id* at 1107. The examiner stated that "Peek discloses a method of fabricating an EEPROM in which the

dielectric is obtained by LPCVD of TEOS at 730°C." *Id*. Xicor responded by amending claim 1 to add the limitation "comprising the use of a silicon and oxygen bearing vapor comprising [TEOS] at a temperature between 450°and 1000°C" to the recited LPCVD process. *Id* at 1117. Xicor attached to its response a supporting declaration from William H. Owen, the Vice President of Product Planning and Intellectual Properties at Xicor, which explained why Peek did not anticipate claims 1-3. *See id* at 1127-1135. Based on the Owen declaration, Xicor argued:

> Peek never actually constructed an EEPROM using TEOS nor did he deposit any oxide layers intended to be used as a tunneling oxide . . . Peek concluded that TEOS oxide were inferior and suggested that HTO oxides were the best for an EEPROM, at least insofar as the insulating properties are concerned. Applicant submits this reference clearly teaches away from the present invention . . . [T]hose in the art believed TEOS oxides to be inappropriate for use in an EEPROM, and that the discovery that sufficiently pure TEOS oxides could be deposited was a surprising and unexpected result.

Id at 1120-21. Xicor made similar arguments regarding the Peek reference at several other points during the prosecution of the '122 application. *See id.* at 1121, 1130, 1153, 1161.

On May 7, 1992, the examiner rejected claim 7 of the '122 application as obvious over the prior art Paterson reference. According to the examiner, "Paterson discloses a method of fabricating a memory device having a floating gate [] and a tunneling oxide []" and "that the tunneling oxide layer can be either thermally grown or deposited by LPCVD." *Id*. at 1164. The examiner stated, however, that Xicor could avoid an obviousness rejection over Paterson if it added an express TEOS limitation:

> If claim 7 was amended to recite that the tunneling oxide layer was deposited by LPCVD using TEOS, the claim would be allowable over Paterson, since neither Paterson nor any of the other references of record disclose the use of a deposited TEOS oxide layer as a tunneling oxide in a memory device.

Id. at 1165.[2] On June 26, 1990, Xicor accepted the examiner's suggestion and amended claim 7 (redesignated as claim 6) by adding the limitation "comprising the use of [TEOS]" to the recited LPCVD process. *Id*. at 1174, 1176 ("Claims 6, 7 and 9 have been amended to add the limitation that the CVD process called for comprises the use of TEOS, as suggested by the Examiner."). On November 23, 1992, the examiner issued her notice of allowability, *id.* at 1179, and U.S. Patent No. 5,219,774 (the '774 patent) issued on June 15, 1993, *see* Evans Decl. Exh. F.

C. The ‘585 Patent Prosecution

After the method claims comprising the ‘774 patent were allowed, Xicor turned its attention to prosecuting its apparatus claims. On May 18, 1993, Xicor filed divisional application No. 08/064,203 (the ‘203 application), in which it pursued the original product-by-process claim 13 of the ‘766 application and added seven new apparatus claims, all also drafted in product-by-process form. Evans Decl. Exh. G at INT0000730. Claim 13 initially was submitted in its original form, thereby lacking a TEOS limitation, but each of the new claims did include a TEOS limitation. *See id.* at 752-53. In submitting its divisional application, Xicor noted that “[n]ew Claims 14-20 are apparatus claims that are similar to the allowed method claims of the parent application.” *Id*. at 754. The ‘203 application, however, was assigned to a different examiner in a different art unit than the allowed method claims. *Compare* Evans Decl. Exh. E at INT0001179 *with* Exh. G at INT0000755.

On July 23, 1993, the examiner rejected claims 13 and 14 as obvious in view of two prior U.S. patents, but this rejection apparently bore no relationship to the use of TEOS in the LPCVD process. *Id*. at 756-57. Nevertheless, Xicor responded to the July 23 office action by making a number of amendments to claims 13 and 14, including adding a TEOS limitation to claim 13. *Id*. at 775-76. In its accompanying remarks, Xicor attached copies of the same declarations of William H. Owen that had been submitted in support of the ‘122 application and that according to Xicor “bear on the patentability of the claims pending in this application.” *Id*. at 782. Xicor accordingly repeated its earlier argument that Peek “clearly teaches away from the present invention” and that “[a]t the time the present invention was made, those skilled in the art generally held the view, similar to Peek’s conclusions, that TEOS oxide layers were inferior to layers deposited by other techniques.” *Id*. at 780-81.

On March 25, 1994, the examiner rejected claims 13 and 14 on the grounds that the prior art disclosed the claimed structures and specifically noted that the process limitations in those claims were insufficient to overcome the novelty and obviousness rejections. The examiner “reminded” Xicor that “it is the patentability of the final product per se which must be determined in a ‘product by process’ claim, and not the patentability of the process, and that, as here, an old or obvious

product produced by a new method is not patentable as a product . . .." *Id*. at 788 (citing *In re Thorpe*, 777 F.2d 695 (Fed. Cir. 1985)). In response, Xicor stated that the apparatus claims were presented in product-by-process form because "the present invention . . . is not capable of independent definition in structural terms." *Id*. at 794. In order to show that the prior art did not "possess the characteristics and structure" of the present invention and that the claimed device "is both novel and non-obvious over the prior art," Xicor attached yet another declaration from William H. Owen. *Id*. at 794-95. In that declaration, Owen repeatedly refers to the structural advantages of the claimed TEOS deposited oxide layer. He states that the TEOS deposited layer lacks the structural defects that are often created by the prior art tunneling oxide layers, that the TEOS deposited layer induces a much lower magnitude of stress on a memory chip wafer, and that "the annealing of the TEOS layer seems to provide more uniform molecular bonding, increasing the total charge conducted. *Id*. at 802-03. The examiner nonetheless finally rejected the pending claims on November 15, 1994, specifically noting that "[t]he generalized allegations . . . that silicon dioxide formation using TEOS results in an oxide having a low defect density and either compressive or tensile stress are not substantiated by hard experimental evidence." *Id*. at 811.

Xicor appealed the rejection to the Board of Patent Appeals and Interferences ("the Board"), and in its briefing reiterated its arguments (1) that the structure of the claimed tunneling oxide layer is significantly different from the prior art and (2) that the Peek reference taught away from the use of TEOS oxide layer. *See id.* at 824-29; 866-69. On June 3, 1999, the Board reversed the examiner's rejection. It reasoned:

> Inasmuch as all of the product limitations are disclosed by the applied prior art, the examiner has a established a *prima facie* case of unpatentability of the claims invention.
>
> Notwithstanding the *prima facie* case of unpatentability, the appellant can come forward with evidence establishing an unobvious difference between the claimed product produced by the process recited *supra* and the prior art product produced by a conventional process. *In re Marosi*, 710 F.2d 799, 803 (Fed Cir. 1983).
>
> . . .
>
> As indicated *supra*, the advantages of appellant's claimed process step are set forth in the [Owen] declarations as well as in the specification. Such advantages are sufficient to establish unobvious differences between the claimed product and the prior art product . . .

Id. at 893-98. On November 12, 1999, claims 13 and 14 issued as claims 1 and 4 of U.S. Patent No. 5,997,585 ("the '585 patent"). *See* Evans Decl. Exh. D.

D. The '370 Reissue

On November 2, 2001, Xicor timely filed reissue application No. 10/053,140 for the '585 patent. *See* Evans Decl. Exh. A at INT0162220. New claims 12 and 13 of the reissue are identical to claims 1 and 4 of the '585 patent, respectively, except that the new claims remove the "unnecessary" TEOS limitation. *Id*. at 162221-22. Pointing to the '585 specification (which is shared with the '774 patent), Xicor argued that TEOS "is only *preferably* used for the LPCVD process." *Id*. (emphasis in original). Xicor argued that "since [TEOS] is not necessary for forming a silicon dioxide layer by [LPCVD] . . . the inclusion of [TEOS] represents an unnecessary limitation in the claim. As a result, an unintentional error has resulted in that the claim is narrower than what the patentee is entitled to." *Id*. at 162221. On July 16, 2003, the examiner allowed the reissue claims, explaining that "[t]he record for the patent indicates that the claims are not broader than the subject matter that applicant previously surrendered during the prosecution of the patent nor do the claims include the surrendered subject matter themselves . . . they are not barred by the recapture rule . . .." *Id*. at 162338.

E. Present litigation

On April 9, 2010, SST filed the present action seeking a declaration that it is not infringing the '370 patent and that the '370 patent is invalid. *See* Docket No. 1. On December 20, 2010, Xicor asserted a counterclaim for patent infringement. *See* Docket No. 46. That same day, SST filed the instant motion for summary judgment, *see* Docket No. 48, and Xicor filed its motion for partial summary judgment on SST's recapture defense, *see* Docket No. 47. The sole issue raised by the parties' cross-motions is whether claims 12 and 13 of the reissue patent '370 are invalid under the rule against recapture.

LEGAL STANDARD

I. Summary Judgment

Summary judgment may be granted only when, drawing all inferences and resolving all doubts in favor of the non-moving party, there are no genuine issues of material fact and the moving party is entitled to judgment as a matter of law. Fed. R. Civ. P. 56(c); *see generally Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 247-255 (1986). A material fact is "genuine" if the evidence is such that a reasonable jury could return a verdict for the non-moving party. *Anderson*, 477 U.S. at 248. The moving party bears the burden of identifying those portions of the pleadings, discovery and affidavits that demonstrate the absence of a genuine issue of material fact. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). Once the moving party meets its initial burden, the non-moving party must go beyond the pleadings and, by its own affidavits or discovery, set forth specific facts showing that there is a genuine issue for trial. Fed. R. Civ. P. 56(e); *see Anderson*, 477 U.S. at 250.

DISCUSSION

The parties agree that there are no material facts in dispute and that the court may decide as a matter of law whether claims 12 and 13 of the '370 patent violate the rule against recapture.

"Under the reissue statute, a patentee may surrender a patent and seek reissue enlarging the scope of the original patent's claims if through error without any deceptive intent he claimed less than he had a right to claim in the original patent . . .." *MBO Labs. v. Becton, Dickinson & Co.*, 602 F.3d 1306, 1313 (Fed. Cir. 2010) (*MBO II*) (citing 35 U.S.C. § 251) (internal quotations and alterations omitted). Although the reissue statute is to be construed liberally, the "rule against recapture" places an important limit on the ability of a patentee to obtain a broadening reissue. *See id*. "Under the rule against recapture, a patentee's reissue claims are invalid when the patentee broadens the scope of a claim in reissue to cover subject matter that he surrendered during the prosecution of the original claims." *Id.* (citing *Hester Indus., Inc. v. Stein, Inc.*, 142 F.3d 1472, 1480 (Fed. Cir. 1998)).

The Federal Circuit has identified two justifications for the rule against recapture. Firstly, a reissue patent is only available when the patentee erroneously failed to claim the full scope of the invention and not where the narrower claims were the result of "deliberate amendments or arguments designed to convince an examiner to allow the claims." *Id*. (collecting cases). Secondly, the rule against recapture is based on principles of equity. "An applicant's surrender of subject matter places competitors and the public on notice and may have caused them to rely on the consequent limitations on claim scope." *Id*. (internal quotation marks and alterations omitted); *see also Kim v. ConAgra Foods, Inc.*, 465 F.3d 1312, 1323 (Fed. Cir. 2006) ("[T]he recapture rule is aimed at ensuring that the public can rely on a patentee's admission during prosecution of an original patent."). In the absence of the rule, "an unscrupulous attorney could feign error and redraft claims in a reissue patent to cover a competing product, thereafter filing an infringement suit." *MBO II*, 602 F.3d at 1313 (citing *Hester Indus.*, 142 F.3d at 1484).

The Federal Circuit has developed a three-step test for the rule against recapture. The court must determine:

(1) "whether and in what respect, the reissue claims are broader in scope than the original patent claims";

(2) "whether the broader aspects of the reissue claims relate to subject matter surrendered in the original prosecution"; and

(3) "whether the reissue claims were materially narrowed in other respects, so that the claims may not have been enlarged, and hence avoid the recapture rule."

N. Am. Container, Inc. v. Plastipak Packaging, Inc., 415 F.3d 1335, 1349 (Fed. Cir. 2005). For the reasons set forth below, the undisputed facts clearly demonstrate that claims 12 and 13 of the '370 patent meet each requirement of the rule against recapture and are therefore invalid.[3]

I. Step 1: The Reissued Claims are Broader than the Original Claims

The parties do not dispute that the reissued claims 12 and 13 are broader than the original claims 1 and 4, respectively. The two sets of claims are identical with the exception that the old claims are limited to an LPCVD process "comprising the use of [TEOS]." "[A] reissue claim that

deletes a limitation or element from the patent claims is broader in that limitations' aspect." *In re Clement*, 131 F.3d 1464, 1468 (Fed. Cir. 1997). By eliminating this limitation on reissue, the patent-in-suit covers silicon dioxide tunneling layers formed by the LPCVD of chemicals other than TEOS. Xicor identifies (1) silane along with oxygen and (2) dichlorosilane along with nitrous oxide as examples of common TEOS alternatives. *See* Docket No. 47 at 14.

II. Step 2: Xicor Surrendered TEOS Alternatives in Prosecuting the '774 and '585 Patents

SST argues that Xicor surrendered TEOS-alternatives while prosecuting the '774 and '585 patents both through claim amendments and through arguments to the examiner and Board. "To determine whether a patentee surrendered subject matter, [the court] asks 'whether an objective observer viewing the prosecution history would conclude that the purpose of the patentee's amendment or argument was to overcome prior art and secure the patent." *MBO II*, 602 F.3d at 1314 (quoting *Kim*, 465 F.3d at 1323). "If the patentee surrendered by argument, he must clearly and unmistakably argue that his invention does not cover certain subject matter to overcome an examiner's rejection based on prior art." *Id*. (collecting cases).

A. The Prosecution of the '774 Patent is Relevant

A critical threshold question is whether the prosecution of the '774 patent is relevant to the recapture analysis here. The '370 patent is a reissue of the '585 patent, which began as a divisional of the application that yielded the '774 patent. Xicor does not appear to dispute that it surrendered TEOS alternatives in order to secure the '774 patent, and the record quite clearly shows (1) that Xicor added the TEOS limitation to claim 7 in order to overcome an obviousness rejection over Paterson and (2) that Xicor overcame a novelty rejection over Peek by arguing that the Peek taught away from the use of TEOS in LPCVD. Instead, Xicor argues that it is improper here for the court to consider the prosecution history of the parent application in determining whether subject matter was surrendered as to its divisional.

The Federal Circuit recently has made clear that the entire patent family of a reissue patent should be considered when addressing the rule against recapture. "[A] patentee may violate the rule against recapture by claiming subject matter in a reissue patent that the patentee surrendered while

prosecuting a related patent application." *MBO II*, 602 F.3d at 1316. In *MBO II*, the Federal Circuit acknowledged that some lower courts have held that a patentee only violates the rule against recapture by surrendering subject matter in the prosecution of "the patent that is corrected by the reissue patent." *Id*. (quoting *U.S. Filter Corp. v. Ionics, Inc.*, 68 F. Supp. 2d 48, 72 (D. Mass. 1999)). After reviewing U.S. Supreme Court caselaw, Federal Circuit precedent and the legislative history of the reissue statute, the court determined that this approach was erroneous. Of particular relevance to the present case, the court expressly rejected the theory that "recapture does not contemplate surrenders made while prosecuting the original application or any precedent, ***divisional***, continuation, or continuation-in-part applications." *Id*. (emphasis added).

Xicor nonetheless argues that *MBO II* did not establish a *per se* rule that the entire patent family is *always* relevant to the recapture analysis and that the circumstances here require limiting the court's inquiry solely to the prosecution of the '585 patent. Xicor points out that no court has found the parent's history to be relevant where, as here, the divisional was the result of a restriction requirement, the claims of the divisional were not narrowed, the claims of the divisional never faced a prior art rejection prior to restriction, and the claims of the divisional application were "patentably distinct" from the claims prosecuted in the parent. *See* Docket No. 57 (Opp.) at 12.

There is no persuasive reason for excepting this case from the Federal Circuit's clear mandate that the entire patent family should be considered in the recapture analysis. Instead, a review of the entire patent family history demonstrates that the '774 prosecution is highly relevant to whether the '370 patent recaptured surrendered subject matter. Aside from the TEOS limitation, the process limitations of claims 12 and 13 of the reissue patent are extremely similar to claims 6 and 1, respectively, of the '774 patent, and during prosecution Xicor expressly linked its product claims to the process claims that issued in the '774 patent. It initially pursued the product and process claims together in the original '766 application, and it traversed the examiner's conclusion that the process and product-by-process claims were patentably distinct. When Xicor submitted the '203 divisional application, it expressly stated that the new product-by-process claims were similar to the claims that had been allowed in the '774 prosecution. Moreover, it was not until after the process claims had

been allowed by the examiner and amended to include TEOS limitations that Xicor made any effort to pursue its product-by-process claims. When it did so, its seven new claims all contained a TEOS limitation, and Xicor soon amended the original claim to include the TEOS limitation. In presenting this amendment to the examiner, Xicor attached the same declarations from William H. Owen it had used to pursue its process claims, and it aped its earlier argument that Peek taught away from the disclosed invention. Xicor repeated these arguments several times before the examiner and eventually before the Board, which allowed the TEOS-limited product-by-process claims to issue.

The above chronology demonstrates that the TEOS limitations did not appear in the '585 patent due to a mere drafting error or a failure to appreciate the permissible scope of the disclosed invention. *See MBO II*, 602 F.3d at 1315 ("MBO's failure to claim relative movement was not 'error without any deceptive intent.' MBO knew exactly how to claim relative movement."). Instead, starting in May 1993 Xicor sought to patent EEPROM devices with tunneling layers formed by processes it had been allowed to patent a few months earlier. The TEOS limitations appeared in the allowed process claims, and it is unsurprising—and certainly not erroneous—that the TEOS limitations appeared in subsequent product claims. Although Xicor pursued its product claims through a "divisional" application, the prosecutions of the product and process claims did not occur in parallel. Were that the case, it might be more persuasive that arguments made in one prosecution are distinct from arguments made in the other. Instead, the prosecutions of the '774, '585 and '370 patents occurred in almost entirely linear succession, and the surrender of TEOS alternatives in the earlier '774 prosecution cannot be insulated from the later broadening reissue. Were such surrender beyond the scope of the recapture analysis, Xicor would be permitted to engage in what the Federal Circuit has characterized as "immense fraud[] against the public":

> If we limited our recapture review to the prosecution history for the patent corrected by reissue, we would severely undercut the rule against recapture's public-reliance rationale: a patentee could deliberately surrender subject matter during prosecution of an earlier patent, obtain a continuation patent without mentioning the surrendered subject matter, and then seek a reissue patent based on the continuation so as to recapture the subject matter.

MBO II, 602 F.3d at 1318. Similarly here, Xicor surrendered TEOS alternatives to obtain a process patent and then pursued a divisional application for a product made by that process without

mentioning the surrendered subject matter to the new examiner. It then obtained a broadening reissue of the product-by-process claims to recapture silicon dioxide layers formed by LPCVD of TEOS alternatives. The principles of equity underlying the rule against recapture accordingly require consideration of the entire patent family.

B. Process Claims vs. Product-by-Process Claims

Xicor makes several variations of the following argument: because a product-by-process claim is not patentable on the grounds that it is made by a novel process, subject matter surrendered as to a process limitation cannot be recaptured by a broadening reissue of the product-by-process claim. It uses this logic to argue: (1) that the '774 prosecution history is irrelevant because process and product-by-process are "patentably distinct," (2) that the examiner's restriction on this basis distinguishes this case from *MBO II* and other decisions, and (3) that arguments related to TEOS in the process limitations of the '585 patent did not surrender subject matter *in order to overcome prior art*. Xicor is correct that a product-by-process claim may not overcome prior art merely by pointing to its novel, non-obvious process limitation, but nonetheless subject matter surrendered with respect to the process limitation at issue here falls squarely within the rule against recapture.

"A product-by-process claim is 'one in which the product is defined at least in part in terms of the method or process by which it is made." *Smithkline Beecham Corp. v. Apotex Corp.*, 439 F.3d 1312, 1315 (Fed. Cir. 2006) (quoting *Bonito Boats, Inc. v. Thunder Craft Boats, Inc.*, 489 U.S. 141, 158 (1989)). "The purpose of product-by-process claims is to allow inventors to claim 'an otherwise patentable product that resists definition by other than the process by which it is made.'" *Id*. (quoting *In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985)). "Thus an inventor will not be foreclosed from the benefits of the patent system simply because a product is difficult to describe in words, or its structure is insufficiently understood." *Id*. Even though a product claim may be described with reference to a particular process, "it is clear that such claims are always to a product, not a process." *Id*. at 1317. "It has long been the case that an old product is not patentable even if it is made by a new process." *Amgen Inc. v. F. Hoffman-La Roche Ltd.*, 580 F.3d 1340, 1366 (Fed. Cir. 2009) (collecting cases). "As a result, a product-by-process claim can be anticipated by a prior art product

that does not adhere to the claim's process limitation." *Id*. at 1370. In other words, if a prior art reference discloses each and every structural limitation of the claimed invention, it is no defense, in and of itself, that the claimed invention is made by a novel process. *See id.* at 1366.

This is not to say, however, that the process limitation is irrelevant to the patentability of a product-by-process claim. As the Board expressly acknowledged in finding the '585 claims patentable, if the prior art appears to disclose all of the structural limitations of the claimed product, an applicant may produce evidence that the product produced by the new process is different than a product produced by conventional processes. *See* Evans Decl. Exh. G at INT0000893-94 (citing *In re Marosi*, 710 F.2d 799, 803 (Fed. Cir. 1983)); *see also Amgen*, 580 F.3d at 1367 ("The question we must next address is whether the production of EPO by recombinant technology resulted in a new product, so that claim 1 was not anticipated by urinary EPO."). In *Amgen*, the Federal Circuit agreed with the district court that the protein EPO formed by recombinant DNA technology was not anticipated by EPO extracted from human urine. In doing so, the Federal Circuit pointed to studies indicating that recombinant EPO had a higher molecular weight and different charge than urinary EPO as well as to expert testimony that the two types of EPO had different carbohydrate composition. *Amgen*, 580 F.3d at 1367. Similarly here, the prior art disclosed EEPROM devices containing all of the structural elements disclosed in claims 1 and 4 of the '585 patent. Nonetheless, Xicor was able to secure a patent for those claims by pointing to the structural advantages of tunneling layers formed by the claimed process step. Such advantages included increased electrical charge, fewer defects and a lower magnitude of induced stress. As the Board observed, "the advantages of appellant's claimed process step are set forth in the declarations as well as in the specification. Such advantages are sufficient to establish unobvious differences between the claimed product and the prior art product." Evans Decl. Exh. G at INT0000895-96. Arguments and amendments made with respect to the process limitation of a product-by-process claim therefore *can* be used to overcome prior art rejections and accordingly can be relevant to the recapture analysis of a reissued product-by-process claim. Moreover, given Xicor's repeated emphasis on the advantages

of LPCVD of TEOS, such arguments and amendments in both the '774 and '585 prosecution are relevant here.[4]

Arguments and amendments related to the process step of a product-by-process claim are particularly significant in light of the public reliance rationale underlying the rule against recapture. Although the inclusion of a process step is often inconsequential to the patentability of a product-by-process claim, it is of great consequence in determining infringement of that claim:

> In determining infringement of a product-by-process claim . . . the focus is on the process of making the product as much as it is on the product itself. In other words, process terms in product-by-process claims serve as limitations in determining infringement. As a result, a product-by-process claim is not infringed by a product made by a process other than the one recited in the claim.
>
> The impact of these different analyses is significant. For product-by-process claims, that which anticipates if earlier does not necessarily infringe if later. That is because a product in the prior art made by a different process can anticipate a product-by-process claim, but an accused product made by a different process cannot infringe a product-by-process claim.

Amgen, 580 F.3d at 1370 (internal citations and quotation marks omitted). The differences in the validity and infringement analyses demonstrate that surrender and recapture of subject matter related to a process limitation can greatly affect the scope of patent rights even if the surrendered subject matter would be insufficient to overcome the prior art.[5] If after issuance of a product-by-process claim, a third-party manufacturer needed to determine whether a particular product infringed the patent, it would be crucial to determine which precise processes are foreclosed by the patent in the manufacture of that product. In order to do so, it would be entitled to look at the prosecution history to identify subject matter surrendered as to a process limitation and rely on the patentee's amendments and/or arguments to determine what processes it can employ to produce a non-infringing product.[6] If the patentee subsequently recaptured the surrendered subject matter via a broadening reissue, the third-party manufacturer might suddenly find itself an infringer. "The reissue statute cannot be construed in such a way that competitors, properly relying on prosecution history, become patent infringers when they do so." *Kim*, 465 F.3d at 1323 (quoting *Mentor Corp. v. Coloplast, Inc.*, 998 F.2d 992, 996 (Fed. Cir. 1993)).

The reissue claims here raise precisely these concerns. Before reissue, Xicor had a patent for a process to form silicon dioxide tunneling layers using LPCVD of TEOS and a patent for EEPROM devices with tunneling layers formed by LPCVD of TEOS only. An EEPROM manufacturer would not infringe either patent by making the tunneling layer of the memory chip through LPCVD of an alternative chemical to TEOS. Looking at the prosecution history of the '774 patent, it would be clearly apprised that Xicor surrendered any TEOS alternative in order to secure its process patents, and looking at the prosecution history of the '585 patent it would observe that Xicor incorporated those same processes—and many of its earlier arguments—into its product-by-process claims. After reissue, however, the EEPROM manufacturer employing LPCVD of a TEOS alternative would still remain clear of the novel, non-obvious processes claimed in the '774 patent but it would potentially infringe upon the product-by-process claims in the '370 patent. Absurdly, this would be the case notwithstanding that the broadened process limitation triggering this infringement was undisputedly surrendered in order to overcome prior art and secure the '774 process patents.

Xicor expressly acknowledges that process limitations are treated differently for purposes of validity and infringement, but it argues that the court should "embrace" this incongruity for purposes of the rule against recapture. Docket No. 57 (Xicor Opp.) at 8. Apparently this would involve first acknowledging that a process claim and a product-by-process claim are "patentably distinct," and therefore validly subject to a restriction requirement. Because the two sets of claims are patentably distinct, arguments and amendments made with respect to the process claim would then be walled off from the product-by-process claim. Finally, the product-by-process claim could be broadened on reissue to cover products that would not infringe the process claims. In other words, because the process claim does not establish the patentability of the product-by-process claim, the product-by-process claim may cover products made by processes that do not infringe the process claim. This reasoning is untenable. The asymmetry regarding validity and infringement of a product-by-process claim is typically to the disadvantage of the patentee; claimed products can be anticipated by products made by a different process, but the claimed products are infringed only by those products made by the same process. *See Amgen*, 580 F.3d at 1370. By contrast, Xicor's approach would be

to the detriment of the public. A patentee may be forced to limit a process claim in order to overcome prior art, but it can nonetheless expand the practical scope of that process through a broadening reissue of a related product-by-process claim. The recapture rule serves as a limit on the availability of reissue patents in order to equitably protect the interest of the public, and a patentee may not leverage the unique treatment of product-by-process claims to feign error and expand the universe of potential infringers.

For the reasons explained above, under Step 2 of the recapture analysis, the court may consider the arguments and amendments made with respect to the TEOS limitations in both the '774 and '585 prosecution histories. A reasonable, objective observer would conclude that the TEOS limitation was included in order to distinguish the claimed processes and process limitations from the prior art. By including the TEOS limitation, Xicor surrendered alternative chemicals to TEOS, and these alternatives were recaptured by claims 12 and 13 of the '370 reissue patent.

III. Step 3: The Reissued Claims are Not Materially Narrowed

Under Step 3 of the recapture analysis, the court looks at whether the reissued claims were materially narrowed in other respects to avoid the rule against recapture. *See Pannu v. Storz Instruments, Inc.*, 258 F.3d 1366, 1371-72. SST argues that there is some conflict within Federal Circuit caselaw regarding whether the proper focus of the third step is a comparison between the reissued claims and the original patent claims *as issued* or between the reissued claims and the original patent claims *before amendment*. *See* Docket No. 48 at 22-25. The court need not resolve this dispute to conclude that the reissued claims were not materially narrowed with regard to the surrendered TEOS alternatives.

The only difference between claim 12 of the reissue patent and the issued claim 1 of the '585 patent is the deletion of the TEOS limitation, meaning that the reissue claim is broader in all respects. Claim 12 of the reissue patent is technically narrower than the originally filed version of claim 1 in a number of respects, but none of these narrowing amendments is *material* to the subject matter surrendered here, namely TEOS alternatives. *See* Docket No. 47 at 22 (side-by-side comparison of claims). Both the originally-filed claim and the reissue claim are completely silent

regarding the chemical used to form the recited silicon dioxide layer. *N. Am. Container*, 415 F.3d at 1350 ("[T]he recapture rule is applied on a limitation-by-limitation basis . . .."); *compare with Varian Semiconductor Equip. Assocs., Inc. v. Axcelis Techs., Inc.*, No. 08-cv-10676-DPW, 2009 WL 189960, at *19 (D. Mass. Jan. 21, 2009) (where patentee surrendered a tilt axis "parallel" to the plane, concluding that the patentee avoided the recapture rule by replacing a "perpendicular" limitation with either "not parallel" or "substantially perpendicular" limitations). Furthermore, the originally-filed claim referenced by Xicor is identical to claim 13 of the '766 application filed in 1988, before the examiner's restriction and before Xicor fully prosecuted its process claims. After the examiner's first rejection of the '203 application, Xicor amended this claim to reflect the language of the allowed process claims in the '774 patent. Once it did so, claim 1 became identical to the reissue claim 12, with the exception of the TEOS limitation. Whether claim 1 of the '585 patent is considered in its final issued form, in its originally filed form, or in light of the entire patent family prosecution, Xicor did not draft claim 12 of the reissue patent in a manner that materially narrowed the recaptured subject matter.

Xicor does not appear to dispute that claim 13 of the reissue patent is not materially narrower than claim 4 of the '585 patent. Claim 4 contained the TEOS limitation from the time it was filed, and the only amendment made on reissue was to eliminate that limitation.

Claims 12 and 13 of the '370 patent meet all three requirements of the rule against recapture and are therefore invalid.

CONCLUSION

For the reasons stated above, SST's motion for summary judgment on its invalidity claim is GRANTED, and Xicor's motion for partial summary judgment is DENIED. Claims 12 and 13 of the '370 patent are hereby declared invalid for violating the rule against recapture.

IT IS SO ORDERED.

Dated: March 21, 2011

MARILYN HALL PATEL
United States District Court Judge
Northern District of California

ENDNOTES

1. In the interest of simplicity, the patentee will be referred to herein as "Xicor," although Xicor is technically the assignee of the patent.

2. The examiner also rejected dependent claim 8 on the grounds that the specification did not disclose that an annealing step was applicable to any type of tunneling layer besides one formed by LPCVD of TEOS. Evans Decl. Exh. E at INT0001164-66. The examiner explained that Xicor could overcome an enablement rejection by adding a TEOS limitation, which it later did. *Id*. The court need not address what, if any, significance this enablement rejection has for purposes of the rule against recapture.

3. The court's conclusion is unaffected by the examiner's determination that the reissue claims do not violate the rule against recapture. Although an examiner's decision is generally due some deference, there is no indication that the examiner fully considered the prosecution histories of the entire patent family. *See N. Am. Container*, 415 F.3d at 1350 (rejecting argument that the district court failed to give proper deference where the examiner's statement demonstrated "inattention to the rule against recapture"). The notice of allowance addresses the recapture rule in a single, short paragraph and in no way discusses why the arguments and amendments related to the TEOS limitation failed to sufficiently surrender subject matter that crept back into the reissue patent. Upon independently reviewing the record and the relevant law, the court respectfully disagrees with the examiner's conclusion.

4. Xicor maintains that it "never argued that the unique structural properties of its invention were a result of the use of TEOS. Rather Xicor consistently argued that the novel structure of its invention resulted from the use of LPCVD to deposit a silicon dioxide layer combined with an annealing step." Docket No. 57 (Xicor Opp.) at 20. This contention is inconsistent with the record. Xicor repeatedly argued that Peek taught away from the use of LPCVD of TEOS and argued to both the examiner and the board that LPCVD of TEOS yielded fewer structural defects and less stress than in the prior art devices. Xicor did point to the annealing step while arguing that the process limitation increased the total electrical charge that could be conducted across the tunneling layer, *see, e.g.*, Evans Decl. Exh. G at INT0000781, 819. This argument regarding the annealing step does not, however, affect Xicor's surrender of TEOS alternatives. *See MBO II*, 602 F.3d at 1316 ("MBO's arguments distinguishing the prior art based on its safety flange do not affect its surrender of another subject matter: a patentee's arguments that emphasize one feature cannot cure arguments that clearly surrender another.").

5. Although it need not decide the issue, the court acknowledges that at least one other district court has concluded that the recapture rule only applies to subject matter surrendered in order to overcome prior art and not to overcome other bases of rejection, such as lack of enablement. *See Voice Capture, inc. v. Intel Corp.*, 354 F. Supp. 2d 997 (S.D. Iowa 2004). Although *MBO II* does not expressly foreclose this conclusion, the broad public-reliance rationale embraced by the Federal Circuit, under which competitors may look to the prosecution history to determine the scope of patent rights, seems inconsistent with the *Voice Capture* court's narrower formulation. Moreover, ignoring surrender with regards to the process limitation on the grounds that process and product-by-process claims are patentably distinct would permit the patentee to materially, and prejudicially, expand its patent rights solely due to the peculiarities of product-by-process claiming.

6. In this regard, as acknowledged by the Federal Circuit, "[t]he recapture rule serves the same policy as does the doctrine of prosecution history estoppel: both operate to prevent a patentee from encroaching back into territory that had previously been committed to the public." *MBO II*, 602 F.3d at 1318 (quoting *MBO I*, 474 F.3d at 1332) (alterations omitted).