United States District Court,
D. New Jersey.

RHEOX, INC,
Plaintiff.
v.
ENTACT, INC,
Defendant.

No. 98-03731 (MLC)

Aug. 21, 2000.

Louis E. Granata, Granata, Wernik & Zaccardi Esqs., Matawan, NJ, for Plaintiff.

Guy V. Amoresano, Gibbons, Del Deo, Dolan Griffinger & Vecchione, PC, Newark, NJ, for Defendant.

MEMORANDUM AND ORDER

COOPER**, J.**

This matter comes before the Court on the motion by defendant Entact, Inc. ("Entact") for summary judgment pursuant to Federal Rule of Civil Procedure 56. For the reasons stated, the motion for summary judgment is granted.

BACKGROUND

Plaintiff Rheox, Inc. ("Rheox") is the owner of United States Patent No. 5,162,600 (hereinafter the " '600 patent"). The '600 patent is entitled "Method of Treating Lead Contaminated Soil."

Claim 1 of the '600 patent provides:

1. A method of treating lead contaminated soil to reduce the amount of mobile lead contained in said soil, the method which comprises:

(a) providing an agent consisting essentially of calcium orthophosphate;

(b) contacting said agent with said soil to react said agent with mobile lead contained in the soil and form immobilized, water-insoluble lead compounds.

(Pl.'s Ex. 1 col. 7.)

Rheox commenced the present lawsuit on August 7, 1998. The Complaint alleges that Entact infringed one

or more claims of the '600 patent through its use of triple superphosphate ("TSP"). (Compl.para. 8.) Rheox argues that TSP is included within the definition of calcium orthophosphate in claim 1 of the '600 patent because TSP consists primarily of monocalcium orthophosphate, which is a form of calcium orthophosphate. (Pl.'s Br. in Opp'n at 18.)

Entact filed the instant motion for summary judgment on October 21, 1999. Entact premised the motion solely on the argument that the term "calcium orthophosphate," contained in claim 1 of the '600 patent, does not encompass TSP. Entact argues that the prosecution history reveals that calcium orthophosphate cannot be interpreted to include monocalcium orthophosphate. (Def.'s Proposed Findings of Facts and Conclusions of Law ("Def.'s Facts and Conclusions") para. 8.) Instead, Entact argues that the term "calcium orthophosphate" is limited to an "essentially water-insoluble" material which has a solubility not substantially different from .002 grams/100 grams of H_2O, which would include tricalcium orthophosphate but not monocalcium orthophosphate. FN1 (Def.'s Br. in Reply at 1-2.) The parties have agreed that if the term "calcium orthophosphate" does not include monocalcium orthophosphate, then none of the asserted claims of the '600 patent are infringed by Entact's use of TSP. (Def.'s Facts and Conclusions para. 5; Pl.'s Response to Def.'s Statement of Undisputed Facts para. 20.)

FN1. It is undisputed that the solubility of tricalcium orthophosphate is .002 grams/100 grams of water and the solubility of monocalcium phosphate is 1.8 grams/100 grams of water. (Pl.'s Ex. 13 para. 3.3.)

Rheox filed its patent application on December 28, 1990. The patent application contained 18 claims. Claim 1, as originally filed with the U.S. Patent and Trademark Office ("PTO") provided:

1. A method of treating lead contaminated soil to reduce the amount of mobile lead contained in said soil, the method which comprises:

(a) providing an agent selected from the group consisting of calcium, zinc, magnesium or ammonium phosphate compounds, calcium, zinc, magnesium or ammonium phosphite compounds and mixtures thereof; and

(b) contacting said agent with said soil to react said agent with mobile lead contained in the soil and form immobilized, water-insoluble lead compounds.

(Pl.'s Ex. 2 at 2.30.)

The original claim 2 referred specifically to TSP. Claim 2 provided:

2. The method of claim 1, wherein said agent comprises a calcium phosphate fertilizer selected from the group consisting of triple superphosphate and superphosphate.

(*Id*.)

Claim 18 also referred to TSP:

18. A method of treating lead contaminated soil to reduce the amount of mobile lead contained in said soil, the method which comprises:

(a) providing an agent selected from the group consisting of triple superphosphate, phosphate rock, hydroxyapatite and mixtures thereof; and

(b) contacting said agent with the soil in an amount of from about 1 to about 60% by weight, based on the total weight of said soil, to react said agent with said lead and form immobilized, water-insoluble lead phosphate compounds.

(*Id*. at 2.32.)

The written description, which is also known as the specification, of the '600 patent states that "in a preferred aspect of the invention," the calcium, zinc, magnesium or ammonium phosphate compounds should be selected from a list of compounds set forth in the patent. (Pl.'s Ex. 1 at 3.) The description then provides that "[e]specially preferred sources of calcium phosphate treating compounds include phosphate rock, as well as fertilizers such as triple superphosphate and superphosphate." (*Id*.) The written description further states that (1) the phosphate agent is preferably provided in the form of a fertilizer; (2) particularly useful fertilizers include TSP and superphosphate; and (3) TSP is preferred over superphosphate. (*Id*. col. 4.)

The written description also contains a table of experimental runs illustrating the treatment of lead contaminated soil according to the process of the invention. (*Id*. col. 6.) Several of the runs were conducted using TSP as the treating agent. (*Id*.) The written description states that TSP provided "superior lead stabilization results." (*Id*. col. 7.)

As part of the original application, Rheox also filed an Information Disclosure Statement. (Pl.'s Ex. 2 at 2.38.) The Information Disclosure Statement listed as prior art, *inter alia,* O'Hara et al., U.S. Patent No. 4,737,356 ("O'Hara" or the "O'Hara patent"). (*Id*.) O'Hara discloses a method for remediating lead in the residue or "fly ash" that comes from burning solid waste in a factory. (*Id*.) O'Hara teaches that this contamination can be remediated by use of water soluble phosphates and that "calcium phosphate, $Ca_3(PO_4)_2$, is 'inoperative' in immobilizing lead" in the O'Hara invention. FN2 (*Id*. at 2.39.)

FN2. We note that the term "calcium orthophosphate" is often condensed to calcium phosphate. (Tr. of Hr'g dated 1-26-00 at 204.) The Court will use the terms interchangeably.

The Court will now set forth the prosecution history of the '600 patent. The PTO Examiner issued his first office action on July 9, 1991, rejecting all 18 of Rheox's proposed claims. (*Id*. at 2.126.) The Examiner rejected the claims pursuant to 35 U.S.C. s. 102(b) as anticipated by, or alternatively under 35 U.S.C. s. 103 as made obvious by, the application of commercial fertilizers such as TSP. (*Id*. at 2.127.) The Examiner stated in pertinent part:

It is well known in the art that fertilizers are routinely bound (agglomerated) with conventional binders such as clays and are routinely spread and plowed into the soil. It would have been obvious to one of ordinary skill in the art to employ phosphate fertilizers for the treatment of a soil, i.e. their intended use. Immobilization of the lead present would inherently occur during or as a result of a fertilizer application for the prior art....

(*Id*. at 2.128.)

The Examiner also rejected the claims as being unpatentable under the O'Hara patent. (*Id*.) The Examiner stated in pertinent part:

O'Hara fairly teaches the use of phosphate to fix lead in particular solids. While it is granted that O'Hara exemplifies fly ash, as shown in claim 1 he is not limited thereto. The use of phosphate taught by O'Hara to fix lead in particular solids such as fly [ash] would suggest to one of ordinary skill in the art [to] similarly fix lead in other particular solids such as soil....

The possible urging [by Rheox] of solubility has been considered[;] however the instant compounds are water soluble to some degree. Otherwise they would not be suitable for their well known use as fertilizer.

(*Id*. at 2.129-28.)

Rheox filed a response to the first office action on October 4, 1991. Rheox argued that it was proposing a new and unobvious use for commercial fertilizers. (*Id*. at 2.172.) In support of this argument, Rheox submitted a Supplemental Information Disclosure Statement, in which Rheox cited a discussion of fertilizers contained in *Van Nostrand's Scientific Encyclopedia*. (*Id*. at 2.161, 2.173.) According to Rheox, the treatise did not suggest that fertilizers could be used to immobilize lead in contaminated soils. (*Id*. at 2.173-74.) Rheox also argued that the fact that fertilizers may have been used in lead contaminated soil, and therefore may have accomplished lead immobilization without the knowledge of the fertilizer user, did not render the novel use of the materials unpatentable. (*Id*. at 2.175.)

Rheox also addressed the argument that the claims were unpatentable under O'Hara. (*Id*. at 2.177.) Rheox argued, *inter alia,* that (1) O'Hara stated that "calcium phosphate is ineffective as a phosphate source in the immobilization of lead" under O'Hara's invention, and (2) calcium phosphate fertilizers were among the preferred materials for carrying out Rheox's invention. (*Id*. at 2.176-77.)

The PTO Examiner issued his second office action on January 2, 1992, again rejecting all 18 claims; however, he premised his decision only on the claims being unpatentable under O'Hara. (*Id*. at 2.184.) He noted that O'Hara teaches the treatment of lead contaminated solids through the formation of lead phosphate and that Rheox's application would be expected by one of ordinary skill in the art. (*Id*. at 2.185-86.) The Examiner rejected Rheox's attempt to distinguish its application on the basis of solubility. (*Id*. at 2.186.) The Examiner noted in pertinent part:

It is well known to one of ordinary skill in the art that monocalcium phosphate is water soluble and is routinely available as super phosphate ... and triple super phosphate.... The selection of water soluble phosphates such as monocalcium phosphate, known water soluble phosphates, readily available as super phosphate and triple superphosphate and sold in bulk quantities as fertilizers as water soluble phosphate for use in the process of [O'Hara] would be obvious to one of ordinary skill in the art.

(*Id*. at 2.186-87.)

The attorney for Rheox met with the Examiner on March 26, 1992. The Examiner's somewhat cryptic notes (the "Interview Notes") concerning the meeting provide: "Attorney urge [sic] difference based on the use of slightly soluble phosphates versus the soluble phosphates of O'Hara ... Solubility of instant compound and

compounds of O'Hara to be provided...." (*Id*. at 2.195.)

Rheox filed a second response on April 2, 1992 (the "April 2, 1992 Response" or the "Response") that, *inter alia,* canceled claim 2 and amended claims 1 and 18. (*Id*. at 2.197.) Claim 1 no longer stated that the treating agent would be selected from a list of compounds but instead identified the agent as "consisting essentially of calcium orthophosphate." (*Id*. at 2.197-98.) Rheox canceled claim 2, which had identified the agent as comprising a calcium phosphate fertilizer selected from the group consisting of triple superphosphate and superphosphate. (*Id*. at 2.198.) Rheox also amended claim 18 to delete the reference to TSP. (*Id*.)

Rheox stated that it was canceling claim 2, and amending claims 1 and 18, to clarify the invention, to advance its patenability, and to distinguish the invention from the water-soluble compounds and method of treatment taught by O'Hara. (*Id*. at 2.198-99.) In support of this contention, Rheox "point[ed] out that the solubility of calcium orthophosphate is 0.002 grams/100 grams of H_2O" and that O'Hara described this material as insoluble. FN3 (*Id*. at 2.202.) Rheox also asserted that the water-soluble phosphates discussed by O'Hara "are believed to be thousands of times more water soluble than Applicant's preferred (and presently claimed) calcium orthophosphate material." (*Id*.) Rheox noted that the substantial insolubility of "the claimed compound" provides a substantial advantage-prevention of water washout of the lead immobilizing agent-which cannot be achieved by the prior art. (*Id*.)

FN3. It is undisputed that the solubility referred to by Rheox is the solubility of tricalcium orthophosphate: .002 grams/100 grams of water. (Pl.'s Ex. 13 para. 3.3.)

Rheox also stated that the prior art did not suggest that "the calcium orthophosphate material" utilized in its invention could be substituted for the materials used in O'Hara. (*Id*. at 2.202-03.) Rheox again noted that O'Hara indicated that "calcium orthophosphate, $Ca_3(PO_4)_2$," is inoperative for immobilizing lead under the O'Hara method. (*Id*. at 2.203.)

The PTO granted the '600 patent on November 10, 1992. To assist in interpreting the term "calcium orthophosphate," this Court held a three-day *Markman* hearing from January 26 to January 28, 2000. *See* Markman v. Westview Instr., Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996).

DISCUSSION

A court shall enter summary judgment when the moving party demonstrates that "there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed.R.Civ.P. 56(c); *see* Celotex Corp. v. Catrett, 477 U.S. 317, 322-23, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986). Once the moving party has satisfied this initial burden, the opposing party must establish that a genuine issue of material facts exists. Jersey Cent. Power & Light Co. v. Township of Lacey, 772 F.2d 1103, 1109 (3d Cir.1985). The opposing party cannot rest on mere allegations; rather, it must present actual evidence that creates a genuine issue of material fact. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 248, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986) (quotation omitted); Schoch v. First Fidelity Bancorporation, 912 F.2d 654, 657 (3d Cir.1990). Issues of fact are genuine only "if the evidence is such that a reasonable jury could return a verdict for the nonmoving party." Anderson, 477 U.S. at 248.

Summary judgment is as appropriate in a patent case as in any other case when the standard for summary

judgment is met. Johnston v. IVAC Corp., 885 F.2d 1574, 1576-77 (Fed.Cir.1989). "Where the parties do not dispute any relevant facts regarding the accused product, ... but disagree over possible claim interpretations, the question of literal infringement collapses into claim construction and is amenable to summary judgment." General Mills, Inc. v. Hunt-Wesson, Inc., 103 F.3d 978, 980 (Fed.Cir.1997).

It is now well-settled that patent claim construction is a legal question to be determined exclusively by the court. Markman v. Westview Instruments, Inc., 52 F.3d 967 (Fed.Cir.), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). The determination of infringement requires a two-step analysis. Id. at 976. First, the claims must be construed, i.e., the legal meaning and scope of each cited claim must be determined. *Id.* Second, it must be determined whether the claims so construed cover an accused product or process, i.e., whether, in fact, every limitation found in a claim is present in the accused product or process. *Id.* Because claim interpretation is purely a question of law, the parties' dispute over the meaning of claim elements does not raise a "genuine issue as to any material fact," so as to preclude the grant of summary judgment. *Id.* at 983.

Once the claim construction aspect of the infringement inquiry is performed, the next step in analyzing a claim of literal infringement requires that the properly interpreted claims be compared to the accused product or device. Southwall Tech. Inc. v. Cardinal IG Co., 54 F.3d 1570, 1575 (Fed.Cir.1995). The determination of whether the properly construed claims read on the accused device is typically a question of fact. *Id.* In the instant matter, Rheox and Entact agree that if the Court determines that the claimed term "calcium orthophosphate" does not include monocalcium orthophosphate, summary judgment should be granted for Entact. (*See* Def.'s Facts and Conclusions para.para. 5-6.)

To determine the proper meaning of a claim term, a court must "consider the so-called intrinsic evidence, i.e., the claims, the written description, and, if in evidence, the prosecution history." Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1344 (Fed.Cir.1998). In defining claims, courts should first look to words of the claims. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). The "general rule is ... that terms in the claim are to be given their ordinary and accustomed meaning." Johnson Worldwide Assoc., Inc. v. Zebco Corp., 175 F.3d 985, 989 (Fed.Cir.1999).

In determining the ordinary meaning of a claim, a court should "construe the claim language according to the standard of what those words would have meant to one skilled in the art as of the application date." Weiner v. NEC Elec., Inc., 102 F.3d 534, 539 (Fed.Cir.1996); *see* Zelinski v. Brunswick Corp., 185 F.3d 1311, 1315 (Fed.Cir.1999) (where claim language is a term of art, "it is given the ordinary and accustomed meaning as understood by those of ordinary skill in the art."). In ascertaining the meaning of claim language to a person of ordinary skill in the art, a court may rely upon expert testimony. Pitney Bowes, Inc. v. Hewlett-Packard Co., 182 F.3d 1298, 1309 (Fed.Cir.1999). Courts may also rely on dictionary definitions when construing claim terms, so long as the dictionary definitions do not contradict any definition found in or ascertained by a reading of the patent documents. FN4 Vitronics, 90 F.3d at 1584.

FN4. The Court notes that "a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history." Vitronics, 90 F.3d at 1582. The '600 patent, however, does not provide its own definition of calcium orthophosphate.

I. The Definition of Calcium Orthophosphate

The parties offered several treatises and technical dictionaries addressing the definition of calcium orthophosphate. Rheox alleges that the ordinary meaning is a family of compounds containing a "Ca" atom and a "PO_4" ion. (Pl.'s Proposed Conclusions of Law ("Pl.'s Conclusions") para. 8.) According to Rheox, the family includes monocalcium orthophosphate, dicalcium orthophosphate, tricalcium orthophosphate and hydroxyapatite. (Id.)

It is undisputed that the plural of calcium orthophosphate refers to a family of compounds. (*See* Tr. of Hr'g dated 1-27-00 at 264-65, 276; Pl.'s Ex. 7: Lindsay, *Chemical Equilibria in Soils;* Pl.'s Ex. 9: J.C. Elliott, Structure and Chemistry of the Apatites and other Calcium Orthophosphates, *Studies in Inorganic Chemistry;* Pl.'s Ex. 10: Corbridge, Phosphorus: An Outline of its Chemistry, Biochemistry, and Technology, *Studies in Inorganic Chemistry;* Pl.'s Ex. 15: Kirk-Othmer, *Encyclopedia of Chemical Technology;* Def.'s Ex. 23: Mello's *Comprehensive Treatise on Inorganic and Theoretical Chemistry; see also* Def.'s Ex. 21: *The Farm Chemical Handbook* " (referring to calcium phosphate as monocalcium phosphate, dicalcium phosphate and tricalcium phosphate); Def.'s Ex. 22: *The Merck Index* (containing separate definitions for monocalcium phosphate, dicalcium phosphate and tricalcium phosphate but without a separate definition for calcium orthophosphate).)

The Court finds limited support for Entact's assertion that calcium orthophosphate is generally used as a synonym for tricalcium orthophosphate. The *Chemical Abstract Service Registry Handbook* (the "*CAS Registry*"), which is a compilation of all synonyms used to describe a specific chemical compound, identifies calcium orthophosphate as synonymous with tricalcium orthophosphate. (Def.'s Ex. 20; Tr. of Hr'g dated 1-27-00.) The Court is not especially persuaded by the *CAS Registry* as the *CAS Registry* only demonstrates that at least one journal has referred to the compound with the formula $Ca_3(PO_4)_2$ as both tricalcium orthophosphate and calcium orthophosphate. (Tr. of Hr'g dated 1-27-99 at 295-299.) Several other authorities do not identify calcium orthophosphate as a synonym for tricalcium orthophosphate. FN5 (*See, e.g.,* Pl.'s Ex. 3: *CRC Handbook;* Pl.'s Ex. 15: Kirk-Othmer, *Encyclopedia of Chemical Technology*.) The Court would likely deny Entact's motion for summary judgment if the only evidence concerning the meaning of calcium orthophosphate in the '600 patent came from the treatises and dictionaries cited by the parties.

FN5. We note, however, that O'Hara refers to tricalcium orthophosphate as calcium orthophosphate in accordance with the *CAS Registry*. (Pl.'s Ex. 2 at 2.99.)

II. The Prosecution History

The Court, however, finds that the prosecution history reveals that Rheox excluded monocalcium orthophosphate, and consequently TSP, from the definition of calcium orthophosphate in claim 1 of the patent. The prosecution history "contains the complete record of all the proceedings before the Patent and Trademark Office, including any express representations made by the applicant regarding the scope of the claims. As such, the record before the Patent and Trademark Office is often of critical significance in determining the meaning of claims." Vitronics, 90 F.3d at 1582. The prosecution history "limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." *Southwall,* 516 U.S. at 987.

The chronology of the patent process reveals that Rheox deleted references to TSP from its claims after the Examiner expressed objections to TSP. In the second office action, the PTO Examiner rejected the

argument that the invention used insoluble compounds whereas O'Hara did not. (Pl.'s Ex. 2 at 2.186.) The Examiner focused on the inclusion of TSP in the patent application:

It is well known to one of ordinary skill in the art that monocalcium phosphate is water soluble and is routinely available as ... triple super phosphate.... The selection of water soluble phosphates such as monocalcium phosphate, known water soluble phosphates, readily available as super phosphate and triple superphosphate and sold in bulk quantities as fertilizers as water soluble phosphate for use in the process of [O'Hara] would be obvious to one of ordinary skill in the art.

(*Id*. at 2.186-87.)

The record reveals considerable support for the Examiner's statement that TSP is water soluble. For example, *Van Nostrand's Scientific Encyclopedia,* which Rheox submitted to the Examiner to demonstrate that fertilizers had not been used in lead remediation, states that "fortunately, monocalcium phosphate, $Ca(H_2PO_4)_2$, is soluble in water and all moist soils." (Pl.'s Ex. 2 at 2.167.) In addition, the Wahlberg patent, which Rheox submitted to the Examiner with its original application as an example of prior art, also states that monocalcium phosphate is soluble in water. (Pl.'s Ex. 2 at 90 col. 4.)

Rheox responded to the Examiner's rejection of its claims by canceling claim 2, which had identified the agent as comprising a calcium phosphate fertilizer selected from the group consisting of triple superphosphate and superphosphate, and by amending claim 18 to delete the reference to TSP. In addition, claim 1 was changed from stating that the treating agent would be selected from a list of compounds to stating that it would be "consisting essentially of calcium orthophosphate." Rheox in its April 2, 1992 Response stated that it was canceling claims to distinguish the invention from the water-soluble compounds and method of treatment taught by O'Hara as well as to clarify the invention and advance the "patentability" of its application. (Pl.'s Ex. 2 at 2.198-99.) Rheox did not suggest in its April 2, 1992 Response that the patent still encompassed TSP. The simple chronology of the prosecution history supports a conclusion that Rheox narrowed its claims to exclude TSP so that the patent application would be approved.FN6

FN6. Rheox acknowledges that "in many cases claims are canceled to get around the prior art" and that if the term "calcium orthophosphate" included TSP as Rheox alleges, Rheox would not have been required to cancel claim 2 and strike the reference to TSP in claim 18. (Pl.'s Proposed Findings of Fact ("Pl.'s Facts") at 3.59.) Rheox, however, offers two alternative reasons, which it describes as "plausible," for why the references to TSP may have been stricken. First, Rheox's patent expert theorized that by narrowing the treating agent in claim 1 from among several broad groups to only calcium orthophosphate, while adding the "consisting essentially of" language, Rheox revised claim 1 to cover a class of compounds that included TSP and therefore simplified the claim structure by deleting references to TSP in other claims. (Tr. of Hr'g dated 1-27-00 at 88.) This speculation is not supported by any language in the April 2, 1992 Response. The Court also notes that the deletion of TSP in later claims, if TSP were intended to still be covered by the invention, could hardily be described as clarifying the patent application.

Secondly, Rheox's expert suggested that it was arguing patentability on the basis of solubility and that the reference to TSP was dropped because as a commercial fertilizer, TSP may have varying solubilities. (*Id*. at 87-88.) We reject this argument as implausible by noting that nowhere in the prosecution history is there any suggestion that (1) the Examiner was concerned with the possibility of various solubilities for TSP, which he simply deemed water soluble, or (2) Rheox deleted references to TSP for this reason. Rheox's April 2, 1992 Response supports a conclusion that the term "calcium orthophosphate" in claim 1

does not include TSP. The Court finds that, in the April 2, 1992 Response, Rheox presented calcium orthophosphate to the Examiner not as representing an entire family of compounds but as referring only to tricalcium orthophosphate. We note in this regard that Rheox referred to the compound claimed by the patent in the singular. (*See* Pl.'s Ex. 2 at 2.201 (Rheox states that "the presently claimed compound (calcium orthophosphate) is substantially water insoluble"); *id*. at 2.201 ("The substantial water-insolubility of the claimed compound ...").) FN7

FN7. The Examiner also uses the singular form when referring to Rheox's invention in the Interview Notes. (Pl.'s Ex. 2 at 195 ("Solubility data of instant compound and compounds of O'Hara to be provided.").) Rheox correctly notes, however, that the Examiner's comment that "attorney urge [sic] difference based on the use of slightly soluble phosphates versus the soluble phosphates of O'Hara" suggests that Rheox was claiming more than one compound. (*Id*.) The Court will decline to give weight to the Examiner's notes in light of this inconsistency and the evidence that the handwritten notes were not done with great care, e.g. "attorney urge [sic]...."

In the April 2, 1992 Response, Rheox also identified calcium orthophosphate as having the solubility of tricalcium orthophosphate. (*See* Pl.'s Ex. 2 at 2.202 ("Applicant points out that the solubility of calcium orthophosphate is 0.002 grams/100 grams of H_2O."). Rheox further asserted that the water-soluble phosphates discussed by O'Hara "are believed to be thousands of times more water soluble than Applicant's preferred (and presently claimed) calcium orthophosphate material." (*Id*.) This sentence does not make sense if "calcium orthophosphate material" included monocalcium orthophosphate, which has a water solubility of 1.8 grams/100 grams of H_2O, more than 500 times the solubility of tricalcium orthophosphate. (*See* Tr. of Hr'g dated 1-26-00 at 195, 197.) It is undisputed that the phosphates discussed in O'Hara do not have solubilities of 1,000 or above but have solubilities more than a thousand times higher than tricalcium orthophosphate.FN8 (Pl.'s Ex. 13: Expert Report of Gary Pierzynski, Ph.D. at 3-5.)

FN8. Rheox suggests that the April 2, 1992 Response refers only to the solubility of tricalcium orthophosphate because O'Hara specifically discussed tricalcium orthophosphate. However, it is clear from the context of the April 2, 1992 Response that Rheox was limiting its definition of calcium orthophosphate to tricalcium orthophosphate. On the bottom of page 5 of the Response, Rheox stated that "the presently claimed compound (calcium orthophosphate) is substantially water-insoluble." (Pl.'s Ex. 2 at 2.201.) The next line provides: "In this regard, Applicants point out that the solubility of calcium orthophosphate is 0.002 g/100 g H_2O." (*Id*. at 2.202.) The juxtaposition of the phrase "presently claimed compound" with the solubility of tricalcium orthophosphate, tied together by the clause "in this regard," reveals that Rheox was not merely responding to the example used in O'Hara but was instead limiting calcium orthophosphate to tricalcium orthophosphate.

Rheox also stated in the April 2, 1992 Response that "calcium orthophosphate, $Ca_3(PO_4)_2$," was identified by O'Hara as inoperative for immobilizing lead. (Pl.'s Ex. 2 at 2.203.) The inclusion of the empirical formula for tricalcium orthophosphate beside the term "calcium orthophosphate" also indicates that Rheox was limiting the definition of calcium orthophosphate. FN9 In light of our analysis of the prosecution history, the Court finds that (1) Rheox eliminated references to TSP to satisfy the Examiner's objections that TSP is water soluble and therefore obvious under O'Hara, and (2) the term "calcium orthophosphate" in claim 1 refers only to tricalcium orthophosphate.

FN9. It is undisputed that $Ca_3(PO_4)_2$ is the empirical formula for tricalcium orthophosphate. The formula for monocalcium orthophosphate is $Ca(H_2PO_4)_2$. *See* note 1 *supra* for the solubility of these compounds.

Rheox offers an alternative explanation of how the Examiner's objections to the inclusion of TSP were placated. The O'Hara patent states as follows in its written description:

Any convenient source of water soluble phosphate may be used in the practice of this invention. By a water soluble phosphate is meant a phosphate soluble in water at about 20 C. at least to the extent of about five weight volume percent.FN10

FN10. There is no dispute that "five weight volume percent" is the equivalent of 5 grams/100 grams H_2O. (Tr. of Hr'g dated 1-26-00 at 13; Tr. of Hr'g dated 1-27-00 at 289-90.)

(Pl.'s Ex. 6 col. 6.) Rheox notes that all of the calcium orthophosphates, including monocalcium orthophosphate, would be considered insoluble under the O'Hara benchmark. (Pl.'s Facts para. 3.40.) Rheox therefore suggests that the Examiner did not have any basis for objecting to the inclusion of TSP in the patent because monocalcium orthophosphate would not be considered water soluble under O'Hara. (*Id*. para. 3.38.)

There is no evidence, however, that Rheox ever made this argument to the Examiner or that the Examiner considered the O'Hara benchmark. The Examiner simply stated: "It is well known to one of ordinary skill in the art that monocalcium phosphate is water soluble." (Pl.'s Ex. 2 at 2.186.) The Examiner's statement that monocalcium phosphate is known to be water soluble is supported in the literature presented to the Examiner by Rheox. (*See* Pl.'s Ex. 2 at 2.167: *Van Nostrand's Scientific Encyclopedia;* Pl.'s Ex. 2 at 90 col. 4: the Wahlberg patent).

In addition, the Examiner stated that the use of TSP, which he identified as water soluble, "would be obvious" for use in the process of O'Hara. (*Id*. at 2.186-87.) The Examiner did not state that the use of TSP would infringe the O'Hara patent. The Examiner's statement is therefore consistent with the O'Hara solubility benchmark because even if the solubility of monocalcium orthophosphate is lower than the O'Hara benchmark of 5 grams/100 grams of water, its use could still be obvious under O'Hara.

Rheox also cites statements in the April 2, 1992 Response that would allegedly be inconsistent unless monocalcium orthophosphate were meant to be included within the definition of calcium orthophosphate. Rheox notes that page 10 of the April 2, 1992 Response referred to phosphate rock and hydroxyapatite as "forms of calcium orthophosphate." (Pl.'s Facts para. 3.51.) If the term "calcium orthophosphate" is limited to tricalcium orthophosphate, Rheox argues that the Responses's identification of phosphate rock and hydroxyapatite as "forms" of calcium orthophosphate would not make sense.

We note, however, that the statement in the April 2, 1992 Response provided in full: "Applicants point out that phosphate rock and hydroxyapatite are forms of calcium orthophosphate (hydroxyapatite is precipitated calcium orthophosphate); these materials therefore have the water-insolubility of calcium orthophosphate." (Pl.'s Ex. 2 at 2.206.) Entact's technical expert testified that phosphate rock can contain tricalcium orthophosphate and that hydroxyapatite can be precipitated from tricalcium orthophosphate. (Tr. of Hr'g

dated 1-28-00 at 38-42: Schwartz test.) Consequently, the statement in the April 2, 1992 Response that phosphate rock and hydroxyapatite are forms of calcium orthophosphate is not inconsistent with limiting calcium orthophosphate to tricalcium orthophosphate.

Moreover, the statement in the April 2, 1992 Response that phosphate rock and hydroxyapatite have the water-insolubility of calcium orthophosphate makes sense only if referring to one of the compounds included in the family of calcium orthophosphates, instead of the entire family of calcium orthophosphates, because the calcium orthophosphates have different solubilities. (Tr. of Hr'g dated 1-28-00 at 42-43: Schwartz test.) Accordingly, we find that this section of the April 2, 1992 Response is not inconsistent with a definition of calcium orthophosphate as referring to tricalcium orthophosphate.FN11

FN11. Rheox points out another alleged inconsistency in the April 2, 1992 Response created by limiting the term "calcium orthophosphate" to tricalcium orthophosphate. On pages 8-10 of the April 2, 1992 Response, Rheox sets forth a list of ways that its invention differs from O'Hara, including that O'Hara did not teach the use of an agent comprising a mixture of calcium orthophosphate and hectorite gangue. Rheox argues that the only explicit reference to using hectorite gangue with another substance in the written description is found in a table listing experimental runs, which contains references to hectorite gangue mixed with TSP. (Pl.'s Facts para. 3.50.)

We note, however, that the written description also states that hectorite gangue may be used with other agents. (Pl.'s Ex. 1 col. 6.) Thus, the reference in the April 2, 1992 Response could refer to a mixture of tricalcium orthophosphate and hectorite gangue and would therefore not be inconsistent with the reference to hectorite gangue in the written description. Even if an inconsistency were created by the reference to hectorite gangue in the April 2, 1992 Response, however, we would find the inconsistency to be insignificant when compared to the major inconsistencies created in the April 2, 1992 Response if calcium orthophosphate were defined to encompass TSP. (*See, e.g.,* Pl.'s Ex. 2 at 2.202 (stating that calcium orthophosphate has a solubility of .002 grams/100 grams H_2O).)

In conclusion, the Court finds that the prosecution history reveals that Rheox limited the definition of calcium orthophosphate to tricalcium orthophosphate. There is no evidence in the prosecution history to explain the deletion of all references to TSP except that it was done to overcome the Examiner's objections to the inclusion of TSP in the patent application.

III. Written Description

Rheox argues that the written description of the '600 patent supports finding that calcium orthophosphate encompasses monocalcium orthophosphate and that Entact's use of TSP therefore infringes the patent. Before addressing each argument, the Court notes that the written description did not change from the date of the original patent application to the date of publication of the patent. (*Compare* Pl.'s Ex. 1 *with* Pl.'s Ex. 2 at 2.11 to 2.30.) The claims, which were amended, govern what is patented, not the written description. *See Southwall,* 516 U.S. at 987.

Rheox argues that TSP is the preferred embodiment of the invention in the written description and that the term "calcium orthophosphate" should not be interpreted to exclude the use of the preferred embodiment. (Pl.'s Conclusions para. 19.) The written description states that (1) the treating agent is preferably provided in the form of a fertilizer; (2) particularly useful fertilizers include TSP and superphosphate; and (3) TSP is preferred over superphosphate. (Pl.'s Ex. 1 col 4.)

The general rule is that a claim should not be interpreted to exclude the preferred embodiment expressed in the written description. Vitronics, 90 F.3d at 1583. In *Vitronics,* the Federal Circuit stated that defining a claim so that the only embodiment in the written description falls outside the scope of the patent claim is "rarely, if ever, correct, and would require highly persuasive evidentiary support." *Id*. The instant matter, however, is distinguishable because there is more than one embodiment in the written description. (*See* Pl.'s Ex. 1 col. 3 (stating that "[i]n a preferred aspect of the invention," the agents are selected from a group consisting of, *inter alia,* tricalcium orthophosphate); *id*. col. 4 (identifying several "useful inorganic compounds," including tricalcium orthophosphate).)

We hold in this case that the prosecution history, as analyzed above, reveals that the claims were narrowed to exclude TSP. Therefore, the language remaining in the written description which is inconsistent with that construction is not controlling. In *Vitronics,* the Federal Circuit reversed a lower court ruling that construed a claim so that it did not cover the sole embodiment of the invention listed in the patent even though there was no issue of claims being limited during the prosecution history. 90 F.3d at 1583. This Court has found that TSP was specifically excluded by Rheox when it amended its patent application. We accordingly find that interpreting calcium orthophosphate so as not to include TSP is correct even if the written description states that TSP is preferred. *See* Ultra-Temp Corp. v. Advanced Vacuum Sys., Inc., 11 F.Supp.2d 141, 146-47 (D.Mass.1998) (finding that some of the embodiments listed in the written description no longer fell under the "purview" of the claim at issue in light of the amending of the claim to overcome an objection raised by the patent examiner).

Rheox also refers to a table in the written description listing experimental runs to illustrate the treatment of lead contaminated soil according to the process of the invention. (Pl.'s Facts para. 2.11.) The table includes several runs using TSP, and the written description states that "triple superphosphate provided superior lead stabilization results, and reduced the level of hazardous leachable lead to less than 5 ppm." (Pl.'s Ex. 1 ccl. 7.) Rheox argues that, if calcium orthophosphate is limited to tricalcium orthophosphate, none of the agents in the table would fall within that definition. (Pl.'s Facts para. 2.12.)

We note, however, that Rheox told the Examiner in the April 2, 1992 Response that phosphate rock and hydroxyapatite are forms of calcium orthophosphate. (*See* Pl.'s Ex. 2 at 2.206; discussion *supra*.) According to the table, several of the runs were done with hydroxyapatite. (Pl.'s Ex. 1 col. 6.) Defining calcium orthophosphate as limited to tricalcium orthophosphate would therefore not lead to the conclusion that the table fails to include any runs using the ultimately claimed agent. Accordingly, we find that the table is not inconsistent with interpreting calcium orthophosphate as limited to tricalcium orthophosphate.FN12

FN12. There is one statement in the written description that is inconsistent with a definition of calcium orthophosphate as limited to tricalcium orthophosphate. The written description provides that "[a]nalysis by X-ray diffraction and infrared spectroscopy indicated that the bulk of triple superphosphate [used in the experiment] was calcium orthophosphate." (Pl.'s Ex. 1 col. 7.) This statement does not make sense if "calcium orthophosphate" is defined as only tricalcium orthophosphate because monocalcium orthophosphate is the primary ingredient of TSP. Entact's chemistry expert stated that an effective analysis of TSP using X-ray diffraction could not have been done, (Tr. of Hr'g dated 1-27-00 at 253: Schwartz test.), but his statement is irrelevant to an analysis of the meaning of the term "calcium orthophosphate" as used in the written description.

The Court's ultimate conclusion is not affected, however, by the use of the term "calcium orthophosphate" in this manner given that it occurred prior to both the Examiner's rejection of the patent application and

Rheox's defining of calcium orthophosphate in a limited manner so as to be awarded the patent.
In conclusion, the Court finds that the term "calcium orthophosphate" as contained in claim 1 does not include monocalcium orthophosphate. Therefore, Entact's use of TSP does not infringe the '600 patent. Accordingly, we will grant Entact's motion for summary judgment.

IT IS THEREFORE on this 17th day of August, 2000 ORDERED that defendant's motion for summary judgment be and hereby is GRANTED.

D.N.J.,2000.
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