United States District Court,
E.D. Pennsylvania.

ROHM AND HAAS COMPANY,
v.
LONZA INC. and.

Feb. 11, 1998.

Patent infringement action was brought, involving patent on biocidal chemicals used in pesticides. The District Court, Ludwig, J., held that: (1) contested terms had meanings assigned to them by court, and (2) claim element of patent referring to ppm (parts per million) would be corrected to refer simply to "parts."

Ordered accordingly.

5,312,827. Cited.

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MEMORANDUM

LUDWIG**, District Judge.**

This is an adjudication following a *Markman* hearing. Markman v. Westview Instruments, Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). The patent claims at issue involve biocidal chemicals used in pesticides. In 1994, plaintiff Rohm and Haas Company was issued U.S. Patent No. 5,312,827 ('827 patent). In this action, Rohm and Haas contends that pesticides developed by defendant Sunkyong Industries, Ltd. and marketed by defendant Lonza, Inc. constitute literal infringements of the '827 patent. Jurisdiction is federal question, 28 U.S.C. s. 1331 (1994), which is exclusive in patent actions, 28 U.S.C. s. 1338(a) (1994).

Plaintiff is proceeding on claims 1, 2, 3, 5, 6, and 8 of the '827 patent, all of which describe chemical compositions. Prior to the patent, biocidal chemicals called 3-isothiazolone compounds were known to be effective pesticides. However, because these compounds, in solution, tended to decompose and become unstabilized, a metal nitrate salt was added. As an untoward result, potentially carcinogenic compounds-nitrosamines-also were produced. The '827 patent consisted of 12 compositions and processes intended to reduce or eliminate nitrosamines and impurity by-products that can become nitrosamine precursors.

[1] In a literal infringement action, there are two steps. First, the claims in question must be construed for scope and meaning. *See* Markman, 517 U.S. at 371, 116 S.Ct. at 1387. Second, there is the question whether the claims, as construed, cover the accused device or process. *See* Serrano v. Telular Corp., 111 F.3d 1578, 1582 (Fed.Cir.1997). Here, only the *Markman* phase is under consideration.

I. *Markman* Analysis

[2] [3] [4] [5] The objective of claims construction analysis is to ascertain the meaning that a person of ordinary skill in the art would give to the claims in dispute. *See* Wiener v. NEC Electronics, Inc., 102 F.3d 534, 539 (Fed.Cir.1996); Haynes Int'l, Inc. v. Jessop Steel Co., 8 F.3d 1573, 1578 n. 4 (Fed.Cir.1993). The operative time is the date of the application for the patent. *See* Wiener, 102 F.3d at 539. In this case, the original application, Serial No. 383,858, was filed with the Patent and Trademark Office on June 1, 1982. *See* '827 patent, at 1. In construing an asserted claim, the first and paramount precept is to look to the intrinsic evidence of record, *i.e.,* the patent itself, which includes the claims and the specification, together with the prosecution history before the Patent and Trademark Office. *See* Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996); Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995). Intrinsic evidence is "the most significant source of the legally operative meaning of disputed claim language." *Id.*

[6] [7] To delineate the scope of coverage, the wording of the claims, asserted and non-asserted, should be examined in their entirety. *See* Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 620 (Fed.Cir.1995). While the claim's words and phrases should be given their ordinary and customary meaning, "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 is clearly stated in the patent specification or file history." Vitronics, 90 F.3d at 1582.

[8] For these reasons, an evaluation of the specification is essential; the claims "must be read in view of the specification, of which they are a part." Markman, 52 F.3d at 979 (citing Autogiro Co. of Am. v. United States, 181 Ct.Cl. 55, 384 F.2d 391, 397 (1967)). As articulated by the Federal Circuit:

The specification contains a written description of the invention which must be clear and complete enough to enable those of ordinary skill in the art to make and use it. Thus the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.

Vitronics, 90 F.3d at 1582.

[9] Prosecution history should also be considered as intrinsic evidence, including the record of proceedings before the Patent and Trademark Office. *See id.* (Prosecution history is "often of critical significance in determining the meaning of the claims"). Those proceedings may incorporate the patentee's representations as to claim scope, together with a review of the prior art. *See id.* at 1583.

[10] [11] [12] "In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term." *Id.* (citing Pall Corp. v. Micron Separations, Inc., 66 F.3d 1211, 1216 (Fed.Cir.1995)). Accordingly, it ordinarily would be improper to resort to extrinsic evidence such as expert testimony, dictionaries or learned treatises. *See id.* FN1 However, in the unusual case, the patent record may be insufficient or an otherwise unsatisfactory basis to enable the claims to be rationally construed. *See* Vitronics, 90 F.3d at 1585. In that narrow instance, extrinsic evidence is permissible on the issue of how someone skilled in the art would understand the claims. *See* Markman, 52 F.3d at 979. Nevertheless, such extrinsic evidence may not contradict the manifest meaning of the claims as set forth, even by implication,

in the specification and prosecution history. *See* Vitronics, 90 F.3d at 1584-85.

FN1. Extrinsic advice may be utilized to assist the judge in understanding scientific and technical matters. *See* Vitronics, 90 F.3d at 1585; *Manual for Complex Litigation (Third)* s. 21.51 (1997). In this case, with the parties' consent, Adam B. Smith, III, Ph.D., professor of chemistry at the University of Pennsylvania, was retained as an independent expert to act as the court's technical consultant. *See* Fed.R.Evid. 706 (the court may appoint an independent expert). With the parties' agreement, a series of questions were submitted to Dr. Smith, and he answered them in the courtroom with counsel present.

Here, having reviewed the intrinsic evidence, it appears to be unnecessary-and insupportable-to go beyond the proffered record. FN2 Plaintiff has shown that the intrinsic evidence is a legally sufficient matrix for claims construction in this case.

FN2. Defendants' requests for discovery of extrinsic evidence and to adduce such evidence at the *Markman* hearing were denied without prejudice.

II. Disputed Elements

The following meanings are adjudicated:

[13] 1. "Stabilized" (all asserted claims)-means resistant to decomposition, particularly the opening of the isothiazolone ring. The backdrop, or explanation, is that shelf-life of the stabilized composition is significantly longer than that for an unstabilized composition under the same storage conditions. *See* Joint *Markman* Hearing Statement, at 10.

The language of the '827 patent specification, its prior art, and the prosecution history support this construction. The '827 patent specification states:

Unfortunately, solutions of the 3-isothiazolones, especially aqueous solutions or solutions in polar organic solvents such as alcohols, are unstable, leading to reduced biological effectiveness.

* * * * * *

The instability results from an opening of the isothiazolone ring to form linear compounds which do not have the same biological properties as the ring compounds. To inhibit ring cleavage, nitrate salts ... can be added to isothiazolone solutions. Thus it is commercially desirable today to formulate many of the 3-isothiazolone biocides in solutions containing water or organic solvent or mixtures thereof together with nitrate stabilizers to prevent decomposition of the 3-isothiazolone (see U.S. Pat. No. 3,870,795).

'827 patent, at 1:53 to 2:2. The '827 patent specification also explicitly references prior art-U.S. Patents Nos. 3,870,795 ('795 patent), and 4,067,878 ('878 patent) FN3-which bolster the same construction. *See* '795 patent, at 1:23-29 ("While such formulation [of 3-isothiazolones in water or polar organic solvents] has no effect on [their] stability or function ... if used relatively quickly, extended storage of the formulated solutions, especially at elevated temperatures, may result in chemical decomposition of the 3-isothiazolone active ingredient and, thus, lead to reduced biocidal effectiveness of the solution."); '878 patent, at 1:29-36 (same language).FN4

FN3. The title of the '795 patent is "Stabilization of solutions of 3-isothiazolones employing certain metal nitrates and nitrites." The title of the '878 patent is "Stabilization of solutions of 3-isothiazolones."

FN4. The '795 and '878 patents describe methods for stabilizing 3-isothiazolone solutions using metal nitrates and nitrites. Both patents include tables illustrating the percentage decomposition of 3-isothiazolone solutions under a variety of active ingredient concentrations and types of nitrate salt stabilizers. *See* '795 patent, Tables I to X; '878 patent, Tables I to X; *see also* '795 patent, at 3:33-38 ("[T]he amount of metal nitrate or nitrite needed to stabilize the solution will be partly dependent on the solvent, the isothiazolone and its concentration, the nitrate or nitrite used, the length of time the solution is to be kept, and other related factors"); '878 patent, at 3:39-44 (same language).

The prosecution of application no. 383,858, the original ancestor of the '827 patent, also confirms this construction of "stabilized." A letter from plaintiff dated September 19, 1983, supplementing the application, explicated:

Shortly after discovering the novel group of 3-isothiazolone compounds, it was discovered that such compounds were not stable upon storage in solutions such as aqueous solutions and alcohol solutions. This problem was obviated when it was discovered that such compounds could be stabilized in solution using metal nitrates and nitrites. (U.S.Pat.3,870,795).

Applicants now have discovered that the second invention, *i.e.,* the discovery of a means for stabilizing the 3-isothiazolones, while effective and necessary in order to ship and store solutions of 3-isothiazolones, causes a new problem. The new problem resulted from a finding that the nitrate stabilizer, added for the purpose of preventing decomposition of the isothiazolone, reacts with by-products formed in the isothiazolone reaction to produce nitrosamines.

Prosecution History, Serial No. 383,858, Paper No. 5, Sept. 19, 1983 letter of Marc S. Adler, at 1-2 (plaintiff's exh. 7; defendants' exh. 1).

Defendants' position is that the '827 patent's reference to the '795 patent is vague because the '795 patent tolerates continuing decomposition even after addition of the nitrate salt. *See* Joint *Markman* Hearing Statement, at 13-14. Examination of the explicitly referenced '795 patent, however, reveals that plaintiff never intended "stabilized 3-isothiazolone solution"-as used in the '827 patent-to mean a solution forever resistant to decomposition.FN5 Defendants do not propose an alternative meaning. To the extent that defendants' argument comes down to vagueness, it is inappropriate in a *Markman* proceeding. "Ambiguity, undue breadth, vagueness, and triviality are matters which go to claim *validity* for failure to comply with 35 U.S.C. s. 112-para. 2, not to interpretation or construction." Intervet Am. v. Kee-Vet Laboratories, 887 F.2d 1050, 1053 (Fed.Cir.1989) (emphasis in original).

FN5. In his testimony, Dr. Smith described stabilization as a "qualitative term" that "depends, by and large, on the system that one is concerned with, and the conditions under which it is placed." Dr. Smith, tr. at 12, Aug. 7, 1997. A precise durational definition of "stabilized" was, in his opinion, unnecessary to an understanding of what the '827 patent teaches- *i.e.,* removal of potentially carcinogenic nitrosamines from 3-isothiazolones in solution. *See* id. at 14, 16.

[14] 2. "Substantially free of nitrosamines or precursors" (all asserted claims)-means that the combined content of nitrosamine and nitrosamine precursors is sufficiently low that no appreciable danger to humans or animals will result from contact with the compositions at issue. *See* Joint *Markman* Hearing Statement, at 14.

Defendants contest this construction. They contend the meaning is that the claimed compositions contain "either (1) a detectable amount, but less than 100 ppm, of nitrosamines or (2) a detectable amount, but less than 100 ppm, of precursors of nitrosamines." Joint *Markman* Hearing Statement, at 24. This view conflicts with the '827 patent specification and the prosecution history.

The '827 patent specification describes the invention as "directed to 3-isothiazolone compositions containing little or no nitrosamine impurities. " '827 patent, at 1:13-14. It also states:

The stabilized 3-isothiazolone compositions which can be prepared according to the processes of the present invention are "sustantially free" of nitrosamine precursors and nitrosamines, that is, they contain less than about 100 ppm of such materials, preferably less than 50 ppm. Even more preferred for sensitive applications or uses which require only minimal dilution, are compositions containing less than 20 ppm of precursors and nitrosamines. As will be demonstrated hereinafter it is even possible to produce compositions with no detectable nitrosamine or precursor compounds.

'827 patent, at 5:47-57. The specification expressly contemplates solutions with no "detectable nitrosamine impurities." Here, the patentee was its own lexicographer in that it provided a special definition of "substantially free" in the specification. Also, in claim 10 of the '827 patent-a claim dependent upon claim 1, in which "substantially free" first appeared-a second claim is made for a composition containing "no detectable nitrosamine or nitrosamine precursor[s]." Id. at 18:6-8.

The "no detectable" wording of the specification is also consistent with adding together the combined amounts of nitrosamine and nitrosamine precursors, as against considering each amount separately. Defendants insist that "or" should be read in the disjunctive. *See* Joint *Markman* Hearing Statement, at 26. The specification defines "nitrosamine precursor" as "a secondary amine (and if present, a tertiary amine) by-product compound which can be converted into a nitrosamine." '827 patent, at 3:16-20. A nitrosamine precursor is a potential nitrosamine. Since the evident purpose of the patent is to maintain nitrosamine amounts below a certain level, it makes sense to aggregate potential nitrosamines with existing ones.FN6

FN6. The prosecution history of the '827 patent is in accord. A decision of the Board of Patent Appeals and Interferences regarding the '827 patent application stated: "While the precursors themselves do not appear to be particularly toxic, they are converted into highly toxic nitrosamines as a direct result of adding the metal nitrate salt [as described in the '795 patent], whereupon nitrosation takes place to form the toxic nitrosamine." Prosecution History, Serial No. 383,858, Paper No. 29, May 30, 1989 decision of Board of Patent Appeals and Interferences, at 6 (plaintiff's exh. 7; defendants' exh. 1).

[15] 3. "Biologically effective amount" (all asserted claims)-means an amount of active ingredient-the 3-isothiazolone-sufficient to obtain effective control of organisms or microorganisms when used or applied by methods such as spraying, fumigating, dusting, and soaking. *See* Joint *Markman* Hearing Statement, at 27.

The '827 patent specification references U.S. Patent No. 3,761,488 ('488 patent). *See* '827 patent, at 1:22-23. The specification of the '488 patent, entitled "3-isothiazolones," speaks to the manner and means of effective control:

Generally, control of an organism is achieved in accordance with this invention by contacting the organism with an isothiazolone in an amount which is effective to control said organism. Any of the techniquesknown in the art can be employed to disseminate the isothiazolones in a manner so as to achieve the desired contact with the organism to be controlled. Spraying and fumigating are typical of such techniques.

'488 patent, at 18:50-57. The '488 patent specification also states: "[E]ffective ... control" of microorganisms

"may be accomplished by varying means common to the art, such as slurrying, soaking, dusting, spraying and the like." Id. at 17:49-50 and 54-56.

The parties do not dispute the meaning of "biologically active." *See supra* part I, para. 6. However, defendants would construe the phrase to signify enough 3-isothiazolone biostatic or biocidal activity as is necessary to produce a solution that is safe and non-deleterious to humans and animals. *See* Joint *Markman* Hearing Statement, at 29. Defendants also cite the '488 patent specification: "By seed treatment is meant the disseminating of a biocidally active material over a seed subject to the attack of microorganisms, and particularly fungi, in an amount which is effective to control such microorganisms without deleteriously effecting the seed." '488 patent, at 17:46-51. This '488 excerpt is not helpful to defendants' position. Biocidal effectiveness and nondeleteriousness are listed as components of '488's definition of "seed treatment." The former is directed to the pest; the latter to the host.

The same is true of the '827 patent: A "biologically effective amount" refers to pest control. A "nondeleterious" result or effect denotes that low levels or absence of nitrosamine and nitrosamine precursors in 3-isothiazolone solutions would avoid harmful consequences to humans and animals. The two points are definitionally distinct.FN7

FN7. For example, 3-isothiazolone solution could be biologically effective and yet harmful if high levels of nitrosamines or nitrosamine precursors were present.

[16] 4. "Ring-stabilizing amount" (all asserted claims)-means that the amount of soluble metal nitrate salt is sufficient to stabilize the 3-isothiazolone and deter decomposition. *See* Joint *Markman* Hearing Statement, at 29.

Defendants' view-an amount of metal nitrate sufficient to inhibit opening of the 3-isothiazolone ring, *see* Joint *Markman* Hearing Statement, at 30-is similar. Their argument is that this claim term is indefinite because the amount of metal nitrate salt is not specified. *See* Tr. at 86, Apr. 7, 1997. The rebuttal is found in prior art: "Of course, the amount of metal nitrate or nitrite needed to stabilize the solution will be partly dependent on the solvent, the isothiazolone and its concentration, the nitrate or nitrite used, the length of time the solution is to be kept, and other related factors. " '795 patent, at 3:33-38; '878 patent, at 3:39-44; *see also supra* note 4. To the extent that this may be a vagueness invalidity issue, 35 U.S.C. s. 112-para. 2, it is inappropriate in a *Markman* proceeding. *See* Intervet Am. v. Kee-Vet Laboratories, 887 F.2d 1050, 1053 (Fed.Cir.1989).

5. "Sufficient water" (claims 1, 2, 3, and 8)-means enough water to form a solution of the active ingredient and the nitrate salt. *See* Joint *Markman* Hearing Statement, at 30.

[17] The '827 patent specification and the prior art are clear. *See* '827 patent, at 1:38-43 ("When the 3-isothiazolone is one in which Y [in the formula described at 1:25-30] is lower alkyl, and at least one of R and R' is halogen ..., the compounds are useful industrial biocides having almost unlimited solubility in water") (citing U.S. Patent No. 4,105,431 (entitled "3-isothialzolones as biocides") ('431 patent)); '431 patent, at 20:51-54 ("Compounds of this invention can be dissolved in a water-miscible liquid, such as ethanol, isopropanol, acetone, and the like. Such solutions are easily extended with water.").

Defendants' sole objection is that the claim term is "ambiguous" given "the other ambiguities in the claim limitations ." Joint *Markman* Hearing Statement, at 31.FN8 As an invalidity argument, it is premature. *See* 35 U.S.C. s. 112-para. 2 (1994); Intervet Am., 887 F.2d at 1053.

FN8. Defendants advanced no alternative construction of this claim term either in the Joint *Markman*

Hearing Statement or at the *Markman* hearing.

[18] 6. "Said composition containing less than 100 ppm of by-product compounds containing an amine moiety capable of being nitrosated or a nitrosamine compound derived therefrom per 150,000 parts of (a)" (claim 1)-this statement contains an error. The term "ppm" appears to have been mistakenly used instead of "parts." The claim element should have read:

Said composition containing less than 100 parts of by-product compounds containing an amine moiety capable of being nitrosated or a nitrosamine compound derived therefrom per 150,000 parts of (a).

See Joint *Markman* Hearing Statement, at 32.

[19] The prosecution history and claim 8 of the '827 patent are persuasive.FN9 Serial No. 970,971, which led directly to the '827 patent, was a continuation application of abandoned Serial No. 728,438. FN10 A change from "parts" to "ppm" occurred during proceedings relating to Serial No. 728,438. On July 11, 1991 a preliminary amendment to Serial No. 728,438 was submitted to the Patent and Trademark Office consisting of independent process claim 14 and several dependent composition claims. Claim 21-the claim that eventually became claim 1 of the '827 patent-described a "[c]omposition according to claim [20] containing less than 100 parts nitrosamine compound per 150,000 parts 3-isothiazolone compound." Prosecution History, Serial No. 728,438, Paper No. 6, July 11, 1991 preliminary amendment, at 2 (plaintiff's exh. 10; defendants' exh. 6). On June 11, 1992, in a subsequent amendment, claim 21 was rewritten as an independent composition claim. *See* id . Paper No. 10, June 11, 1992 amendment, at 1-2. The rewritten claim, however, provided: "said composition containing less than 100 *ppm* of said by-product compounds per 150,000 parts 3-isothiazolone compound." Id. at 2 (emphasis added).

FN9. A certificate of correction granted to plaintiff on March 4, 1997-while no doubt indicative of a mistake-is not legally determinative. Plaintiff's position, relying on 35 U.S.C. s. 255, is that the issuance of the certificate of correction mooted the dispute over this claim element. *See* Joint *Markman* Hearing Statement, at 32. Section 255 states that after the issuance of a certificate of correction by the Patent and Trademark Office, "[s]uch patent, together with the certificate, shall have the same effect and operation in law on the trial of actions for causes thereafter arising as if the same had been originally issued in such corrected form." 35 U.S.C. s. 255 (1994).

The present lawsuit was filed on August 19, 1996. The certificate of correction was not issued until more than five months later. Accordingly, this action can not be said to have been "thereafter arising" under s. 255.
FN10. Serial No. 970,971 was filed with the Patent and Trademark Office on November 2, 1992. Serial No. 728,438 was filed on August 12, 1991. *See* '827 patent, at 1.

While both parties refer to the same prosecution history, their explanations differ as to how claim 1 reached its final form. There can be no doubt that a mistake occurred. To begin with, claim 8 is dependent upon claim 1. It states: "Composition according to claim 1 containing less than 20 parts nitrosamine compound per 150,000 parts 3-isothiazolone compound." '827 patent, at 17:13-15. This claim, which also was part of Serial No. 728,438, as dependent composition claim 22, was not rewritten during the '827 prosecution. "Interpretation of a disputed claim term requires reference not only to the specification and prosecution history, but also to other claims." Southwall Technologies, Inc. v. Cardinal IG Co., 54 F.3d 1570, 1579 (Fed.Cir.1995), *cert. denied,* 516 U.S. 987, 116 S.Ct. 515, 133 L.Ed.2d 424 (1995). Since claim 8 sets forth the same composition as that described in claim 1, there is an irreconcilable inconsistency between the two claims. A parsing of each of them cogently points out claim 1 as the place of the error.

As written, claim 1 says "less than 100 ppm"-parts per million-"per 150,000 parts." On the face of it, this statement seems quantitatively anomalous. To someone who has skill in the art-here, Dr. Smith-it appeared to have been, in his words, a "typographical error," to which he added:

One would not talk about parts per million per 150,000. That just seems illogical to the way I would quantitate anything. If I'm going to use the parts per million designation then its per million, not per some other amount.

Dr. Smith, tr. at 32-33, Aug. 7, 1997. Defendants' remedial construction of claim 1 is to let stand "less than 100 ppm" and to lop off "per 150,000 parts." Given the prosecution history and claim 8, that strained construction must be rejected in favor of deleting "ppm" and substituting "parts." FN11

FN11. Defendants' invalidity argument and the assertion, *see* Joint *Markman* Hearing Statement, at 36, that plaintiff violated its duties under 37 C.F.R. s. 1.56 of good faith, candor and disclosure to the Patent and Trademark Office in obtaining the certificate of correction are not reached.

[20] 7. "Containing less than 25 parts per million by weight of by-product nitrosamine impurities or precursors thereof" (claims 5 and 6)-means less than 25 parts by weight of by-product nitrosamine impurity and precursor per million parts of stabilized aqueous 3-isothiazolone solution as a whole, such solution being comprised of active ingredient(s), nitrate salt(s), and water. *See* Joint *Markman* Hearing Statement, at 43.

Example 4 of the '827 patent specification evinces this construction. *See* '827 patent, at 12:25-68. Defendants' question the use of "or"-as an indeterminate disjunctive-and "25 parts per million" because it weakens the validity the terminology of claim 1. These issues have been ruled on, *see* supra para.para. 2, 6.

[21] 8. "Less than 20 parts nitrosamine compound per 150,000 parts 3-isothiazolone compound" (claim 8)-means that there are less than 20 parts of nitrosamine compound per 150,000 parts of active ingredient(s). *See* Joint *Markman* Hearing Statement, at 44.

This dependent claim requires a higher degree of purity than that described in claim 1. Defendants' challenge relies on their view of claim 1, which has been disapproved, *see supra* para. 6.

Upon consideration of the '827 patent claims and specification, and the prosecution history, plaintiff's asserted claims will be construed in accordance with this memorandum and the accompanying order.

ORDER

AND NOW, this 11th day of February, 1998, the claim elements in claims 1, 2, 3, 5, 6, and 8 of U.S. Patent No. 5,312,827 ('827 patent) are construed as follows:

I. Claim Terms and Phrases not in Dispute

As agreed by the parties, the following are assigned the meaning set forth in the Joint *Markman* Hearing Statement, pages 2-4, which are adopted in full. See Attachment, 1-3.

1. 5-chloro-2-methyl-3-isothiazolone or 5-chlor o-2-methyl-4-isothiazolin-3-one (all asserted claims).

2. 2-methyl-4-isothiazolin-3-one (claims 3, 5, and 6).

3. Byproduct compounds (all asserted claims).

4. Nitrosamine compound (all asserted claims).

5. Nitrosamine precursor or a compound containing an amine moiety capable of being nitrosated (all asserted claims).

6. Biologically active (all asserted claims).

II. Disputed Claim Elements

The disputed terms of '827 patent shall have the following meanings:

1. "Stabilized" (all asserted claims)-means resistant to decomposition, particularly the opening of the isothiazolone ring, so that shelf-life of the stabilized composition is significantly longer than for an unstabilized composition under the same storage conditions.

2. "Substantially free of nitrosamines or precursors" (all asserted claims)-means the combined content of nitrosamine and nitrosamine precursors is sufficiently low that no appreciable danger to humans or animals results from contact with the compositions claimed.

3. "Biologically effective amount" (all asserted claims)-means an amount of active ingredient-the 3-isothiazolone-in the claimed compositions sufficient to obtain effective control of organisms or microorganisms when used or applied by means such as spraying, fumigating, dusting, and soaking.

4. "Ring-stabilizing amount" (all asserted claims)-means that the amount of soluble metal nitrate salt is sufficient to stabilize the 3-isothiazolone and deter decomposition.

5. "Sufficient water" (claims 1, 2, 3, and 8)-means enough water to form a solution of the active ingredient and the nitrate salt.

6. "Said composition containing less than 100 ppm of by-product compounds containing an amine moiety capable of being nitrosated or a nitrosamine compound derived therefrom per 150,000 parts of (a)" (claim 1)-contains an error. The term "ppm" was mistakenly used instead of "parts." The claim element should have read:

Said composition containing less than 100 parts of by-product compounds containing an amine moiety capable of being nitrosated or a nitrosamine compound derived therefrom per 150,000 parts of (a).

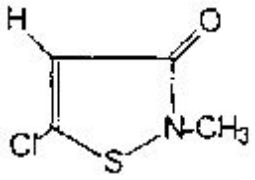
7. "Containing less than 25 parts per million by weight of by-product nitrosamine impurities or precursors thereof" (claims 5 and 6)-means less than 25 parts by weight of by-product nitrosamine impurity and precursor thereof per million parts of stabilized aqueous 3-isothiazolone solution as a whole, such solution being comprised of active ingredient(s), nitrate salt(s), and water.

8. "Less than 20 parts nitrosamine compound per 150,000 parts 3-isothiazolone compound" (claim 8)-means less than 20 parts of nitrosamine compound per 150,000 parts of active ingredient(s).

I. Claim Terms and Phrases not in Dispute:

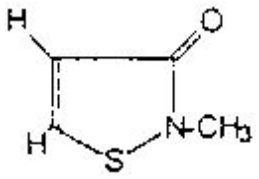
1. 5-chloro-2-methyl-3-isothiazolone or 5-chloro-2-methyl-4-isothiazolin-3-one (in all asserted claims).

"5-chloro-2-methyl-3-isothiazolone" or "5-chloro-2-methyl-4-isothiazolin-3-one" are alternative nomenclatures for the compound depicted structurally as:



2. 2-methyl-4-isothiazolin-3-one (in claims 3, 5, and 6).

"2-methyl-4-isothiazolin-3-one" is the compound depicted structurally as:



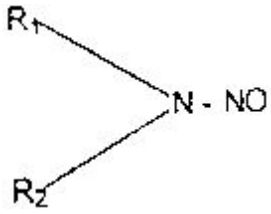
3. Byproduct compounds (in all asserted claims).

This refers to undesirable or unintended compound(s) co-produced during the process of making the 3-isothiazolone compounds. The '827 patent explains the formation of such undesirable compounds (containing an amine moiety capable of being nitrosated or a nitrosamine compound derived therefrom) at column 3, line 55 to column 5, line 5.

4. Nitrosamine compound (in all asserted claims).

The term "nitrosamine" commonly means a compound of the illustrative formula:

***645**



where R_1 and R_2 are organic groups.

The '827 patent, column 5, lines 4-5, provides the structures of nitrosamine compounds that may be produced and which the patent instructs to avoid or minimize in the 3-isothiazolone compositions.

5. Nitrosamine precursor or a compound containing an amine moiety capable of being nitrosated (in all asserted claims).

These terms mean chemical compounds which can, under the reaction conditions employed, be converted into unwanted nitrosamine compounds. "Nitrosated" is the term used for the conversion of an amine compound, usually a secondary or tertiary amine compound, to a nitrosamine compound. Some of the principal nitrosamine precursors are illustrated at column 4, lines 37-44 and lines 55-56 of the '827 patent; column 4, line 6 to column 5, line 5 of the '827 patent describes the principal nitrosamine reactions that occur during synthesis of the 3-isothiazolone compounds.

6. Biologically active (in all asserted claims).

"Biologically active" means exhibiting biostatic and/or biocidal activity toward many pests of both animal and vegetable origin, such as fungi, bacteria, algae, slime, barnacles, and mildew ('827 patent, column 1, lines 19-23). This term alone does not describe any amount. Rather, it describes a property of a material.

E.D.Pa.,1998.
Rohm and Haas Co. v. Lonza Inc.