United States District Court,
D. Delaware.

In re MANCHAK PATENT LITIGATION.

No. MDL 1228-RRM

May 9, 2002.

Background: Patentee brought actions against three alleged infringers of its patent for a method of transforming sludge into solid material, and actions were consolidated. Alleged infringers moved for summary judgment.

Holdings: The District Court, McKelvie, J., held that:
(1) alleged infringer's process directed to the processing of inorganic flue dust from its copper smelter did not infringe patent;
(2) genuine issues of material fact precluded summary in favor of the other infringers.

Motions granted in part and denied in part.

4,028,240, 4,079,003. Cited.

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MEMORANDUM OPINION

MCKELVIE**, District Judge.**

This is a multi-district patent case. Plaintiff Frank Manchak Jr. resides in Santa Barbara, California and is the owner of U.S. Patent No. 4,079,003 (the '003 patent), entitled "Method of Transforming Sludge Into Ecologically Acceptable Solid Material." Manchak brought twelve suit in numerous districts, alleging that the various defendants infringed the claims of the '003 patent before its expiration on June 7, 1994. On June

3, 1998, the Judicial Panel on Multidistrict Litigation ordered that Manchak's infringement suits be consolidated before this court pursuant to 28 U.S.C. s. 1407.

The defendants in three of those consolidated actions have moved for summary judgment of noninfringement. Those defendants, and the corresponding suits, are: (i) Atlantic Richfield Company ("ARCO"), a Delaware company with its principal place of business in Los Angeles, California, *Manchak v. Atlantic Richfield Co.,* C.A. No. 97-699-RRM; (ii) District of Columbia Water and Sewer Authority ("DCWASA"), an independent entity of the District of Columbia government, *Manchak v. District of Columbia,* C.A. No. 98-328-RRM; and (iii) Agronomics Management Group, Inc. ("AMG"), a Texas company with its principal place of business in Fort Worth, Texas, *Manchak v. Chemical Lime Co.,* C.A. No. 98-356-RRM. This is the court's decision on the defendants' motions.

I. *FACTUAL AND PROCEDURAL HISTORY*

The '003 patent has been the subject of previous litigation in this court. *See Manchak v. Chemical Waste Mgmt., Inc.,* C.A. No. 95-709-RRM (D.Del. May 1, 1997) (the " *Sevenson* litigation"), *rev'd,* 217 F.3d 860 (table), 1999 WL 1103364 (Fed.Cir. Dec.6, 1999), *cert. denied,* 530 U.S. 1231, 120 S.Ct. 2663, 147 L.Ed.2d 276 (2000); Manchak v. Rollins Envtl. Servs., Inc., C.A. No. 96-37-SLR, 1996 WL 790100 (D.Del. Dec.18, 1996).

The following facts are taken from this court's earlier opinion in the *Sevenson* litigation, the '003 patent, the prosecution history of that patent, and the affidavits and documents submitted by the parties.

A. *The* '003 Patent *and its Prosecution History*

Because this court has already discussed the '003 patent at length, in this opinion it will briefly summarize the details salient to these motions.

Manchak filed a patent application on October 15, 1973. That application described a method of using calcium oxide, popularly referred to as lime or quick-lime, to neutralize organic material in sumps. The Patent and Trademark Office (PTO) Examiner rejected the method claims of the 1973 application as either obvious based on U.S. Patent No. 3,476,683 (the "Liljegren patent"), or obvious in light of the Liljegren patent in combination with other patents. The Liljegren patent discloses a method of separating inorganic impurities from sewage.

Manchak appealed the rejection of some of those claims to the Board of Appeals of the PTO, which reversed the decision of the Examiner with respect to the first two claims of Manchak's application. Those two claims issued on June 7, 1977 as U.S. Patent No. 4,028,240 (the " '240 patent").

Manchak filed a second application on June 1, 1976 as a continuation-in-part of his 1973 application. The PTO Examiner rejected several claims of the 1976 application as obvious, once again based on the Liljegren patent or the Liljegren patent in light of other patents. Manchak withdrew the remaining claims. Manchak eventually cancelled the original 26 claims of the 1976 application, and added new claims 27-43 to distinguish his invention from the Liljegren patent. On June 2, 1977, the PTO Examiner rejected claims 27-43 as obvious in light of Manchak's '240 patent. Manchak filed a terminal disclaimer on July 20, 1977, specifying that "any patent granted on this application shall be enforceable only for and during such period that said patent is commonly owned with" the '240 patent. On March 14, 1978, the '003 patent issued, with claims 27-41 of the application issuing as claims 1-15 of the '003 patent. The '003 patent is comprised of one independent claim (claim 1) and fourteen dependant claims (claims 2-15).

The '003 patent discloses a method of treating "aqueous organic solutions containing sludge" by mixing

them with calcium oxide, which is also referred to in the patent as lime. Mixing the sludge with calcium oxide at a predetermined rate produces an exothermic reaction and decreases the acidity of the solution to a pH of at least 12. FN1 As a result, the water in the sludge is converted to steam and the bacteria and viruses present are deactivated. The transformed sludge thereby becomes a "solid, friable, and substantially odor free reaction product" that can be used for agriculture or disposed in landfills.

FN1. pH is a measure of the acid or base characteristics of a substance on a scale of 0 to 14. Seven is a neutral measure. pH levels from 7 to 0 are increasingly acidic, while pH levels from 7 to 14 are increasingly basic.

Pursuant to Manchak's terminal disclaimer, the '003 patent expired concurrently with the '240 patent on June 7, 1994.

B. *The Sevenson Litigation*

During the first of Manchak's suits, this court required Manchak to choose one of the defendants to proceed against. Manchak selected Sevenson Environmental Services, Inc. The court conducted a three-day hearing on claim construction of the '003 patent. In a subsequent memorandum opinion, the court construed various terms in independent claim 1 and dependant claim 14 of the '003 patent, including: (i) "aqueous organic material containing sludge;" (ii) "substantially insoluble compounds;" (iii) "a solid, friable, and substantially odor free reaction product;" (iv) "initiated;" (v) "pH of at least 12;" (vi) "bacteria and virus initially present in said sludge are deactivated;" (vii) "elongate confined space" and "withdrawingsaid steam from said confined space;" and (viii) "major portion of said sludge is of marine origin." *Manchak v. Chemical Waste Mgmt., Inc.,* C.A. No. 95-709-RRM (D.Del. May 1, 1997). The court's construction of several of these terms is relevant to the present motions, including the terms and constructions listed below.

Claim Term	Construction
"friable"	"Easily crumbled, pulverized, or reduced to powder"
"elongate confined space"	"An elongate space that must confine the reaction product of calcium oxide and sludge. However, steam produced as the result of the reaction between calcium oxide and water in the sludge need not be so confined."
"withdrawing said steam from the elongate confined space."	"removing, either by active or passive means, steam from said confined space"

Following trial, the jury found Sevenson had infringed claims 1, 2, 13, and 14 of the '003 patent and awarded Manchak $975,000 in damages. In a post-trial opinion, the court set aside the jury's verdict as to claims 13 and 14, but upheld its verdict otherwise. Sevenson took appeal.

On appeal, the Federal Circuit reversed this court's construction of "elongate confined space." Manchak v. Chemical Waste Mgmt., Inc., 217 F.3d 860 (table), 1999 WL 1103364 (Fed.Cir. Dec.6, 1999). The Federal Circuit held that the plain meaning of the term "confined space" was that it "must also confine steam." Manchak, 1999 WL 1103364, at *3. Because the accused device in the *Sevenson* litigation "ha[d] a safety screen on top that allows the steam formed by the exothermic reaction to ... escape [freely]," the court concluded it could not infringe claim 1 of the '003 patent either literally or under the doctrine of equivalents. Id. at *2, 5-6.

C. *The Reexamination of* the '003 Patent

Following this court's claim construction, but prior to the Federal Circuit's reversal of that construction, an

unknown party, William Pierro, FN2 sought reexamination of claims 1-4 of the '003 patent on October 17, 1997. Pierro's request for reexamination highlighted thirteen prior references, including nine earlier patents. Among the references cited were "German Laid-Open Specification of Bastgen No. 1806732" (the "Bastgen reference"), U.S. Patent No. 918,744 (the "Fryklind patent"), and the earlier considered Liljegren patent. The Fryklind patent discloses an apparatus for mixing "night-soil" with quick-lime. On January 1, 1998, the Examiner granted the request for reexamination and noted that claim 1 may be unpatentable as obvious over the Fryklind patent and the Bastgen reference, in light of an article by Robert B. Dean and James E. Smith, Jr., entitled "Disposal and Recycling of Wastewater Sludges Containing Lime."

FN2. Pierro listed an unknown address in Iowa. No party has explained who Pierro is or why he might be interested in the '003 patent.

On April 21, 1998, the PTO Examiner rejected claims 1-15 of the '003 patent. Claim 1 was rejected as "unpatentable over Fryklind in view of the Dean and Smith paper." The Examiner stated that "Fryklind discloses stabilization of sludge (beating apparati 1 and 2) mixing the sludge with lime at one end of an elongated confined space (boiler 7), mixing and moving the mixture to the opposite end of the boiler, causing an exothermic reaction, further causing the release of steam, and removing the treated product ...." The Examiner noted that Fryklind did not disclose a particular pH or the "transformation of toxic water soluble compounds into insoluble ones," but explained that the use of a pH above 12 to disinfect the sludge was disclosed by the Dean and Smith paper and therefore would have been obvious to one of ordinary skill in the art at the time of the invention.

Manchak responded by distinguishing Fryklind on four bases: (i) the semi-liquid "night soil" processed in Fryklind was different from the "sludge" described in the '003 patent; (ii) the Fryklind process used an external heat source, whereas the claims in the '003 patent describe dewatering the sludge using only the exothermic chemical reaction caused by the calcium oxide; (iii) the Fryklind process mixed in batches, whereas the method disclosed in the '003 patent was continuous; and (iv) the Fryklind patent does not discuss the reaction of toxic soluble compounds with calcium oxide, as Manchak's invention does. Despite these distinctions, the examiner once again rejected Manchak's claims as unpatentable in view of Fryklind and the Dean and Smith paper on September 14, 1998.

Manchak appealed to the Board of Patent Appeals and Interferences on November 12, 1998, and once again repeated his arguments about the difference between night soil and sludge, the use of an external heat source, and a continuous process. On April 7, 1999, the PTO issued its Notice of Intent to Issue Reexamination Certificate. The Notice was accompanied by a note from the Primary Examiner of the relevant PTO group. He stated that, based on the submissions of Manchak and an expert retained by him, Dr. Ronald Neufeld, that "sludge" was properly understood from the specification to have "a water content of not over 75% by weight." Under this definition, the "sludge" discussed in the '003 patent was distinguished from the "night soil" treated in the Fryklind patent. The Reexamination Certificate issued on October 19, 1999.

D. ***The Present Actions***

The Judicial Panel on Multidistrict Litigation transferred Manchak's infringement suits to this court on June 3, 1998. On July 10, 1998, this court stayed those suits pending the outcome of the reexamination and the Federal Circuit appeal in the *Sevenson* litigation. On May 15, 2000, the court lifted that stay and the parties proceeded with discovery. Discovery was completed on May 6, 2002.

E. ***ARCO's Accused Process***

Manchak accuses ARCO of infringing the '003 patent at its sites in Anaconda, Montana and Sand Springs, Oklahoma. Following the commencement of summary judgment briefing, Manchak withdrew his claim of infringement at the Sand Springs, Oklahoma site.

In support of its motion for summary judgment, ARCO has submitted the declarations of Barton Dent Richardson, a former employee of ARCO, and Irfan Torr, Ph.D, a chemical engineer and former employee of ITEX Environmental Services, Inc., explaining ARCO's activities in Anaconda, Montana and the operation of the allegedly infringing devices. The following facts are taken from their declarations.

Anaconda Mining Company operated a copper smelting facility in Anaconda, Montana from 1884 to 1980. In 1977, ARCO acquired Anaconda Mining Company and became responsible for the environmental liabilities created by the copper smelting. The Anaconda site was eventually declared a Superfund site and ARCO, together with the Environmental Protection Agency ("EPA"), developed a remediation plan. The plan called for the remediation of a large quantity of flue dust, which is created as a byproduct of the copper smelting and contains heavy metal contaminants such as cadmium, lead, and arsenic. ARCO contracted with ITEX for the remediation and ITEX performed that task between 1992 and 1994. ITEX used three portable treatment facilities known as ARCHON units in its remediation.

Manchak alleges in his complaint that ARCO infringed the '003 patent by operating the ARCHON units at its Anaconda, Montana site. In its summary judgment briefing, Manchak limited his allegation of infringement to one component of the ARCHON units, known as the "Homogenizer."

According to Richardson, flue dust was piled in several areas at the Anaconda site. It typically had the consistency of a sandy soil, but a "small proportion (5-10%) ... had the consistency of wet sand" and another "very small proportion (about 1-2%) had the consistency of dry ash." The flue dust was excavated with bulldozers and other equipment, was screened to remove debris and rocks, and then was loaded into an open hopper in the top of the "Homogenizer." The loading hopper was open to the atmosphere and comprised one-third to one-half of the top of the Homogenizer. The Homogenizer was not part of the initial ARCHON equipment, but was added "to moderate the harsh affect that some highly acidic dust piles had on the ARCHON equipment." In the Homogenizer, water and lime was added to the flue dust and mixed with blade-like paddles to create a slurry with the consistency of wet concrete. A hydraulic gate at the end of the Homogenizer controlled the release of the slurry into the next step of the ARCHON device, the weigh batcher/mixer.

Torr declared that ITEX was responsible for treating the flue dust to meet EPA standards for arsenic, cadmium, and lead. The flue dust was an inorganic material created by the smelting process. Because the high temperature of the smelting, any organic compounds in the flue dust would have been burned, volatized, or decomposed.

F. *DCWASA's Accused Process*

Manchak accuses DCWASA of infringing the '003 patent between December 22, 1991 and the expiration of the patent, June 7, 1994. According Manchak, DCWASA infringed the patent by processing sewage at its Blue Plains facility using two mixers, a pug mill mixer manufactured by McLanahan Corporation, which was used between December 1991 and January 1994, and a mixer manufactured by Leopold Company, which was used thereafter.

Walt Bailey, DCWASA's manager of the Blue Plains facility, submitted a declaration explaining the processing of municipal sewage at that plant. According to Bailey, the McLanahan and Leopold mixers were used to convert municipal sewage into Class B sludge for agricultural use. The McLanahan mixer received sludge and calcium oxide and mixed both into Class B sludge. The mixer had a loose cover and

both ends were open, permitting any steam generated to escape. The Leopold mixer also combined sludge with calcium oxide in a chamber, but the mixing of those components was not completed there and continued on a conveyer belt and in a concrete bunker located after the mixer.

Bailey explained that Class B sludge, as compared to Class A sludge, can only be distributed to persons who obtain a special permit, due to the high number of pathogens it contains and its "distinctive sludge-like odor." Neighbors of both the Blue Plains facility and the farms where the Class B sludge was used complained of its odor. DCWASA retained BBS Consulting Engineers to examine the odor problem in 1992. Although one of BBS's engineers, Alan Smith, noted he could not smell objectionable odors at the McLanahan mixer on his one-day site visit, he prepared a report suggesting further mixing of the lime with the sludge to reduce odor. DCWASA commissioned a Sludge Processing Odor Study in July 1992 to study the problem further.

According to Bailey, the Class B sludge created by the mixers had a content of approximately 70% percent moisture and 30% solids. The Class B sludge produced by both mixers "had a soft, pasty consistency much like cake batter" and was not dry or friable.

Manchak introduced a videotape of the Blue Plains facility. The video, recorded July 10, September 8, and October 22, 1992, purports to depict the reaction product of the McLanahan mixer. It shows a dark, rubble-like substance that Manchak describes as "friable" because it appears to break into pieces and piles up as it is dumped into trucks.

G. *AMG's Accused Process*

Manchak accuses AMG, which operates the Village Creek Wastewater Treatment Plant for the City of Fort Worth, Texas, of infringing the '003 patent at that plant. According to Manchak, AMG uses a lime stabilization system at Village Creek. That system dewaters sludge and raises its pH to at least 12 to detoxify it and eliminate odor.

In support of its motion for summary judgment, AMG submitted the affidavit of Ed Tacha, Vice-President of AMG. Tacha explained that AMG's sludge processing operation at Village Creek uses "a feed hopper to accept sludge and lime, a mixing auger to mix the two, and a conveyor to transport the combined sludge and lime away for stockpiling on the ground or a concrete pad." He further noted the material input into the mixer is "already dewatered, is friable, and is capable of being stacked, with no paste or liquid character." Tacha described the mixing auger as "an open concept mixer with no containment for steam or vapor." He explained that "there is no detectable steam generated during the normal functioning of the operation." Tacha included pictures of the accused device, which show an open hopper, followed by a long auger with a hinged top. The pictures show that when the top is affixed, there is a one and a half inch gap along the side of the mixer and another gap at an unidentified location on the top of the mixer.

AMG also supplied affidavits from Mark Clark, Ph.D, its Rule 30(b)(6) designee and a Project Agronomist with AMG. Dr. Clark stated that the top of the mixer was frequently open when the mixer was in use. He explained that the cover was required by the Occupational Safety and Health Administration regulations to protect workers from the moving auger. Dr. Clark stated that the cover was not used to confine steam. Dr. Clark also stated that the reaction product of AMG's process is not easily crumbled, pulverized, or reduced to powder.

II. *DISCUSSION*

A. *Claim Construction and Summary Judgment Standards*

[1] To evaluate whether the defendants infringe the '003 patent, the court must undertake a two-step

analysis. Markman v. Westview Instruments, Inc., 52 F.3d 967, 976 (Fed.Cir.1995). First, the court must construe the disputed claims of the '003 patent. Id. at 976. Second, the court must compare the claims, as construedby the court, to the accused processes to determine whether all of the claim limitations are present. Id.

[2] [3] To construe the disputed claims of a patent, the court must examine the intrinsic evidence, which includes the claims of the patent, the patent specification, and the prosecution history. Vitronics Corp. v. Conceptronic, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). The court begins by examining the patent claims themselves and giving those terms their ordinary meaning to one of skill in the art. Hockerson-Halberstadt, Inc. v. Avia Group Int'l, Inc., 222 F.3d 951, 955 (Fed.Cir.2000). The court can use a dictionary to aid its analysis of the meaning of non-technical terms. Interactive Gift Express, Inc. v. Compuserve Inc., 256 F.3d 1323, 1332 n. 1 (Fed.Cir.2001).

[4] [5] The patent's specification aids the construction of claim terms by explaining and illustrating the claimed invention. Thus, patent claims should be construed in a manner that is consistent with the specification, for "[t]he construction that stays true to the claim language and most naturally aligns with the patent's description of the invention will be, in the end, the correct construction." Renishaw PLC v. Marposs Societa' per Azioni, 158 F.3d 1243, 1250 (Fed.Cir.1998). The court may depart from the ordinary meaning of a claim term when a patentee chooses to be his or her own lexicographer and uses a claim term in the specification in a manner other than its plain and ordinary meaning. Vitronics Corp., 90 F.3d at 1582.

[6] The prosecution history is also used to give "insight into what the applicant originally claimed as the invention, and often what the applicant gave up in order to meet the Examiner's objections." Lemelson v. General Mills, Inc., 968 F.2d 1202, 1206 (Fed.Cir.1992). A court can deviate from the ordinary meaning of claim terms when the patentee "relinquished [a] potential claim construction in an amendment to the claim or in an argument to overcome or distinguish a reference." Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 979 (Fed.Cir.1999); *see also* Southwall Techs. Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576 (Fed.Cir.1995) ("The prosecution history limits the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution.").

[7] [8] When the intrinsic evidence is inadequate to construe the patent's claims without ambiguity, the court may use extrinsic evidence, such as the testimony of experts. "Relying on extrinsic evidence to construe a claim is 'proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence.' " Interactive Gift Express, 256 F.3d at 1332 (quoting Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys., 132 F.3d 701, 706 (Fed.Cir.1997)). Even in this situation, "extrinsic evidence may never be used 'for the purpose of varying or contradicting the terms in the claims.' " *Id.* (citing Markman, 52 F.3d at 981.).

[9] [10] Once the disputed claims of the patent are construed, the court must compare the claims to the accused device. This comparison presents a question of fact. Tanabe Seiyaku Co. v. United States Int'l Trade Comm'n, 109 F.3d 726, 731 (Fed.Cir.1997). Summary judgment is only appropriate if there are no genuine issues of material fact. *See* Fed.R.Civ.P. 56(c). In resolving whether genuine issues of material fact exist, the court must draw all reasonable factual inferences in favor of the non-moving party. Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 255, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986). If there are no genuine issues of material fact regarding the allegedly infringing products, then the court's analysis of infringement reduces to construing the claims and applyingthat construction to the allegedly infringing products on summary judgment. Athletic Alternatives Inc. v. Prince Mfg., Inc., 73 F.3d 1573, 1578 (Fed.Cir.1996).

B. *Claim Construction*

As noted previously, this court construed many of the terms of the '003 patent during the *Sevenson*

litigation. The parties to summary judgment motions dispute the correct construction of some of those previously-construed terms in light of the reexamination proceeding and the Federal Circuit's opinion. They also dispute one additional claim term, "organic."

1. *Organic*

[11] ARCO submits that the flue dust processed in its ARCHON units is entirely inorganic and therefore it is entitled to summary judgment of non-infringement. The parties dispute the proper construction of "organic." Both parties agree that the word "organic" indicates the presence of carbon in a substance. Indeed, ARCO notes that PTO Classification Class 260 defines "organic carbon compound" as satisfying one of following criteria:

(1) two carbon atoms bonded to each other;

(2) one carbon atom bonded to at least one hydrogen atom or halogen atom, or

(3) one carbon atom bonded to at least one nitrogen atom by a single or double bond.

United States Patent and Trademark Office, Class 260 Chemistry of Carbon Compounds. Thus, both parties look to the presence of carbon to indicate the existence of an organic material.

Manchak argues, however, that even a 100% inorganic material could infringe claim 1 of the '003 patent because the patent's specification discusses "sludges in the form of aqueous suspensions of organic and inorganic materials." Manchak submits that the organic nature of the sludge is only a common characteristic of sludges, and not itself a claim limitation. Regardless of what the specification discusses, claim 1, by its own terms, only covers "organic" sludges. Thus, claim 1 is limited to "organic" sludges and the otherwise identical processing of entirely inorganic material would not infringe claim 1 either literally or under the doctrine of equivalents.

2. *Friable Reaction Product*

[12] During the *Sevenson* litigation, Sevenson sought a construction of "friable" that would require the reaction product be dry. The court rejected Sevenson's proposed construction, finding it was not supported by the claims or the specification. Instead, the court construed the term "friable" to mean "easily crumbled, pulverized, or reduced to powder." This construction was taken from *Webster's Third New International Dictionary,* 910 (1986). Sevenson did not appeal the court's construction of "friable."

All three defendants argue that during the post- *Sevenson* reexamination, Manchak argued to the PTO that the reaction product created by his invention must be processed into a "dry state." Therefore, those defendants seek to have "friable" construed to mean "dry," among the other components of its definition.

In the Patent Owner's Response to the Office Action in Reexamination, Manchak repeatedly used the word "dry" to describe Fryklind's reaction product. For example, in explaining how Fryklind is distinguished by its use of an external heat source, Manchak stated " 'an outer heat supply' is added to make it possible to control the dryness of the night soil." However, Manchak also used "dry" to describe the reaction product of the '003 patent on at least two occasions. For example, he stated "Fryklind describes ..., but does not describe using a rate of longitudinal movement that will allow the exothermic reaction to reduce the mixture to a *dry* solid reaction product by the time it has reached the end of the confined space." (emphasis added). Because his reference to the rate of longitudinal movement was a reference to the workings of the '003 patent, Manchak described the '003 patent's reaction product as dry. In the later Request for Reconsideration and Record of Interview, Manchak again referred to the dryness of the '003 patent's reaction product. He

stated that "there is no suggested in Fryklind for relating the rate of movement of the mixture through the confined space to the exothermic reaction in such a way that the mixture would be transformed to a *dry* or friable condition by the time the reaction product reached the second end." (emphasis added).

Manchak argues that the term "dry" was used to distinguish the Fryklind patent because Fryklind repeatedly uses that word to describe the reaction product of his process. While that is true, it is nonetheless evident from the cited quotations that Manchak also described the reaction product of the '003 patent as "dry" or "dry or friable." Dry and friable are related terms. As the court noted in its prior opinion, "friable" describes how an item reacts with another force; it is "easily crumbled, pulverized or reduced to powder." "Dry," on the other hand, is defined as "free or relatively free of liquid." *Webster's Ninth New Collegiate Dictionary* 386 (1991). Thus, while "dry" describes a particular characteristic of the substance, "friable" is a functional adjective explaining how it reacts when acted upon. It is undisputed that the relative dryness of a substance effects how friable it is, but the two terms nonetheless describe different characteristics of the substance.

[13] Generally, the prosecution history of a patent aids the construction of a claim term when the examiner and patentee have an exchange relating to a claim's meaning. Digital Biometrics, Inc. v. Identix, Inc., 149 F.3d 1335, 1344 (Fed.Cir.1998) ("The prosecution history is relevant because it may contain contemporaneous exchanges between the patent applicant and the PTO about what the claims mean."). The prosecution history can also "limit[ ] the interpretation of claim terms so as to exclude any interpretation that was disclaimed during prosecution." Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1576 (Fed.Cir.1995). In this case, the exchanges between the PTO and Manchak did not relate to the construction of the term "friable," but were instead directed to other claimed distinctions between the patents. Nor did Manchak limit the construction of "friable" by disclaiming any particular construction of that term.

[14] Manchak merely used the adjective "dry," in conjunction with "friable," to characterize the reaction product of the '003 patent. This is not the type of "definitive statement" on which the public would rely in reviewing the '003 patent. Digital Biometrics, Inc., 149 F.3d at 1347 (noting the public has a right to rely on definitive statements construing claim terms made during prosecution). Not every adjective used in characterizing a claim element must necessarily become part of the claim itself. Instead, the court's focus must remain on the claim language itself. Thermalloy, Inc. v. Aavid Eng'g, Inc., 121 F.3d 691, 693 (Fed.Cir.1997) ("Nonetheless, throughout the interpretation process, the focus remains on the meaning of claim language."). In this case, Manchak chose to use the term "friable" to describe his reaction product. While the adjective "dry" is related to "friable," the reexamination history of the '003 patent does not require that "friable" be construed to have the special meaning "dry." Therefore, the court will adhere to its earlier construction of friable-"easily crumbled, pulverized, or reduced to powder."

3. "*elongate confined space*" and "*withdrawing said steam from said confined space*"

All three defendants seek summary judgment on the basis that their accused processes do not possess an "elongate confined space." In this court's claim construction opinion in *Sevenson*, it construed "elongated confined space" not to require the confinement of steam because several dependant claims (5, 6, 7, and 9) disclosed methods for accumulating, transmitting, treating, and filtering steam before discharge. Applying the principle of claim differentiation, the court concluded claim 1's use of the term "confined" should be limited to the confinement of sludge and calcium oxide, and not steam, which was addressed by the other dependent claims. *See Manchak v. Chemical Waste Mgmt.,* C.A. No. 95-709, slip op. at 30-32.

[15] On appeal, the Federal Circuit held that the plain meaning of the term "confined space" is that it "must also confine steam." Manchak, 1999 WL 1103364, at *3. The Federal Circuit rejected this court's reliance on claim differentiation, noting that dependant claims 5 through 9 would not make sense unless the structure of claim 1 already confined the steam to be processed. *Id.* at *3. The Federal Circuit also found its construction to be consistent with the embodiment depicted in one of the figures and with the prosecution history. *Id.* It

therefore held that a device that "has a safety screen on top that allows the steam formed by the exothermic reaction to ... escape [freely]," could not infringe, either literally or under the doctrine of equivalents, the "confined space" claim limitation. *Id*. at *2, 5-6. The court will therefore define "elongate confined space" to mean "an elongate space that must confine the reaction product of calcium oxide and sludge, including steam."

[16] In the *Sevenson* litigation, this court also construed the words in claim 1(f), which requires "withdrawing said steam from said confined space." Sevenson argued that this claim limitation should be construed to require "an active means of removing steam from the elongate confined space," as opposed to permitting steam to escape passively into the environment. The court rejected this construction of claim 1(f), noting that dependant claim 5 discloses a process by which steam accumulates in the confined space and proceeds down a passage to the exterior of the confined space. Claim 6, which is dependant on claim 5, discloses using a stream of air to withdraw steam from the confined space. Because claim 6 discloses an active system for withdrawing steam, the court employed the canon of claim differentiation to conclude that claim 1(f)' s "withdrawing" requirement should be more generally understood as encompassing either active or passive means for steam removal.

While addressing the court's construction of "confined space," the Federal Circuit did not reach the construction of the term "withdrawing." Manchak, 1999 WL 1103364 at *3. Several defendants argue, however, that the Federal Circuit's analysis supports a more narrow construction of withdrawing than was employed in *Sevenson*. DCWASA, for example, argues that the "passive" escape of steam is not covered by the "withdrawing" claim limitation. It notes the Federal Circuit stated that "[t]he step of 'withdrawing said steam from [said] confined space' in claim 1 also would make little sense if the steam were not confined in the space to begin with." *Id*. at *3. DCWASA posits that because claim 1 requires both the confinement and removal of steam from the confined space, the mere passive escape of steam from the ends or top of an accused device is not covered by the claim term "withdrawing."

In response, Manchak argues in support of the court's prior ruling that the "withdrawing" claim limitation is satisfied by either active or passive removal of steam from the confined space. He notes that the Federal Circuit did not reach "withdrawing." Indeed, it noted that dependant claim 6's active means of discharging steam by means of an air flow distinguished it from claim 1. Thus, claim 1 should be read to apply to the active or passive removal of steam from the confined space.

The plain meaning of "withdraw" is "to take back or away" or "to remove from use or cultivation." *Webster's Ninth New Collegiate Dictionary,* 1355 (1991). Nothing in this definition suggests the manner in which the removal of steam must occur. Nor does any part of the claim specification suggest that this withdrawing must occur actively. Thus, the court will continue to construe the phrase "withdrawing said steam from said confined space" to mean "removing, either by active or passive means, steam from the elongate confined space."

C. *Is ARCO Entitled to Summary Judgment of Non-Infringement?*

ARCO has presented five bases for summary judgment. It argues that: (i) the flue dust entering the Homogenizer was inorganic, and thus was not "organic," as required by claim 1; (ii) the flue dust entering the Homogenizer was dry, and thus was not "aqueous" and did not "contain sludge," as required by claim 1; (iii) the Homogenizer was not a continuous process, as required by Claim 1(g), because the hydraulic gate at its end periodically closed to mix the wet slurry; (iv) the reaction product of the Homogenizer was a wet slurry, and therefore did not meet the "solid" and "friable" requirements of claim 1; and (v) the Homogenizer's top was open to the atmosphere over at least one-third to one-half of its length, and therefore was not a "confined space," as required by claim 1.

1. ***Is ARCO's sludge organic?***

[17] Claim 1 requires an "aqueous organic material containing sludge" be input into the confined space. ARCO argues that flue dust is inorganic, and because that flue dust is the only material that enters the Homogenizer through the hopper at its front end, the Homogenizer cannot infringe claim 1. In response, Manchak argues that Dr. Torr admitted in his deposition that organic material is input into the Homogenizer. Specifically, Dr. Torr explained that some small amount of soil and clay may have been processed with the flue dust. Because clay and soil may have had some organic matter, Dr. Torr stated he could not say with certainty that the material processed by the Homogenizer was 100% inorganic. Moreover, he admitted he did not test what proportion of the material treated was soil and clay. Manchak therefore argues that he can prove to a jury that the "organic" requirement of claim 1 is satisfied.

ARCO presents two arguments in response. First, it argues that clay is inorganic because it does not contain the requisite carbon. FN3 Second, it argues that the possible presence of a minuscule amount of soil is insufficient to establish that the Homogenizer processed organic materials. It notes that an assay conducted on soil near the flue dust piles showed that organic matter on the average comprised less than 1%, and typically about 0.3%, of the soil. That some small amount of soil, containing a similarly small proportion of organic material, might have been processed by the Homogenizer, ARCO argues, in insufficient proof to survive summary judgment.

FN3. Hawley's *Condensed Chemical Dictionary* (13th ed.1997), defines clay as "[a] hydrated aluminum silicate. Generalized formula Al_{2O3} SiO_2->xH_20. Component of soils in varying percentages."

ARCO cites CFMT, Inc. v. Steag Microtech, Inc., 71 F.Supp.2d 373 (D.Del.1999), for the proposition that an insignificant amount of the substance claimed can be inadequate to meet the claim limitation. In *CFMT,* a jury held that an accused process, which utilized 97.5% non-vapor and 2.5% vapor to dry a silicon wafer, infringed the claim limitation "replacing said rinsing fluid with said drying vapor." The Federal Circuit affirmed the court's construction of the relevant claim terms, but remanded jury's infringement verdict because "the mere 2.5% vapor" did not take the place of the rinsing fluid, as required by the claim. CFMT, Inc. v. Steag Microtech, Inc., 194 F.3d 1336 (table), 1999 WL 319505, (Fed.Cir. May 13, 1999). On remand, this court understood that the Federal Circuit held that if the drying function was performed "only to a trivial extent [by the vapor], then there is no infringement." CFMT, Inc., 71 F.Supp.2d at 380. Nonetheless, the court found that there was conflicting evidence concerning whether the vapor substantially or trivially performed this function, and therefore reinstated the jury's finding of infringement. Id. at 383.

ARCO's analogy to *CFMT* is apt. The ARCHON process is directed to the processing of inorganic flue dust, as required by the EPA's mandate to remediate the cadmium, lead, and arsenic contained in the flue dust. The inclusion of a trivial quantity of organic material in the surrounding soil is merely an unintended byproduct in the ARCHON process. In contrast, the '003 patent is directed to solidifying and detoxifying organic sludges, including "hydrocarbon bearing sludges and hazardous marine silt as well as sewage sludge or other toxic sludges." '003 Patent, Col. 1, ln 32-34. Furthermore, neither ARCO nor ITAX measured the amount of soil that might have been inadvertently included in the flue dust during the period of the remediation, from 1992 to 1994. Richardson and Dr. Torr only speculated that some small amount of organic material might have been run through the Homogenizer. Given the trivial quantity of organic material and the speculative nature of the evidence that it was ever processed in the ARCHON units, the court concludes that no reasonable jury could find that ARCO has infringed the '003 patents either literally or under the doctrine of equivalents.

Because Manchak cannot establish that ARCO's accused process infringes claim 1's "organic" requirement, the court will not address the remaining arguments proffered by ARCO.

D. ***Is DCWASA Entitled to Summary Judgment of Non-Infringement?***

DCWASA proffers three arguments as to why it is entitled to summary judgment. It argues that: (i) the reaction product created by the McLanahan and Leopold mixers was a sludge with up to a 70% moisture content, and therefore was not a "solid, friable" or dry reaction product, as required by claim 1; (ii) the reaction product of the mixers was not "substantially odor free," as required by claim 1; and (iii) the McLanahan mixer does not withdraw steam from a confined space, as required by claim 1(f).

1. ***Is DCWASA's reaction product solid and friable?***

[18] DCWASA argues that the Class B sludge created by its mixers does not satisfyclaim 1's limitation that the reaction product must be solid and friable. Its argument proceeds in two parts. First, DCWASA argues that "friable" must be construed to mean "dry." Second, DCWASA argues its reaction product is not solid, friable, or dry, and therefore it is entitled to summary judgment of non-infringement.

In construing the term "friable," the court has held that "dry" is not a necessary component of friable's definition. Therefore, the court need not further address DCWASA's argument that because its reaction product is not dry, it cannot satisfy the "friable" claim limitation.

DCWASA nonetheless argues that the Class B sewage it produces is not a "solid, friable" reaction product. It relies on Bailey's declaration, his deposition testimony, and the records of operation at the Blue Plains facility to show that the moisture content of the reaction product was 65-70%, thus leaving only approximately 30-35% solids content. According to DCWASA, reaction product with a moisture content that high cannot be friable. Bailey described it as having a "soft, pasty consistency."

Manchak argues that the video it produced of DCWASA's operations rebuts Bailey's declaration and testimony. The reaction product in the video appears to be a dark, rubble-like substance. It appears to break into pieces as it falls from the accused device into a truck beneath it. It also accumulates into piles that exceed the height of the truck's containment walls. Based on this evidence, Manchak argues that a reaction product with a water content as high as 70% can still be friable. Therefore, it submits that there is a genuine issue of material fact that DCWASA's reaction product met the "friable" claim limitation of the '003 patent.

If Manchak's video does indeed depict DCWASA's ordinary reaction product at the Blue Plains facility, a reasonable jury could conclude that the "friable" limitation is met there. Thus, the court cannot grant summary judgment on this basis.

2. ***Is DCWASA's reaction product substantially odor free?***

DCWASA argues that the reaction product of its mixers was not "substantially odor free," as required by claim 1 of the '003 patent. According to Bailey, the mixing process did not eliminate odors from the Class B sewage and DCWASA received complaints of odors from nearby property owners and from the farmers to whom the processed sewage was sold.

To demonstrate a genuine issue of material fact that the Class B sewage is substantially odor free, Manchak relies on efforts that DCWASA made to reduce the odor problem in 1992. In particular, he notes that Alan Smith, one of the BBS engineers retained by DCWASA, wrote in his notes that he could not smell objectionable odors at the McLanahan mixer. Manchak also relies on a Sludge Processing Odor Study completed for DCWASA in July 1992, in which the authors recommended improved mixing of lime. Because it is undisputed that odor control can be achieved by thoroughly mixing lime into sludge to increase its pH, Manchak argues that the study shows that DCWASA achieved a substantially odor free reaction process.

Manchak cannot rely on the odor-eliminating property of lime, as restated in the Sludge Processing Odor Study, as evidence that DCWASA infringed the "substantially odor free" claim limitation. The dispositive question is whether the Blue Plains facility ever actually achieved a substantially odor free reaction product using the McLanahan or Leopold mixers during the relevant period. The only non-theoretical, contemporaneous evidence Manchak has submitted on this subject is the notation of Alan Smith, in which he states he "could not smell objectionable odor" at the McLanahan mixer.

DCWASA argues that the notes of one person on a one day visit to the Blue Plains facility is an inadequate basis for a reasonable inference that the Class B sludge was substantially odor free. Instead, it notes the declaration of Walt Bailey, manager of Blue Plains for over twelve years, that the Class B sludge had a strong odor. It is not the court's task, however, to weigh the evidence presented on summary judgment. Because the court concludes that Alan Smith's notes are sufficient evidence upon which a jury could conclude that DCWASA's processes resulted in a substantially odor free reaction product, the court will deny summary judgment to DCWASA on this claim term.

3. ***Does DCWASA's process withdraw steam from a confined space?***

Finally, DCWASA argues that its McLanahan mixer FN4 did not infringe the '003 patent as a matter of law because its mixers did not actively "withdraw" steam from a "confined space," as required by claim 1(f). DCWASA relies on Bailey's declarations that the McLanahan mixer was open at both ends and steam was therefore not actively withdrawn from the confined space. DCWASA's argument is premised on its argument that claim 1(f) requires the active removal of steam from the confined space. As previously noted, the court construes the claim term "withdrawing said steam from said confined space" as "removing, either by active or passive means, steam from the elongate confined space." DCWASA explains that steam "escapes passively" from the ends of the McLanahan mixer. Therefore, under the court's construction of this claim limitation, there is a genuine issue of material fact as to whether the McLanahan mixer infringes the '003 patent. The court will therefore deny DCWASA's motion for partial summary judgment on this basis.

FN4. DCWASA did not seek summary judgment on this basis with respect to the Leopold mixer it employed at the Blue Plains facility from January 1994 through the expiration of the '003 patent on June 7, 1994.

Because there is a genuine issue of material fact on each of the claim limitations addressed by DCWASA, the court will deny its motion for summary judgment.

E. ***Is AMG Entitled to Summary Judgment of Non-Infringement?***

AMG asserts three reasons its wastewater treatment process at Village Creek did not infringe the '003 patent as a matter of law.FN5 AMG argues that: (i) its process does not enclose steam in a confined space, as required by claim 1(c); (ii) its process does not have an apparatus to withdraw steam from that confined space, as required by claim 1(f); and (iii) the material exiting the process was gelatinous and not solid and friable, as required by claim 1's preface.

FN5. AMG also asserted in its opening brief that its process did not meet the "pH of at least 12" required by claim 1(b). Ed Tacha's affidavit, however, noted that the pH of the material "is, by AMG's design and management, intended to be only 12.0 and never to be greater than 12.0." Manchak noted in its answering brief that material with a pH of "only 12.0" would infringe claim 1(b). In its reply brief, AMG appears to have withdrawn this claim term from those bases on which it seeks summary judgment.

Prior to filing its motion for summary judgment, AMG's counsel wrote Manchak's counsel and disclosed that AMG's process does not have a confined space or withdraw steam from the confined space. AMG's counsel therefore requested Manchak voluntarily dismiss its action against AMG. Manchak refused. On this basis, AMG seeks to recover its attorneys' fees and costs in moving for summary judgment pursuant to 35 U.S.C. s. 285.

1. ***Does AMG's process have a confined space?***

[19] AMG argues that its apparatus does not have a space in which steam is confined for two reasons. One, Tacha's affidavit establishes that no steam is created by the process used at AMG. Two, even if steam were created, it is not confined because it would escape freely into the atmosphere through holes in the mixer.

In response to Tacha's claim that the AMG process creates no steam, Manchak has submitted two articles. The first article, entitled "Quicklime Cuts City's Sludge Cost and Odor," is from the magazine *Pollution Engineering*.FN6 That article discusses AMG's operations at Village Creek. AMG agronomist Mark D. Clark is quoted as saying, "Material coming off our belt presses is 20 percent solids. The heat from the lime increases that by about 8 to 10 percent. Then the steam the heat creates dewaters it another 8 percent." The second article, written by Mark Clark, Ed Tacha and Steve Bowman, is entitled "Stabilization and Pasteurization," and appeared in the magazine *Operations Forum* in March 1994. While the second article does not mention steam, it does describe the mixing of quicklime with dewatered biosolids. The article explains that when this mixture occurs, "[t]he heat released from the hydration of the quicklime is intense ...." Furthermore, "[t]he addition of a lime material also raises the solids content of the biosolids." Manchak argues that these articles are sufficient to create a genuine issue as to whether steam was created by the AMG processes at Village Creek.

FN6. The court's copy of the article does not list an author and has an obscured date.

AMG claims that the articles do not create a genuine issue of material fact because both were actually drafted by a quicklime supplier and they describe a different, heat-based process than the one that is alleged to infringe the '003 patent. AMG's only support for these conclusions, however, are the affidavits of Clark and Tacha. Because the articles themselves appear to discuss the process at issue, Manchak has demonstrated that a genuine issue of material fact exists as to whether steam is created by AMG's process.

AMG also argues that any steam created by its process is not confined, because the steam escapes freely into the atmosphere through gaps in the top and side of the mixer. Therefore, AMG submits that it lacks the "confined space" limitation of the '003 patent, as construed by the Federal Circuit in *Sevenson*. The accused product in *Sevenson*, however, had no top whatsoever. Steam escaped from the sludge through only a "safety screen on top that allows the steam formed by the exothermic reaction to freely escape." Manchak, 1999 WL 1103364 at *2. As Manchak points out, AMG's accused product is distinguishable from *Sevenson* because steam escapes only through a one and a half inch gap running along the side of the mixer and a small gap at one point on the top of the mixer. While steam can undoubtedly escape through those gaps, the mere fact that steam can escape the mixer does not establish that no steam is elsewhere confined in it. Because there is a question of fact concerning whether the AMG process confines steam, the court will therefore deny its request for summary judgment on that claim limitation.

2. ***Does AMG's process withdraw steam?***

AMG presses a related argument that its process does not infringe claim 1(f), which requires "withdrawing said steam from said confined space." Like DCWASA, its argument is premised on construing this claim

term to apply only to the active removal of steam from the confined space, such as by a fan or vacuum. It argues that "there was no apparatus at Village Creek for withdrawing steam from a confined space," and therefore there was no "active" withdrawal of steam.

As noted previously, claim 1(f) can be satisfied by either the active or passive withdrawal of steam. Manchak argues that AMG practices passive withdrawal of steam from the confined space through the gap along the side of the mixer and the gap at one point in its top. He cites the declaration of Dr. Neufeld that the withdrawing of steam can be accomplished by either creating a mechanism to force steam from the space (as in active withdrawal), or configuring the confined space to direct the steam out of the confined space without mechanical inducement (as in passive withdrawal). Manchak contends that the gaps in the AMG mixer accomplish this passive withdrawal.

Because claim 1(f) encompasses removing steam by both active or passive means, there is a genuine issue of material fact whether AMG's process satisfies this claim limitation. The court will therefore deny summary judgment on this basis.

3. ***Does AMG's process result in a friable reaction product?***

Last, AMG argues that it is entitled to summary judgment because the reaction product of its process is not friable, as required by the prefatory clause in claim 1. Mark Clark, an AMG Agronomist, submitted an affidavit stating that, in AMG's process, "the material to be treated and the reaction product were not capable of being 'easily crumbled, pulverized or reduced to powder.' "

Manchak presents two pieces of evidence that, it argues, creates a genuine issue of material fact on this issue. First, it notes that Tacha stated in his affidavit in support of AMG's motion that "[t]he material that AMG mixes with lime is already dewatered, is friable, and is capable of being stacked, with no paste or liquid character and is capable of beneficial re-use prior to being mixed with lime." Manchak notes that if the material to be mixed with lime is already friable, it will continue to be friable after mixing, due to the dewatering characteristics of lime explained by Dr. Neufeld. Manchak also cites an article entitled "Answers to Questions Regarding Sludge Recycling & Land Application," in which the nutrient recycling program of Fort Worth, Texas is discussed. That article, which cites Dr. Mark Clark of AMG, states that "[w]hen [municipal sludge] is dry, processed sludge looks like soil." Manchak asserts that soil is friable and therefore AMG's process results in a friable reaction product.

AMG argues that Tacha's affidavit is irrelevant because it is only the reaction product, and not the sludge, that is required to be friable. While it is technically correct that it is the reaction product that must be friable, should the jury credit Tacha's affidavit that the sludge is friable when it is placed in the mixer, it could reasonably conclude that AMG's reaction product is also friable. Furthermore, although AMG claims that the article's reference to "soil" describes the end product of AMG's complete process, in which further drying occurs after the gelatinous material leaves the mixer, the article itself does not explain this. Given Tacha's statement using the term "friable," a jury could reasonably credit the article's description of the reaction product as soil-like. Therefore, Manchak has established a genuine issue of whether the reaction product created by AMG's mixer is friable. The court will therefore deny summary judgment on this basis.

Because the court is denying AMG's summary judgment motion, it will also deny its request for attorneys' fees and costs from Manchak pursuant to 35 U.S.C. s. 285.

III. *CONCLUSION*

For the foregoing reasons, the court will grant ARCO's motion for summary judgment and deny the summary judgment motions of DCWASA and AMG.

D.Del.,2002.
In re Manchak Patent Litigation

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