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The opinion in support of the decision being entered today (1) was not written for publication in a law journal and (2) is not binding precedent of the Board.

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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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ROBERT L. BAMBERGER, PAUL M. GERMAN,  
GERALD D. MALPASS, Jr., and LAWRENCE K. LOCKE,

Junior Party,

v.

SUBRAHMANYAM CHERUVU, FREDERICK Y. LO  
and S. CHRISTINE ONG,

Senior Party.

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Patent Interference No. 103,844

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Before: STONER, Chief Administrative Patent Judge, and  
McKELVEY, Senior Administrative Patent Judge, and  
SCHAFER, Administrative Patent Judge.

McKELVEY, Senior Administrative Patent Judge

**MEMORANDUM OPINION AND ORDER**

**Bamberger Preliminary Motion 4  
for judgment based on alleged  
unpatentability of Cheruvu claims 22-35**

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**A. Introduction**

Bamberger Preliminary Motion 9 (Paper No. 83) seeks entry of judgment as to Cheruvu claims 22-35 on the ground that those claims are unpatentable under 35 U.S.C. §§ 102, alternatively under 35 U.S.C. § 103, over U.S. Patent 4,808,561 to Welborn (BX-1010).

**B. Abbreviations**

<b>BR-</b>	Bamberger record
<b>BX-</b>	Bamberger Exhibit
<b>CX-</b>	Cheruvu Exhibit
<b>LLDPE</b>	linear low density copolymers of ethylene
<b>MFR</b>	melt flow ratio, which is determined by dividing $I_{21}$ by $I_2$
<b>ppm</b>	parts per million

**C. Evidentiary burden of proof in an interference when an applicant maintains that a patent claim is unpatentable**

1.

In opposition to Bamberger's preliminary motion, Cheruvu makes the following argument (Paper No. 129, page 1, ¶ 1):

Moreover, in these proceedings, the claims [of the Cheruvu patent] are to be construed narrowly.

No authority is cited and Cheruvu fails to provide any cogent rationale in support of its argument.

In reply, Bamberger makes a contrary argument (Paper No. 229, pages 1-2):

Cheruvu is wrong. In re Van Geuns, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993) ("In the patentability context, claims are to be given their broadest reasonable interpretations."). Indeed, Cheruvu's proposition is contrary to the longstanding rule that claims are to be interpreted in the same manner for validity as they are for infringement. Thus, Cheruvu's/Mobil's claims should be interpreted with the same scope for assessing their validity here as Mobil urged when accessing infringement in the Eastern District of Virginia.

Neither argument has been particularly helpful. Without the benefit of well-developed views from either party, we undertake sua sponte to determine the standard applicable to construction of claims of a party's patent involved in an interference before the Patent and Trademark Office when an opponent maintains that those claims are unpatentable.

The parties have argued at various times throughout this interference that (1) the issues in the Eastern District of Virginia and here are the same (when it has been convenient to

make that argument), (2) the issues in the Eastern District of Virginia and here are different (when it has been convenient to make that argument) and; (3) positions taken by a party in the Eastern District of Virginia bind that party forever, in particular in this proceeding. Bamberger argues in this interference that Cheruvu's patent claims are "invalid." But, our enabling statute uses the word "patentability." 35 U.S.C. § 135(a). None of these arguments have been particularly helpful.

2.

The Patent Statute provides that, in an interference, the board "may determine questions of patentability." 35 U.S.C. § 135(a). "Validity" is a concept exclusively reserved for civil actions. A patentee may file a civil action for infringement of its patent. 35 U.S.C. § 281. In the civil action, the patent is presumed valid. 35 U.S.C. § 282, first sentence. Nevertheless, a defendant may assert that a patent claim is not valid and the burden of establishing invalidity of a patent claims "shall rest on the part asserting such invalidity." 35 U.S.C. § 282, first paragraph, last sentence. The Federal Circuit has judicially determined that the burden must be sustained by clear and convincing evidence. American Hoist & Derrick Co. v. Sowa & Sons, Inc., 725 F.2d 1350, 1358-60, 220 USPQ 763, 769-71 (Fed.

Cir. 1984); Ryco, Inc. v. Ag-Bag Corp., 857 F.2d 1418, 1422, 8 USPQ2d 1323, 1327 (Fed. Cir. 1988). Among other things, invalidity may be based on prior art or a failure to comply with 35 U.S.C. § 112. 35 U.S.C. § 282, second paragraph. Placing the burden on a party alleging invalidity simply makes common sense, apart from any burden placed on an alleged infringer by 35 U.S.C. § 282. How could a patentee prove that its claimed invention is not invalid?

3.

The presumption of validity has not been held to apply in proceedings before the Patent and Trademark Office. Nevertheless, an entity maintaining that a claim is unpatentable in a proceeding in the PTO bears the burden of proving its case. Again, placing the burden on a party alleging unpatentability in a proceeding before the PTO simply makes common sense, apart from any burden placed on an alleged infringer by 35 U.S.C. § 282. How could an applicant prove that its claimed invention is not unpatentable?

An examiner's burden of proving unpatentability when rejecting claims in a patent application is by a preponderance of the evidence. In re Caveney, 761 F.2d 671, 674, 226 USPQ 1, 3 (Fed. Cir. 1985). The same burden is applicable in a reexamination proceeding. In re Etter, 756 F.2d 852, 857-58, 225 USPQ 1, 4-5 (Fed. Cir.) (in banc), cert. denied, 474 U.S. 828

(1985). Likewise, during examination of an application to reissue a patent, the burden is preponderance of the evidence. In re Sneed, 710 F.2d 1544, 1550 n.4, 218 USPQ 385, 389 n.4 (Fed. Cir. 1983). See also Ethicon, Inc. v. Quigg, 849 F.2d 1422, 1427, 7 USPQ2d 1152, 1155-56 (Fed. Cir. 1988).

We cannot think of any reason why that same burden should not apply when unpatentability is asserted of a claim of an application or a patent involved in an interference. We can think of a lot of reasons why the burden should be preponderance of the evidence.

There is no reason apparent to us for requiring a party in an interference to prove by clear and convincing evidence that a claim in its opponent's application is unpatentable. Reason and common sense dictate that the party should have the same burden of proof as an examiner. Since a patentee and an applicant can claim identical subject matter, why should a higher burden be imposed upon an applicant seeking to have its patentee opponent's claims held unpatentable? If different burdens were placed on applicants and patentees, it would be possible for a patentee to prevail on the same evidence which defeats an applicant. The language "may determine questions of patentability" of 35 U.S.C. § 135(a) would be rendered partially useless, if different burdens were placed on proving unpatentability of patent vis-à-vis application claims. Moreover, we note that 35 U.S.C.

§ 282 does not impose a clear and convincing evidence burden--that burden was judicially created for infringement civil actions.

There are significant differences between proceedings in a civil action and proceedings in the PTO. In all proceedings in the PTO, a party has an opportunity to amend, and narrow, the scope of its claims when confronted with prior art. An applicant, a reissue applicant and a patent owner in a reexamination proceeding may file an amendment. 35 U.S.C. §§ 132 and 305; 37 CFR §§ 1.111 and 1.550(b). Likewise, a patentee involved in an interference may narrow its claims by filing an application to reissue the patent (35 U.S.C. § 251) and requesting that the reissue application be added to the interference. 37 CFR § 1.633(h). Any narrower patentable claims in the application for reissue may appear in a reissue patent, even if the original patent claims are held to be unpatentable, provided the patentee otherwise prevails on priority. What an applicant involved in an interference can accomplish through a motion to narrow its claims under 37 CFR § 1.633(i), a patentee involved in the same interference can accomplish through filing a reissue application and taking advantage of 37 CFR § 1.633(h). Many patentees involved in interference ultimately end up filing an application to reissue an involved patent and having the application for reissue added to the interference.

4.

We hold that an applicant asserting unpatentability of a patent claim in an interference bears a burden of proving its case by a preponderance of the evidence. Our holding is consistent with other non-binding precedent by other merits panels. Behr v. Talbott, 1992 Pat. App. LEXIS 31 (Bd. Pat. App. & Int. July 1, 1992) ("[t]he amount of evidence required to prevail on a motion under 37 CFR § 1.633(a) for judgment on the ground of unpatentability is a preponderance of the evidence"); Schrag v. Strosser, 21 USPQ2d 1025, 1027 (Bd. Pat. App. & Int. 1991); Lamont v. Berguer, 7 USPQ2d 1580, 1582 (Bd. Pat. App. & Int. 1988).

We recognize that when an application is filed after a patent issues, that the applicant must prove priority by clear and convincing evidence. Price v. Symsek, 988 F.2d 1187, 26 USPQ2d 1031 (Fed. Cir. 1993). In the interference before us, the Bamberger application was copending with the application which matured into the Cheruvu patent. We leave for another case the determination of whether unpatentability should be based on clear and convincing evidence in those interferences where the junior party application was filed after the senior party patent issued.

**D. Construction of claims in an interference with respect to the issue of patentability**

1.

During examination of a patent application, claims are given their broadest reasonable construction consistent with the specification. Burlington Industries v. Quigg, 822 F.2d 1581, 1583, 3 USPQ2d 1436, 1438 (Fed. Cir. 1987); In re Prater, 415 F.2d 1393, 1404-05, 162 USPQ 541, 550-51 (CCPA 1969). Claims in an application to reissue a patent are given their broadest reasonable construction consistent with the specification. In re Reuter, 670 F.2d 1015, 1019, 210 USPQ 249, 253 (CCPA 1981). Likewise, the same rule applies to unexpired patents undergoing reexamination. In re Yamamoto, 740 F.2d 1569, 1571, 222 USPQ 934, 936 (Fed. Cir. 1984). The rationale upon which each of these precedents is based is that an applicant or a patentee in proceedings in the PTO has an opportunity to amend its claims.

2.

Where, however, a patentee has no opportunity to amend, claims are construed, if possible, to sustain their patentability. For example, in a reexamination proceeding before the PTO, the claims of an expired patent will be construed to

sustain their patentability. Ex parte Papst-Motoren, 1 USPQ2d 1655 (Bd. Pat. App. & Int. 1986).<sup>1</sup>

In a civil action for alleged infringement, likewise claims are construed, if possible, to sustain their validity. Turrill v. Michigan S. & N.I. R.R., 68 U.S. (1 Wall.) 491, 510 (1863) ("Patents for inventions are not to be treated as mere monopolies, and, therefore, odious in the eyes of the law; but they are to receive a liberal construction, and under the fair application of the rule, ut res magis valeat quam pereat, are, if practicable, to be so interpreted as to uphold and not to destroy the right of the inventor."). See also Klein v. Russell, 86 U.S. (19 Wall.) 433, 466 (1873), and ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 1577, 221 USPQ 929, 932 (Fed. Cir. 1984) (in district court litigation, claims are to be construed, if possible, to sustain their validity). A rationale supporting each of these precedents, is that a patentee cannot amend its claims in a civil action before a district court.

3.

For reasons given earlier in this opinion, the ability of a patentee to file an application to reissue a patent and have the reissue application added to the interference, in effect, allows

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<sup>1</sup> A civil action for alleged infringement may be brought up to six years after a patent expires. 35 U.S.C. § 286. Hence, the PTO will reexamine a patent for at least six years after it expires. There is no opportunity to amend claims after a patent expires.

a patentee to amend claims of a patent involved in an interference. A broader claim can only be presented within two years of the date a patent issues. 35 U.S.C. § 251, fourth paragraph. But, a narrower claim can be presented at any time.

We hold that, when the patentability of a patent claim involved in an interference is under consideration, the patent claim shall be given its broadest reasonable construction consistent with the specification.

4.

Nothing in our opinion should be construed as affecting the well-established rules for construing a count. A count is not a claim. Rather, a count is solely a vehicle for determining the admissible evidence on the issue of priority. Case v. CPC International, Inc., 730 F.2d 745, 749, 221 USPQ 196, 199 (Fed. Cir.), cert. denied, 469 U.S. 872 (1984); Squires v. Corbett, 560 F.2d 424, 433, 194 USPQ 513, 518-19 (CCPA 1977). However, it is a fact that a determination of the scope of a count, particularly today where counts are often written in an alternative format (i.e., "the composition of claim 1 of A or the composition of claim 12 of B"), will often involve construction of the scope of a claim which forms part of the count.

There are well-established rules for construing the scope of a count. Notwithstanding the use of alternative language in

counts, in the absence of ambiguity, the language of a count still should be given the broadest reasonable interpretation it will support. It should not be given a contrived, artificial or narrow interpretation which fails to apply the language of the count in its most obvious sense. Only when counts are ambiguous may resort be had to the application or patent where the count originated. Genentech, Inc. v. Chiron Corp., 112 F.3d 495, 500, 42 USPQ2d 1608, 1612 (Fed. Cir. 1997). See also Mead v. KcKirnan, 585 F.2d 504, 507, 199 USPQ 513, 515 (CCPA 1978) ("[a]bsent ambiguity, interference counts are to be given their broadest reasonable interpretation").

5.

Cheruvu argues that Bamberger relies on "extrinsic evidence that is not pertinent to claim construction under Markman" (Paper No. 129, page 1). There is no citation to "Markman." Cheruvu does not explain what "extrinsic evidence" relied upon by Bamberger is "not pertinent." Nor did Cheruvu take advantage of the evidence excluding provisions of 37 CFR § 1.656(h).

By "Markman," we assume that Cheruvu is referring to Markman v. Westview Instruments Inc., 52 F.3d 967, 34 USPQ2d 1321 (Fed. Cir. 1995) (in banc), aff'd, 517 U.S. 370, 116 S.Ct. 1384 (1996).

A significant portion of Section IV, Part A, of the Federal

Circuit's in banc Markman opinion contains a discussion of certain principles which can be used to assist in the construction of the scope of claims. 52 F.3d at 979-81, 34 USPQ2d at 1329-1333. The principles include:

(1) The construction of a claim is an issue of law.

(2) The claims, specification and prosecution history (i.e., the "intrinsic evidence") may be considered to ascertain the meaning of claims.

(3) Expert testimony, including evidence of how those skilled in the art would interpret the claims, may also be used.

(4) Claims must be read in view of the specification, of which they are a part.

(5) The description in the specification may act as a sort of dictionary, which explains the invention and may define terms used in the claims.

(6) A patentee is free to be its own lexicographer. The caveat is that any special definition given to a word must be clearly defined in the specification.

(7) The written description part of the specification itself does not delimit the right to exclude. That is the function and purpose of claims.

(8) To construe claim language, it is also appropriate to consider the patent's prosecution history, if it is in evidence. We will note, at this point, that in an interference,

the specification, claims and drawings of involved applications and patents are part of the record. However, the file wrapper of involved and benefit applications and patents (i.e., prosecution history) must be placed in evidence. 37 CFR § 1.671(a).

(9) The "undisputed public record" of proceedings in the Patent and Trademark Office is of primary significance in understanding the claims. Therefore, a court has broad power to look as a matter of law to the prosecution history of the patent in order to ascertain the true meaning of language used in the patent claims:

The construction of the patent is confirmed by the avowed understanding of the patentee, expressed by him, or on his half [sic-behalf], when his application for the original patent was pending. . . . When a patent bears on its face a particular construction, inasmuch as the specification and claim are in the words of the patentee, . . . such a construction may be confirmed by what the patentee said when he was making his application.

Goodyear Dental Vulcanite Co. v. Davis, 102 U.S. 222, 227 (1880).

(10) Although the prosecution history can and should be used to understand the language used in the claims, it cannot "enlarge, diminish, or vary" the limitations in the claims.

(11) Extrinsic evidence consists of all evidence external to the patent and prosecution history, including expert

and inventor testimony, dictionaries, and learned treatises.

(a) Extrinsic evidence may be helpful to explain scientific principles, the meaning of technical terms, and terms of art that appear in the patent and prosecution history.

(b) Extrinsic evidence may demonstrate the state of the prior art at the time of the invention. It is useful "to show what was then old, to distinguish what was new, and to aid the court in the construction of the patent.

(12) When the intrinsic evidence is ambiguous, Bell & Howell Document Mgt v. Altek Systems, \_\_\_ F.3d \_\_\_, \_\_\_, 45 USPQ2d 1033, 1037-38 (Fed. Cir. 1997), a court may, in its discretion, receive extrinsic evidence in order "to aid the court in coming to a correct conclusion" as to the "true meaning of the language employed" in the patent.

(13) Extrinsic evidence is to be used for the court's understanding of the patent, not for the purpose of varying or contradicting the terms of the claims.

(14) After considering the extrinsic evidence, the court finally arrives at an understanding of the language as used in the patent and prosecution history. The court must then pronounce as a matter of law the meaning of that language.

(15) Through this process of construing claims by, among other things, using certain extrinsic evidence that the court finds helpful and rejecting other evidence as unhelpful,

and resolving disputes in route to pronouncing the meaning of claim language as a matter of law based on the patent documents themselves, the court is not crediting certain evidence over other evidence or making factual evidentiary findings. Rather, the court is looking to the extrinsic evidence to assist in its construction of the written document, a task it is required to perform.

**E. Evidentiary burden and claim construction applied to patentability determinations made in this interference**

In deciding Bamberger Preliminary Motion 4, as well as other patentability motions in this interference, we have applied the principles set out in Parts B and C. To the extent applicable, we have also applied the "Markman" principles set out in Part D, Section 5.

**F. Preliminary motions for judgment under 37 CFR § 1.633(a) based on the prior art**

The rules authorize a party to raise the unpatentability of an opponent's claim based on the prior art. Unpatentability is raised by filing a preliminary motion under 37 CFR § 1.633(a).

A party who files a motion, including a preliminary motion under Rule 633(a), must comply, inter alia, with 37 CFR § 1.637(a), which provides in part:

A party filing a motion has the burden of proof to show that it is entitled to the relief sought in the

motion. Each motion shall include a statement of the precise relief requested, a statement of the material facts in support of the motion, in numbered paragraphs, and a full statement of the reasons why the relief requested should be granted.

We take this opportunity to comment on the preferred manner of setting out "a full statement of the reasons why" a claim should be held unpatentable over the prior art.

When anticipation (i.e., 35 U.S.C. § 102) is the basis for unpatentability, the claim alleged to be unpatentable should be set out along with parenthetical insertions describing exactly where a prior art reference describes each limitation of the claim. A similar procedure should be used for each claim of an opponent which a party maintains is anticipated. In this respect, we appreciate the effort made by Bamberger in Attachment A of its Supplement to Bamberger Preliminary Motion 4 (Paper No. 91).

When obviousness (i.e., 35 U.S.C. § 103) is the basis for unpatentability, the claim alleged to be unpatentable should be set out along with parenthetical insertions describing which limitations in the claim are described in a prior art reference. Any difference should then be explicitly identified. Finally, an explanation should be made as to why the subject matter of the claim, as a whole, would have been obvious to a person having

ordinary skill in the art notwithstanding any difference. Furthermore, the explanation should include a discussion (1) into the level of ordinary skill in the art and (2) any evidence of so-called "secondary factors" (which we prefer to call objective evidence of obviousness and/or non-obviousness). A similar procedure should be used for each claim of an opponent which a party maintains is unpatentable based on obviousness.

#### **G. Findings of fact**

##### Background

1. According to Bamberger, Cheruvu claims 22-35 (reproduced in Appendix 409-1) are unpatentable under 35 U.S.C. § 102, alternatively under 35 U.S.C. § 103, over U.S. Patent 4,808,651 to Welborn (BX-1010).

2. The application which matured into the Cheruvu patent was filed on March 25, 1993 (BX-1007, page 1).

3. The Welborn patent was issued on February 28, 1989 (BX-1010, page 1).

4. Welborn is prior art vis-à-vis Cheruvu under 35 U.S.C. § 102(b).<sup>2</sup>

##### Cheruvu process claim 34 and product-by-process claim 35

5. Bamberger argues that Cheruvu claim 35 is anticipated.

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<sup>2</sup> To the extent this finding is a conclusion of law, it may be treated as a conclusion of law.

6. Cheruvu claim 35 reads:

The product produced by the process of claim 34.<sup>3</sup>

7. Cheruvu claim 35 thus depends from Cheruvu claim 34, which reads (indentation and paragraph numbering ours):

A gas phase process for producing an as-synthesized composition which

- (1) is dry and
- (2) solvent-free and

comprises spherical, non-porous particles, which has [sic--have]

- (a) an average particle size of 0.015 to 0.035 inches, and
- (b) a settled bulk density of from 25 to 36 lb/ft<sup>3</sup> and

which is a copolymer of ethylene and an alpha olefin, which

- (i) has a density of 0.902 to 0.929,
- (ii) a MFR of 15 to about 20, and
- (iii) a  $M_w/M_n$  of from about 2.5 to about 3.0,

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<sup>3</sup> A product by process claim defines a product. The product may be anticipated by any prior art reference which describes a "product" which is identical to a "product by process" even if "product" is made by a method which differs from the process used to make the "product by process." See In re Thorpe, 777 F.2d 695, 697, 227 USPQ 964, 966 (Fed. Cir. 1985). The rationale is that a product is old if it has been made by any method. A new method of making an old product may, however, be patentable.

comprising contacting ethylene and said alpha olefin with a catalyst

(I) at a temperature of about 60<sup>E</sup> C. to about 95<sup>E</sup> C.

(II) at a pressure of from about 100 to about 350 psi,

wherein the catalyst comprises silica

(A) having reactive hydroxyl groups and impregnated with a zirconocene compound and an aluminoxane, and

(B) which has an Al to Zr ratio of from 50 to 500.

Scope and content of the Welborn patent

8. In the language of Cheruvu claim 34, Welborn explicitly describes (column and line insertions are to Welborn):

A gas phase (**e.g., col. 8, lines 35-36 and 60 et seq.; col. 12, line 23**) process for producing an as-synthesized composition (**e.g., col. 12, lines 42-46**) which

(1) is dry and

(2) solvent-free and

comprises spherical, non-porous particles, which has

[sic--have]

(a) an average particle size of 0.015 to 0.035 inches, and

(b) a settled bulk density of from 25 to 36 lb/ft<sup>3</sup> and

which is a copolymer of ethylene and an alpha olefin (col. 1, lines 9-11 -- 1-butene and 1-hexene; col. 2, lines 36-37 and 53-54; col. 12, line 59 -- 1-butene), which

(i) has a density of 0.902 to 0.929 [gm/cc] (col. 12, line 62 -- density of 0.918),

(ii) a MFR of 15 to about 20, and

(iii) a  $M_w/M_n$  of from about 2.5 to about 3.0

(col. 13, lines 51-52 --  $M_w/M_n = 2.5^4$ ),

comprising contacting ethylene and said alpha olefin with a catalyst

(I) at a temperature of about 60<sup>E</sup> C. to about 95<sup>E</sup> C (col. 10, lines 41-44 -- -60<sup>E</sup> to 280<sup>E</sup>C; col. 12, line 39 -- 85<sup>E</sup>C).

(II) at a pressure of from about 100 to about 350 psi (col. 10, lines 45-48 -- 1 to 500 atm; col. 12, line 39 -- 200 psi),

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<sup>4</sup> In Welborn's Example 9, the weight average molecular weight is described as 190,00 (which is a typo which should read 190,000) and the number average molecular weight is reported as 76,000.  $M_w/M_n = 190000 / 76000 = 2.5$ . But, Welborn's polymer (which may be a homopolymer (BX-1096, page 4, ¶ 13)) having an  $M_w/M_n$  of 2.5 has a density of 0.958 gm/cc (which is outside the density range of 0.902 to 0.929 gm/cc required in Cheruvu claim 34).

wherein the catalyst comprises silica (**col. 11, line 23 -- Davison 952 silica**)

- (A) having reactive hydroxyl groups and impregnated with a zirconocene compound (**col. 11, lines 66-67 -- bis(n-butyl-cyclo-pentadienyl) zirconium dichloride**) and an aluminoxane (**col. 11, line 27 -- methyl alumoxane**), and
- (B) which has an Al to Zr ratio of from 50 to 500 (**col. 5, lines 51-52 -- Al:metal of from 1:1 to 100:1; col. 5, line 64 -- metal may be zirconium**).

9. Bamberger maintains that one having ordinary skill in the art would understand from other evidence in the record that the property limitations not explicitly described by Welborn are inherent. Bamberger relies in part on certain experiments performed by Dr. Frederick Y. Lo (a Mobil employee and a named inventor in the Cheruvu patent) to establish that certain properties in Cheruvu claim 34 are inherently described by Welborn.

#### The Lo experiments

10. There came a time during prosecution of the application which matured into the Cheruvu patent that the

examiner entered a rejection of the then pending Cheruvu claims as being unpatentable under 35 U.S.C. § 102(b), alternatively under 35 U.S.C. § 103, over the Welborn patent (BX-1007, pages 046-048).

11. In response to the rejection, Cheruvu filed a declaration by Dr. Lo describing certain experiments which were said to have been conducted for the purpose of making a comparison of the copolymers made in accordance with the Welborn method vis-à-vis copolymers made by the method claimed by Cheruvu (CX-1).

12. Bamberger Exhibit 1011 comprises copies of Mobil laboratory notebook and analysis describing, among other things, the Lo experiments mentioned above.

13. Bamberger relies on four Lo experiments to make out a case of inherency. Those Lo experiments are identified in the record as:

- a. Run 4086-108 (BX-1011, pp. MOC-099974-76)
- b. Run 4086-109 (BX-1011, pp. MOC-099977-79)
- c. Run 4086-111 (BX-1011, pp. MOC-099983-85)
- d. Run 4086-118 (BX-1011, pp. MOC-099993-95).

14. Cheruvu maintains that the four Lo experiments "are not representative of the Welborn '561 catalysts" (CX-1, page 26, ¶ 64).

15. Cheruvu maintains, however, that other Lo experiments are representative (CX-1, page 16, Table 1).

Those Lo experiments are identified in the record as:

- a. Run 4086-107 (BX-1011, pp. MOC-099971-73).
- b. Run 4086-121 (BX-1011, pp. MOC-100000-02).
- c. Run 4086-122 (BX-1011, pp. MOC-100003-04).
- d. Run 4086-123 (BX-1011, pp. MOC-100005-06).

16. From tables in both Bamberger Preliminary Motion 4 and Cheruvu Exhibit 1, Bamberger Exhibits 1011, 1141 and 1142, attachment A to the Supplement to Bamberger Preliminary Motion 4 and information contained in a declaration filed during ex parte prosecution by Cheruvu before the examiner (BX-1007, pages 061-070), polymers made in the eight Lo experimental "Welborn runs" identified above have properties shown in the **Table 1** (see unnumbered page 23).

17. For the purpose of deciding Bamberger Preliminary Motion 4, the following facts have been assumed, albeit not necessarily found to exist):

- a. One skilled in the art would understand the Cheruvu claim limitation of "a  $M_w/M_n$  of from

about<sup>[5]</sup> 2.5 to about 3.0" to mean "a  $M_w/M_n$  of from 2.3 to 3.3" (BX-1138, page 140:8-12).

- b. One skilled in the art would understand the Cheruvu claim limitation "MFR of 15 to about<sup>[6]</sup> 20" to mean " MFR of 15 to 21" (BX-1008, page 47:22 through 48:20).
- c. The products produced in the Lo experiments and gas-phase as-synthesized polymers described by Welborn are "dry" (BX-1074, page 292:17 through 293:10).
- d. The gas-phase polymerization described by Welborn does not include the use of a solvent. Hence, the gas-phase as-synthesized polymers described by Welborn are "solvent-free."

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<sup>5</sup> The assumption makes it unnecessary for us to determine whether the "intrinsic evidence" with respect to the word "about" is ambiguous. Cheruvu is prevailing on Bamberger Preliminary Motion 6 and therefore the assumption does not harm Cheruvu.

<sup>6</sup> The assumption makes it unnecessary for us to determine whether the "intrinsic evidence" with respect to the word "about" is ambiguous. See n.5, supra.

Table 1

Run 4086	catalyst	type of polymerization	density gm/cc	MFR	Average particle size		Zr Content ppm	M <sub>w</sub> /M <sub>n</sub>
					in	F <sub>m</sub>		
107	Welborn A-105	slurry	<b>0.934</b>	<b>34.9</b>			64.8	<b>5.1</b>
108	Welborn D-106	slurry	0.919	18.46			9.4	2.8
109	Welborn D-106	slurry	0.928	<b>22.16</b>	0.018	452.29	7.9	3.0
111	Welborn D-106	slurry	0.926	18.81	0.016	397.78	4.1	2.9
118	Welborn D-115	slurry	0.927	20.43	0.014	350.76	5.4	3.1
121	Welborn D-115	slurry	0.929	<b>24.09</b>			11.3	<b>2.1</b>
122	Welborn D-115	gas	<b>0.949</b>	n/r <sup>7</sup>				
123	Welborn D-115	gas						
110	Mobil 4086-064	slurry	0.918	18.16	0.017	423.05	1.0	n/r <sup>8</sup>

The "A-105" and "D-106" and "D-115" in the catalyst column refer to the number used by Mobil to identify the particular Welborn catalyst in the Lo laboratory notebooks (see, e.g., BX-1011, page MOC-099973, near the top of the page under "Cat:" which then identifies in handwriting "4086-105"). Welborn A and Welborn D mean Examples A and D of Welborn.

The **Table 1** figures in bold are not within the range for that property as set out in Cheruvu claim 34 (it being noted that Cheruvu claim 34 does not contain a limitation to Zr content).

The Speed testimony--Part 1

18. Dr. Charles S. Speed provided testimony on behalf of Bamberger (BX-1096)

19. Dr. Speed rendered a first opinion that the silica of the Welborn catalyst has reactive hydroxyl groups (BX-1096,

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<sup>7</sup> A blank space or "n/r" means not reported. According to Dr. Lo, the MFR could not be meaningfully determined (BX-1007, page 063) due to high molecular weights and for other reasons.

<sup>8</sup> Mobil GPC (gel permeation chromatography) analysis for Run 4086-110 was not included by Bamberger in Bamberger Exhibit 1141.

page 2, ¶ 8; BX-1143 [book authored by Dr. R. K. Iler], page 639; BX-1034, page 1).

20. Dr. Speed's first opinion is found to be credible and is supported by objective data in Iler (BX-1143).<sup>9</sup> Accordingly, the silica of the Welborn catalyst has reactive hydroxyl groups.

21. Dr. Speed rendered a second opinion along the following lines (BX-1096, page 4, ¶ 15) (emphasis ours):

[a]s of March 25, 1992, it was known that the catalysts and processes described in \*\*\* Welborn \*\*\* would result in ethylene alpha-olefin copolymers having a particle size and a bulk density within the ranges claimed in the Cheruvu patent, i.e., "an average particle size of 0.015 to 0.035 inches, and a settled bulk density of from 25 to 36 lb/ft<sup>3</sup>." Such a bulk density and average particle size are typical for copolymer particles made in a commercial gas-phase reactor.

22. Dr. Speed's second opinion is not entitled to much, if any, weight with respect to settled bulk density. Dr. Speed does not refer to any documentary prior art in rendering his second opinion. Dr. Speed points to no evidence

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<sup>9</sup> Bamberger also relies on Hockey, *The Surface Properties of Silica Powders, Chemistry and Industry*, pages 57-63 (1965). Bamberger, however, does not point to any page, column and line. We decline to conduct a search in the first instance through Hockey to determine whether Bamberger's reliance on Hockey is justified.

that the reaction conditions in the Welborn gas-phase reactor are those in "a commercial gas-phase reactor" mentioned in his testimony. Dr. Speed's use of the language "typical" also leaves some doubt as to whether, in the case of the Lo experiments attempting to duplicate the Welborn process, the settled bulk density recited in Cheruvu claim 34 was obtained.

23. Dr. Speed rendered a third opinion along the following lines (BX-1096, page 6, ¶ 19):

In a gas-phase polymerization in which a supported catalyst is used, polymer morphology<sup>[10]</sup> is dependent on the morphology of the catalyst support. The use of a generally spherical or round-shaped silica particle as a catalyst support in a gas-phase copolymerization of ethylene with an alpha-olefin typically results in generally spherical-shaped polymer particles. I am familiar with Davison 948<sup>[11]</sup> and Davison 952<sup>[12]</sup> silicas. Both of those silicas are high-surface area silicas that are generally spherical or

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<sup>10</sup> "Polymer morphology" means "the structure, arrangement, and physical form of polymer molecules. Stevens, Polymer Chemistry, page 70 (2d ed. 1990). Polymer morphology would include, among other things, voids in polymer granules, i.e., porosity of those granules (see, e.g., BR-4188:21-24).

<sup>11</sup> Davison 948 silica is described as having been used by Dr. Howard C. Welborn, Jr., in certain experiments discussed, infra. See, e.g., CX-3, page 44 under "Supported catalyst preparation."

<sup>12</sup> Both Cheruvu (col. 3, lines 41-42) and Welborn (col. 11, line 23) describe the use of Davison 952 silica as a suitable silica carrier to make the catalyst used to produce their respective polymers. The same silica was used in the Mobil experiments (BX-1007, pages 056-057) discussed in Table I.

round-shaped in appearance. Use of either of these materials as a catalyst support in a commercial gas-phase polymerization results in generally spherical or round-shaped polymer particles.

24. Dr. Speed's third opinion is found to be credible and is supported by objective evidence. The Cheruvu and Welborn patents both describe the use of the same silica support. The same silica support was used in the Lo experiments leading to the declaration filed in the PTO.

25. Welborn as-synthesized polymers made by using a catalyst comprising a silica carrier based on Davison 952 would be spherical.

26. Dr. Speed does not provide any convincing testimony that the Welborn as-synthesized polymers are "non-porous."

Cheruvu product claim 22

27. Cheruvu claim 22 reads (indentation and paragraph numbering ours):

An as-synthesized composition which is

(1) dry and

(2) solvent-free and

comprises spherical, non-porous particles, which has

[sic--have]

(a) an average particle size of 0.015 to 0.035 inches, and

(b) a settled bulk density of from 25 to 36 lb/ft<sup>3</sup>, and

which is a copolymer of ethylene and an alpha olefin of 3 to 10 carbon atoms,

(i) having a density of 0.900 to 0.929,

(ii) MFR of 15 to about 20, and

(iii) containing 0.1 to 2 ppm Zr.

28. Cheruvu dependent claim 33 reads:

The composition of claim 22, wherein the copolymer is characterized by  $M_w/M_n$  which ranges from 2.5 to 3.0.

29. Cheruvu product claim 22 differs from Cheruvu product-by-process claim 35 essentially

a. in requiring that the zirconium content of the product be 0.1 to 2 ppm and

b. it does not contain a limitation with respect to  $M_w/M_n$ .

30. Cheruvu claim 33 contains a  $M_w/M_n$  limitation.

The Speed testimony--Part 2

31. Dr. Speed rendered a fourth opinion along the following lines (BX-1096, page 5, ¶ 17):

From the standpoint of physical properties, there is no difference between an ethylene alpha-olefin copolymer "containing 0.1 to 2 ppm Zr" and an ethylene alpha-olefin copolymer containing up to 10 ppm Zr.

32. Dr. Speed's fourth opinion is not consistent with the results of the Lo experiments (upon which Bamberger has bottomed its preliminary motion). In the Lo experiments, Run 4086-109 resulted in a polymer with a zirconium content of 7.9 (which is **within** "up to 10") and an MFR of 22.16 (which is **not within** the MFR required by Cheruvu claim 22), whereas Run 4086-110 resulted in a polymer with a zirconium content of 1.0 (which is **within** "0.1 to 2") and an MFR of 18.16 (which is **within** the MFR required by Cheruvu claim 22).

33. Dr. Speed's fourth opinion will not be given much, if any, weight.

34. Dr. Speed rendered a fifth opinion along the following lines (BX-1096, page 5, ¶ 18):

As of March 25, 1992 [the critical date as to Cheruvu], it was known that the amount of zirconium in a copolymer could be reduced by one or more of a number of known techniques. For example, it was known that if the partial pressure of the ethylene was increased during the polymerization, catalyst productivity would increase \*\*\*.

It also was known that if the reaction was allowed to continue for a longer period of time, the amount of copolymer produced per pound of catalyst would increase \*\*\*. Furthermore, it was known that when a small-scale polymerization like those described in Welborn examples is scaled-up to commercial scale, the amount of impurities in the system can be controlled at a lower level \*\*\*. Finally, it was known that the catalyst activity in terms of grams of polymer produced per gram of zirconium could be increased by increasing the Al:Zr ratio of the catalyst. Again, this increase in catalyst activity would lead to a decrease in the amount [of] residual zirconium in the copolymer. It was known that one or more of these techniques could be used to increase catalyst productivity, thereby reducing the amount of residual zirconium from about 10 ppm to "0.1 to 2 ppm" in the "as-synthesized composition."

35. No documentary evidence has been called to our attention to support of Dr. Speed's fifth opinion. There is objective evidence in the record which may be partially contrary to Dr. Speed's fifth opinion.<sup>13</sup> More important, Dr. Speed does

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<sup>13</sup> We have found on our own that increasing the Al:Zr ratio from (54:1) in Welborn run 14126-134 to (100:1) in Welborn run 14126-147, (1) appears to have increased the yield from 97.0 grams to 122.1 grams, but (2) contrary to the opinion expressed by Dr. Speed, increased (not decreased) the Zr content from 1.17 ppm to 1.68 ppm. See Dr. Welborn's runs as discussed infra at Findings 39-42.

not say why one having ordinary skill in the art would want to have reduced, or would have been motivated to reduce, zirconium content to a level of "0.1 to 2 ppm." We decline to give Dr. Speed's fifth opinion much weight, particularly given that he also believes that there is no difference between the properties of polymers containing 10 ppm zirconium and the properties of polymers containing "0.1 to 2 ppm" zirconium.

Dr. Lo's Table 2

36. In his testimony, Dr. Lo sets out the zirconium content of the polymers produced in Examples 1-3, 3A and 4-10 of Welborn. The zirconium content ranges from a low of 61 ppm for Example 7 to a high of 846 ppm for Example 5 (CX-1, page 21, Table 2).

37. Bamberger does not challenge the correctness of Dr. Lo's zirconium contents as set out in Dr. Lo's Table 2.

The Welborn declaration

38. The file wrapper of the Welborn patent is in evidence (CX-3).

39. Included in the Welborn file wrapper is a declaration (CX-3, pages 43-47) of Dr. Howard Curtis Welborn, Jr., deceased (BX-1074, page 338:12-14).<sup>14</sup>

40. Dr. Lo, reviewing two runs reported in Table 1 of the Welborn declaration

- a. 14126-134 supported catalyst and
- b. 14126-147 supported catalyst.

41. Dr. Lo, agreed that the polymers described in these two Welborn runs contain zirconium contents of 1.17 ppm (BX-1074, pages 341:18 through 342:13) and 1.68 (BX-1074, pages 343:17-19).

42. Some of the properties of the two Welborn runs discussed above are shown in **Table 2**.

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<sup>14</sup> The Welborn file wrapper was introduced in evidence during an evidentiary hearing which took place on July 28, 1997, in connection with Bamberger Preliminary Motion 1. The file wrapper was offered in evidence by Cheruvu. Initially a question was raised by a member of this merits panel (the only member present at the evidentiary hearing) as to the admissibility of the declaration, given it could not be cross-examined. Ultimately the declaration was admitted because Cheruvu placed it in evidence and Bamberger did not object (BX-1074, pages 339:16 through 341:11). Bamberger's use of the declaration was on re-direct after Cheruvu "opened the door." In any event, the declaration is clearly admissible for the limited purpose of showing what is described in the Welborn patent file. We have considered the declaration only for what is described therein.

**Table 2**

<u>Welborn Run No.</u>	<u>Zr Content ppm</u>	<u>Al/Zr ratio</u>	<u>Yield grams</u>	<u>Morphology</u>	<u>M<sub>w</sub>/M<sub>n</sub></u>
14126-134	1.17	54	97.0	Free flowing polymer granules	1.94 <sup>15</sup>
14126-147	1.68	100	122.1	Free flowing polymer granules	2.34 <sup>16</sup>

) @ )

43. There is no discussion in Welborn or the Welborn declaration of zirconium content or of the significance of zirconium content.

Difference between Cheruvu claims 22-33 and Welborn

44. Cheruvu claim 22 differs from Welborn at least in that Welborn does not describe polymers having a zirconium content of from 0.1 to 2.0 ppm.

**H. Discussion**

1. Burden of proof

Bamberger maintains that some of Cheruvu's claims are unpatentable over the prior art. Bamberger is under a burden

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<sup>15</sup> This M<sub>w</sub>/M<sub>n</sub> is not within the scope of Cheruvu product claims 33 and 35. See Finding 17(a). Cheruvu claim 22 does not have as M<sub>w</sub>/M<sub>n</sub> limitation.

<sup>16</sup> This M<sub>w</sub>/M<sub>n</sub> is within the scope of Cheruvu product claims 33 and 35.

to prove its case (37 CFR § 1.637(a)) by a preponderance of the evidence.

To establish anticipation, Bamberger must show that a prior art reference describes each and every element of a claimed invention. Hybritech Inc. v. Monoclonal Antibodies, Inc., 802 F.2d 1367, 1379, 231 USPQ 81, 90 (Fed. Cir. 1986), cert. denied, 480 U.S. 947 (1987).

The description in the prior art may be explicit or by way of inherency. Glaxo, Inc. v. Novopharm, Ltd., 52 F.3d 1043, 1047, 34 USPQ2d 1565, 1567 (Fed. Cir. 1995) (for anticipation, the description need not be express, but may anticipate by inherency where it would be appreciated by one of ordinary skill in the art); RCA Corp. v. Applied Digital Data Systems, Inc., 730 F.2d 1440, 1444, 221 USPQ 385, 388 (Fed. Cir.), cert. dismissed, 468 U.S. 1228 (1984) (anticipation is established only when a single prior art reference discloses, expressly or under principles of inherency, each and every element of a claimed invention).

A description in the prior art of a single species within the claim is an anticipation of the claims. Titanium Metals Corp. v. Banner, 778 F.2d 775, 782, 227 USPQ 773, 779 (Fed. Cir. 1985).

A description in prior art of any value within a claimed range is an anticipation of the range. In re Wertheim, 541 F.2d 257, 267, 191 USPQ 90, 100 (CCPA 1976).

To establish unpatentability under 35 U.S.C. § 103, Bamberger must satisfy the requisites set out in Graham v. John Deere Co., 383 U.S. 1 (1966).<sup>17</sup>

To establish that a prior art reference inherently anticipates a claim, Bamberger need not establish that every limitation is expressly set forth in haec verba in the prior art reference relied upon; it is sufficient if the prior art is so worded that the necessary and only reasonable construction to be given the disclosure of the prior art by one skilled in the art is one which will lend clear support to each positive limitation in the claim. Compare Binstead v. Littmann, 242 F.2d 766, 770, 113 USPQ 279, 282 (CCPA 1957). Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances described in a prior art reference is not sufficient. If, however, the disclosure is sufficient to show that the natural result flowing from the operation as taught by the prior art would result in the

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<sup>17</sup> We disagree with Bamberger's suggestion that "[a] claimed invention is obvious [sic--unpatentable] \*\*\* if the differences between that invention and the prior art would have been obvious to a person of ordinary skill in the art" (Paper No. 83, page 11). Rather, claimed subject matter is unpatentable under 35 U.S.C. § 103 only if the subject matter, as a whole, would have been obvious notwithstanding any differences between the subject matter and a prior art reference.

claimed subject matter, the description in the prior art disclosure would be sufficient to establish anticipation through inherency. Compare Hansgirg v. Kemmer, 102 F.2d 212, 214, 40 USPQ 665, 667 (CCPA 1939).

Bamberger may properly rely on ex parte experimental work performed after the Welborn patent issued to establish inherency. Spero v. Ringold, 377 F.2d 652, 658, 153 USPQ 726, 730 (CCPA 1967). See also Standard Oil Co. (Indiana) v. Montedison S.p.A., 664 F.2d 356, 364, 376,<sup>18</sup> 212 USPQ 327, 334, 345 (3d Cir. 1981), cert. denied, 456 U.S. 915 (1982).

## 2. Anticipation

In our opinion, Bamberger has not met its burden of establishing anticipation. Bamberger necessarily has to concede that the some of the property limitations of Cheruvu claims 22 and 34 are not described in haec verba in Welborn, because Welborn does not describe in so many words all of the properties recited in the Cheruvu claims or their numerical values.

To overcome the absence of an in haec verba in Welborn, Bamberger turns to four Lo experiments. Cheruvu maintains that the four Lo experiments are not representative of the Welborn

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<sup>18</sup> In Standard Oil, an objection to the admissibility of ex parte experiments was overruled where the party not present during the experiments had an opportunity cross-examine the individuals conducting the experiments. Here, Bamberger was not present during the ex parte experiments, but was able to cross-examine. Moreover, and perhaps more significant, it is Bamberger who attempts to rely in the first instance on the Lo experiments.

process, and calls attention to other Lo experiments which it maintains are representative. Insofar as we can tell, Bamberger does not challenge Cheruvu's argument that the other Lo experiments are representative. Hence, we agree with Cheruvu that if the Lo experiments are to be considered, all of Lo experiments should be considered as a whole. When all of the Lo experiments are considered, it is our view that Bamberger cannot sustain its burden of demonstrating "inherency."

Initially, we question whether it would be appropriate to take bits and pieces from one part of Welborn and combine them with other bits and pieces from another part of Welborn to "come up" with a "phantom polymer" not explicitly described by Welborn and then measure the properties of the phantom polymer to establish inherency. Rather, we believe Bamberger was under a burden to show that (1) a polymer explicitly described by Welborn has the Cheruvu properties or (2) operating under the Welborn process conditions will necessarily result in a polymer having the Cheruvu properties.

We start our analysis with an assumption (which we will later undermine) favorable to Bamberger, viz., the Lo experiment (see Table 1, supra) Runs 4086-108, -111 and -118 produced polymers having the properties recited in Cheruvu process claim 34, and therefore also Cheruvu product-by-process claim 35. However, it is a fact that Lo experimental Runs 4086-107, -109

and -121 (MFR too high) and -122 (density too high) produce polymers which do not have all of the properties recited in the same Cheruvu claims.

The question of whether a prior art reference inherently describes a limitation in a claim is a question of fact. In re Schreiber, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997). We cannot find that Welborn inherently describes a process for making a polymer or a polymer within the scope of Cheruvu claims 34 and 35. We have properties "results" for polymers made in seven Lo experimental runs. The "results" reveal a "score" of 4 do not have the properties to 3 have the properties. From Bamberger's point of view, we are not particularly impressed with the "score." Six of the Lo experimental runs were performed in a slurry polymerization. Cheruvu claim 34 calls for a gas-phase polymerization. The only Lo experimental run performed in the gas-phase, and supposedly duplicating Welborn, resulted in a density (0.949) which is higher than the density limitation in Cheruvu claims 34 and 35. Perhaps more important, however, is the reliability of the evidence. Can it be said that (1) the necessary and only reasonable construction to be given the description of the process in Welborn by one skilled in the art is one which will lend clear support to each positive limitation in the Cheruvu claims 34 and 35 and/or (2) the natural result flowing from the

operation as taught by Welborn would (not may) result in the subject matter of Cheruvu claims 34 and 35? We think not. Too much is left to chance, speculation and hope when only 3 experiments out of 7 experiments purporting to duplicate the Welborn process produce a result which favors inherency.

Earlier, we made assumptions, which we now address. Insofar as we can tell, Bamberger has not addressed the limitation in the Cheruvu claims which requires the as-synthesized composition to be "non-porous." In discussing the "spherical, non-porous particles" limitation on page 6 of attachment A to the Supplement to Bamberger Preliminary Motion 4, we find no discussion of porosity. Nor, have we found any discussion of the "non-porous" limitation in the Speed testimony.<sup>19</sup> Likewise, Bamberger has failed to satisfy us that the Cheruvu settled bulk densities were achieved in the Lo experiments. What might be typical for a commercial gas-phase reactor has not been shown by Bamberger, generally or through the testimony of Dr. Speed, to be typical for a laboratory scale slurry reactor.

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<sup>19</sup> In connection with other preliminary motions, Bamberger has pointed to col. 2, line 67 through col. 3, line 4 of the Cheruvu patent: "When made in the gas phase fluid bed process, on pilot plant scale, the product is dry and solvent-free and comprises spherical, non-porous particles \*\*\*." According to Bamberger, Cheruvu's statement constitutes an admission that gas phase fluid bed processes result in non-porous particles. We disagree that Cheruvu's "admission" is as broad as Bamberger suggests. At most, the admission applies to polymers made in a "pilot plant" and then only to those made in accordance with the Cheruvu invention. There is no admission by Cheruvu that all gas phase products necessarily are "non-porous."

There is a dispute between Bamberger<sup>20</sup> and Cheruvu<sup>21</sup> as to whether the Welborn and Cheruvu catalysts are the same. Cheruvu says that its catalyst has more reactive hydroxyl groups than the Welborn catalyst. Bamberger responds by saying that there is no numerical limitation of reactive hydroxyl groups in the Cheruvu claims. We find it unnecessary to resolve the Bamberger-Cheruvu dispute. However, the fact that there are no numerical limitations for reactive hydroxyl groups in the Cheruvu claims does not mean that Bamberger can avoid proving that other numerical range polymer property limitations are obtained when the Welborn process is duplicated. The extent of the reactive hydroxyl groups on the respective Welborn and Cheruvu catalysts may be the reason the Lo experimental results are not consistent.

Bamberger has failed to establish, by a preponderance of the evidence, that Welborn anticipates any of Cheruvu claims 22-35.

### 3. Obviousness

Cheruvu claim 22 (from which Cheruvu claims 23-33 depend in one form or another) requires the zirconium content to be "0.1 to 2 ppm."

According to Dr. Lo, the zirconium content of polymers made in accordance with the examples of Welborn contain from 61 ppm

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<sup>20</sup> See Bamberger Reply 4 (Paper No. 229), page 5.

<sup>21</sup> See Cheruvu Opposition 5 (Paper No. 129), pages 6-8.

to 846 ppm zirconium (CX-1, page 21, Table 2) (see also Finding 36). There is no discussion of zirconium content in the Welborn patent. Hence, the patent cannot per se serve to show that one having ordinary skill in the art would have regarded zirconium content as a significant matter at the time Welborn filed the patent application which matured into the Welborn patent. Furthermore, in presenting his declaration (see Findings 38-43), Dr. Welborn did not discuss zirconium content or its significance.

If we assume that Welborn describes polymers which comprise granules which are "non-porous" and have a settled bulk density of from 25 to 36 lb/ft<sup>3</sup>, then Cheruvu claims 22-33 differ from Welborn in that Welborn does not describe Cheruvu's zirconium content of 0.1 to 2 ppm. The question then becomes, would the subject matter of Cheruvu's claims 22-33 have been obvious notwithstanding Welborn's failure to describe Cheruvu's zirconium content range? In this respect, we conclude that Bamberger has failed to establish obviousness within the meaning of 35 U.S.C. § 103.

There is no discussion in the prior art relied upon by Bamberger about zirconium and/or its significance. Dr. Speed's conclusion that the polymer having 10 ppm zirconium is essentially no different, in terms of other properties, that a polymer having 0.1 to 2 ppm zirconium is not an explanation of

why one skilled in the art would want, or be motivated, to change the zirconium content of the Welborn examples of 61-849 ppm to 0.1-2 ppm, as required by Cheruvu claims 22-33. If it is Dr. Speed's position that there is no practical difference between a polymer having a zirconium content of 10 ppm and a polymer having a zirconium content of 0.1 to 2 ppm, why would anyone have been motivated, based on the prior art before us, to lower zirconium content to 0.1 to 2 ppm?

To some extent Bamberger would say to the rationale set out in the previous paragraph, "so what!" and would point to the Welborn experimental results set out in Table 1 of the ex parte Welborn declaration (see Finding 42; CX-3,

page 47).<sup>22</sup> Bamberger can make out a case that polymers made in two of the Welborn experimental runs contain zirconium contents of 1.17 and 1.68 ppm, which of course are within Cheruvu's claimed range of 0.1 to 2. With the exception of Cheruvu claim 33, Bamberger can also make out a case that polymers made in those two experimental runs have a  $M_w/M_n$  which is the same as the polymers of Cheruvu claims 22-32, because Cheruvu claims 22-32 do not have a  $M_w/M_n$  limitation. Bamberger arguably can make out a case that Welborn experimental run 14126-147, which achieved a  $M_w/M_n$  of 2.34 falls within the  $M_w/M_n$  range of about 2.5 to about 3.0 of Cheruvu claim 33, if the assumption made in Finding 17(a)<sup>23</sup> is adhered to. But, there are numerous other differences between what Dr. Welborn explicitly sets out in Table 1 with respect to the properties of the polymers there described and the as-synthesized compositions of Cheruvu's claims 22-33. Bamberger has not undertaken to explain what those differences are and why the subject matter, as a whole, of Cheruvu's claims 22-33 would have been obvious notwithstanding those differences. We decline to search the

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<sup>22</sup> We have assumed that the Welborn declaration in the file of the Welborn patent is prior art under 35 U.S.C. § 102(b), given that the patent issued more than one year prior to the date Cheruvu filed the application which matured into the Cheruvu patent and a patent file is available to the public on the date a patent issues. 37 CFR § 1.11 (1988). Hence, as of February 28, 1989, the Welborn declaration was available to the public.

<sup>23</sup> One having ordinary skill in the art would interpret "a  $M_w/M_n$  of from about 2.5 to about 3.0" to mean "a  $M_w/M_n$  of from 2.3 to 3.3."

record in the first instance to determine whether there is evidence which might support a holding of obviousness based on that evidence combined with the revelations in the Welborn declaration.

Bamberger has failed to establish that the subject matter of Cheruvu claims 22-33 or Cheruvu claim 35 would have been obvious to a person having ordinary skill in the art within the meaning of 35 U.S.C. § 103.

4. Additional observation

We close this chapter of the interference with the following observation. We are totally puzzled as to why Bamberger did not undertake experiments to duplicate the precise conditions in one or more of the examples of Welborn and report the properties of polymers obtained from duplicating those conditions. Compare Standard Oil Co. (Indiana) v. Montedison S.p.A., 664 F.2d at 371-373, 212 USPQ at 340-342. There manifestly was a full opportunity for Bamberger to have done so, and there was more than ample reason to do so in this interference where Bamberger's burden of proof (preponderance of the evidence) was lower than it would have been in the civil action (clear and convincing). Apparently, Bamberger elected to bottom its litigation strategy

