UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NESTLÉ PURINA PETCARE COMPANY,

Petitioner,

v.

OIL-DRI CORPORATION OF AMERICA,

Patent Owner.

Case No.: Not Yet Assigned
U.S. Patent No. 5,975,019
Title: Clumping Animal Litter

PETITION FOR *INTER PARTES* REVIEW OF U.S. PATENT NO. 5,975,019 PURSUANT TO 37 C.F.R. § 42.100 et seq.

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An electronic payment in the amount of $23,000.00 for the *Inter Partes* Review fees specified by 37 C.F.R. § 42.15(a)(1 and 2) – comprising the $9,000.00 request fee and $14,000.00 post-institution fee – are being paid at the time of filing this petition. If there are any additional fees due in connection with the filing of this paper, you are hereby authorized to, and please do, charge the required fees to our deposit account No. 02-4467.

Table of Authorities

Cases

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Exhibit List

Exhibit	Description
1001	U.S. Patent No. 5,975,019, filed Aug. 19, 1997, issued Nov. 2, 1999
1002	January 29, 1999 Rejection of U.S. Patent Application No. 08/914,406
1003	April 29, 1999 Terminal Disclaimer for U.S. Patent Application No. 08/914,406
1004	Notice of Allowability for U.S. Patent Application No. 08/914,406
1005	Declaration of John Hughes
1006	Hughes U.S. Patent No. 5,386,803, filed Oct. 18, 1989, issued Feb. 7, 1995
1007	U.S. Sieve Series Chart
1008	Pattengill U.S. Patent No. 5,458,091, filed Oct. 14, 1994, issued Oct. 17, 1995
1009	Hughes U.S. Patent No. 5,503,111, filed Feb. 4, 1994, issued Apr. 2, 1996
1010	Proof of Service
1011	Hughes U.S. Patent No. 5,129,365, filed July 16, 1990, issued July 14, 1992
1012	1997 Merriam Webster definition of "Particulate"
1013	1997 Merriam Webster definition of "Arithmetic Mean"
1014	Henry F. Zobel and Alistair M. Stephen, *Starch: Structure, Analysis and Application*, *in* Food Polysaccharides and Their Applications (Alistair M. Stephen ed., 1995).
1015	Stedman's Medical Dictionary definition of "Plantago" (26th ed. 1995).

I. Compliance With Requirements For A Petition For *Inter Partes* Review.

A. Mandatory Notices.

Real Parties-In-Interest: Petitioner Nestlé Purina PetCare Company, Nestlé SA, Nestec SA, and Nestlé Holdings, Inc.

Related Matters: *Oil-Dri Corporation of America v. Nestle Purina PetCare Company*, Case No. 1:15-cv-01067, pending in the U.S. District Court for the Northern District of Illinois is a related matter pursuant to 37 C.F.R. § 42.8(b)(2).

Lead and Backup Counsel:

Lead Counsel	Backup Counsel
David Roodman Reg. No. 35,663 BRYAN CAVE LLP One Metropolitan Square 211 N. Broadway, Suite 3600 St. Louis, MO 63102 General Tel: (314) 259-2000 Fax: (314) 259-2020 daroodman@bryancave.com	Robert G. Lancaster Reg. No. 43,736 Emma Harty Reg. No. 56,677 BRYAN CAVE LLP One Metropolitan Square 211 N. Broadway, Suite 3600 St. Louis, MO 63102 General Tel: (314) 259-2000 Fax: (314) 259-2020 rglancaster@bryancave.com emma.harty@bryancave.com

A Power of Attorney appointing these attorneys is filed herewith.

Service Information: Service information for lead and back-up counsel is provided in the designation of lead and back-up counsel, above. Petitioner consents to electronic service by email at the email addresses provided above.

B. Grounds for Standing.

Petitioner hereby certifies that the '019 Patent is available for *Inter Partes* Review

("IPR") and that it is not barred or estopped from requesting IPR of the Challenged Claims on the grounds identified herein. Specifically: (i) Petitioner is not the owner of the '019 Patent; (ii) Petitioner has not, and no real party in interest to Petitioner has, filed a civil action challenging the validity of a claim of the '019 Patent; (iii) this Petition is filed less than one year after the date on which the Petitioner, the Petitioner's real part in interest, or a privy of the Petitioner, is or was served with a complaint alleging infringement of the '019 Patent; (iv) the estoppel provisions of 35 U.S.C. § 315(e)(1) do not prohibit this IPR; (v) this Petition is filed more than nine months after the date of grant of the '019 Patent; and (vi) Petitioner has not previously filed a petition for IPR of the '019 Patent.

C. Proof of Service.

Proof of service of this Petition appears in Exhibit 1010.

II. Introduction.

Petitioner Nestlé Purina PetCare Company ("Petitioner") hereby respectfully requests the institution of *Inter Partes* Review ("IPR") of Claims 1-13, 30 & 32 (the "Challenged Claims") of Goss et al. U.S. Patent No. 5,975,019 (Ex. 1001, the "'019 Patent"). U.S. Patent and Trademark Office ("PTO") records reflect that the '019 Patent is assigned to Oil-Dri Corporation of America ("Oil-Dri" or "Patent Owner").

III. Overview of the '019 Patent.

The '019 Patent, entitled "Clumping Animal Litter," was filed on August 19, 1997, and issued on November 2, 1999.

A. <u>The '019 Specification</u>.

The '019 Patent is directed to a clumping animal litter, a product that is used for animals, principally cats, to urinate in. The '019 Patent contends that the named inventors were the first to use a free-flowing blend of *non-swelling* and *swelling* clay particles together, where the *non-swelling* clay particles are larger than the *swelling* clay – and then erroneously ascribes certain alleged novel percentages and size ranges to the different clay particles. As the prior art, a person of ordinary skill in the art at the time, and detailed review herein makes abundantly clear, the '019 Patent claimed *nothing* new or unobvious at the time of the alleged invention.

Specifically, the '019 Patent is directed to a clumping litter[1/] comprised of a composition of discrete, *free-flowing*: (i) *non-swelling*; and (ii) *swelling*; clay particles, where the average, *mean*, particle size of the *non-swelling* clay particles is greater than that of the *swelling* clay particles. Ex. 1001, Abst., 2:44-48; 3:9-11 ("The animal litter of this invention is in the form of a free-flowing admixture of particulate non-swelling clay material and swelling clay"); 4:5-7 ("The clay constituent of the present composition is in the form of discrete particles").[2/] The very essence of the *alleged* invention is that

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1/ The principal benefit of a "clumping" (*versus* non-clumping) litter is that when it is combined with animal urine it forms a "clump" that can be easily removed.

2/ A common well-known *non-swelling* clay is "calcium bentonite" or smectite, and a common well-known *swelling* clay is "sodium bentonite."

the distribution and mixture of the two known types and relative sizes of clay particles *purportedly*, for the first time, resulted in a blended product requiring less than 60% *swelling* clay (by weight). Ex. 1001, 1:42-53 (the '019 Patent incorrectly contends that previously, a composition "containing sixty-percent (60%) by weight or less of sodium bentonite" was unable to obtain "good clumping"), 2:49-56; 4:61-63 ("the use of less swelling clay is possible because there is more effective distribution of the particles").

Yet, the '019 Patent itself concedes that both *swelling* clay (sodium bentonite) and "blends of sodium bentonite and a non-clumping clay material" were well known in the litter art at the time of the application for the '019 Patent. Ex. 1001, 1:35-37; 1:47-50 ("wide acceptance, particularly in clumping litter"). The '019 Patent goes on to admit that prior art animal litter blends comprising "well in excess" of 60% *swelling* clay by weight were also well known in the art, and *falsely* represents that, prior to the claimed invention, compositions of blends of clumping litter having 60% or less *swelling* clay (sodium bentonite) were not known. Ex. 1001, 1:42-53.

The specification of the '019 Patent also wrongly contends that the alleged inventors were the first to find that ratios of mean particle sizes of *non-swelling* clay to *swelling* clay in ranges of 1.1:1 to about 4:1 (including about 2:1 to about 3:1), could be used to achieve good "clump strength." Ex. 1001, 7:21-23.[3/] And, other claims of the

[3/] Good "clump strength" is desirable to allow easier removal and disposal of clumps of animal waste (in other words, the "clump" does not easily fall apart when lifted).

'019 Patent simply add organic clumping agents, which the '019 Patent admits was also extremely well-known in the art. Ex. 1001, 1:59-61, 3:11-14, Claims 13, 31.

As detailed herein, litter blends of *swelling* and *non-swelling* clay particles meeting all of the claimed limitations of the Challenged Claims were well known, published, and used in the art long prior to the alleged invention of the '019 Patent. Indeed, using *non-swelling* particles that have an average size greater than the *swelling* clay particles was well known. Using various ranges of percentages of each ingredient were also well known – including 40% *swelling* and 60% *non-swelling* clays. And, even the claimed ratios of sizes of particles was taught by the prior art. The Challenged Claims of the '019 patent are unpatentable and invalid.

B. <u>The Prosecution History</u>.

The application for the '019 Patent was filed on August 19, 1997, long after pet litter blends of *swelling* and *non-swelling* clays had become well-known in the art. The PTO initially rejected all of the claims of the application for obviousness-type double patenting in view of Claims 1-14 of U.S. Patent No. 5,836,263 (the "'263 Patent"). Ex. 1002, p. 3. In response, the Patent Owner filed a terminal disclaimer, disclaiming the terminal part of the statutory term of the '019 Patent that would extend beyond that of the '263 Patent. Ex. 1003.

The PTO issued a Notice of Allowability contingent upon the submission of formal drawings. Ex. 1004. The Patent Owner submitted replacement drawings on August 26, 1999 and the '019 Patent issued on November 2, 1999.

C. The '019 Patent Claims.

Independent Claims 1 & 30 of the '019 Patent contain substantially the same subject matter, with both simply claiming a distributed mix of *swelling* and *non-swelling* clay particulates (where the *non-swelling* clay particles have a larger average, *mean*, particle size), and Claim 1 sets maximum average particle sizes for the two blended clays. Claim 30, a method claim, adds nothing more than two simple inherent steps – (1) mixing the two types of clay particles, and then (2) packaging:

Claim 1	Claim 30
1. A clumping animal litter comprising:	30. A method for making a clumping animal litter comprising the steps of: a. combining
a. a particulate non-swelling clay material having a predetermined mean particle size no greater than about 4 millimeters; and	a particulate non-swelling clay material
b. a particulate swelling clay having a predetermined mean particle size no greater than about 2 millimeters,	with a suitable particulate swelling clay to form a composition
wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay.	wherein the mean particle size of the particulate non-swelling clay material is greater than the mean particle size of the particulate swelling clay;
	b. mixing the composition to effect a substantially uniform distribution of the two materials;
	c. packaging a quantity of the mixed composition.

The challenged dependent claims encompass nothing more than basic known types of clay, ranges of clay particulate sizes, ranges of percentages of the two types of clay that are mixed together, and ratios of mean particle sizes of the two types of clay:

Dependent Claim 2: simply defines the *swelling clay* as well-known "sodium bentonite";

Dependent Claim 3: simply defines the *non-swelling clay* as well-known smectite;

Dependent Claims 4 & 5: simply define ratios of, *average*, mean particle sizes of the *non-swelling* to *swelling* clay --1.1:1 to about 4:1, and 2:1 to about 3:1, respectively;

Dependent Claims 6-7, 9-10 & 32: simply define known broad ranges of percentages of *swelling* and *non-swelling* clay;

Dependent Claims 8, 11 & 12: simply set broad ranges of known particulate sizes; and

Dependent Claim 13: simply adds the known use of an organic clumping agent.

D. Level of Ordinary Skill in the Art.

The qualifications of a person of ordinary skill in the art at the time of the alleged invention is apparent from the cited art, and includes a person with an undergraduate scientific or engineering degree in a relevant field (such as chemistry, materials, and/or mechanical or process engineering) and/or approximately three years of relevant industry or academic experience. Ex. 1005, ¶ 22.

Mr. John Hughes undoubtedly qualifies as a person of ordinary skill in the art at the time of the alleged invention. As set forth in his Declaration, Mr. Hughes received a BSc *cum laude*, in Chemistry from the University of Wales in the United Kingdom. Ex. 1005, ¶ 2. He then moved to the United States and, in 1965, began working as a research chemist at American Colloid Company ("AMC"), where he developed further expertise in bentonite clay and bentonite clay products and

applications. Ex. 1005, ¶ 5. While at AMC, Mr. Hughes held positions including Assistant Director of Chemical Research, Manager of Clay Utilization, Manager of Corporate Development, Vice President, Senior Vice President, and Executive Vice President. Ex. 1005, ¶¶ 7-8. In 1985, Mr. Hughes became President and Chief Executive Officer of AMC and, in 1999, became Chairman of the Board of AMCOL International Corporation (the successor to AMC). Ex. 1005, ¶¶ 10, 14.

In 1989, *eight years before the application for the '019 Patent*, Mr. Hughes filed the first of many patent applications directed to clumping litter inventions. Indeed, in the litter industry, Mr. Hughes is known as one of the earliest and foremost inventors of clumping litter and is a named inventor on over 30 patents and patent applications, many of which are directed to uses and applications of clays and, in particular, *swelling* clays – including for use as animal litter. Ex. 1005, ¶¶ 12-13.

IV. Statement of Relief Requested for Each Challenged Claim, 37 C.F.R. § 42.104(b).

A. Claims for Which Review Is Requested.

Petitioner respectfully requests *Inter Partes* Review of Claims 1-13, 30 & 32 of the '019 Patent, and cancellation of these claims as unpatentable.

B. The Specific Art on Which the Challenge Is Based.

Each of the cited references in the Petition are prior art to the '019 Patent, which has an earliest possible priority date of August 19, 1997, the filing date of the '019 Patent. The cited references are as follows:

1. **Hughes U.S. Patent No. 5,386,803**, entitled "Animal Dross Absorbent and Method" ("Hughes '803 Patent"). The Hughes '803 Patent was filed on Oct. 18, 1989, has a priority date of Jan. 13, 1989, and issued on Feb. 7, 1995 – over 2 ½ years before the filing date of the '019 Patent.

2. **Pattengill, et al. U.S. Patent No. 5,458,091**, entitled "Clumpable Animal Litter Mixture" ("Pattengill"). Pattengill was filed on Oct. 14, 1994, has a priority date of Aug. 18, 1993, and issued on Oct. 17, 1995 – almost 2 years prior to the filing date of the '019 Patent.

C. The Statutory Grounds on Which the Challenge Is Based.

This Petition identifies three grounds of unpatentability.

Ground 1: Claims 1-4, 6-13, 30 & 32 are anticipated under 35 U.S.C. § 102 by Hughes U.S. Patent No. 5,386,803.

Ground 2: Claims 1-4, 6-13, 30 & 32 are anticipated under 35 U.S.C. § 102 by Pattengill U.S. Patent No. 5,458,091.

Ground 3: Claims 1-13, 30 & 32 would have been obvious to a person of ordinary skill in the art at the time of the alleged invention under 35 U.S.C. § 103 in view of: (a) Hughes U.S. Patent No. 5,386,803; (b) Pattengill U.S. Patent No. 5,458,091; and/or (c) Hughes U.S. Patent No. 5,386,803 in view of Pattengill U.S. Patent No. 5,458,091.

Petitioner details the reasons for unpatentability, including specific evidence supporting this Petition, below.

D. Claim Construction of the Challenged Claims.

Each claim in an *Inter Partes* Review must be given the "broadest reasonable construction in light of the specification of the patent in which it appears." 37 C.F.R. § 42.100(b); *In re Cuozzo Speed Technologies, LLC.*, Case No. 2014-1301, slip op. (Fed. Cir. Feb. 4, 2015).

1. "Mean Particle Size." A person of ordinary skill in the art at the time of the alleged invention would conclude that the proper, and *broadest reasonable construction*, of the claim term "mean particle size" is the average of the known particle sizes or sizes of groupings of particle sizes.[4/] Ex. 1005, ¶ 24. This construction is entirely consistent with the common and ordinary meaning of the mathematical term "mean" and the specification. Ex. 1013; Ex. 1005, ¶ 24; Ex. 1001, 4:17-20. If one only knows the largest and smallest sizes of a group of particles, the "*mean particle size*" is the average of the known largest and smallest values. Ex. 1005, ¶ 24.

[4/] Petitioner provides constructions in compliance with the required *broadest reasonable construction* standard, recognizing that neither it nor a Court is bound by such constructions in judicial proceedings. Petitioner maintains, does not waive, and reserves the right to challenge the claims in other proceedings (*e.g.,* before the PTAB or a Court) on any different grounds, *e.g.* 35 U.S.C. § 112. By supplying the analyses and charts herein, Petitioner does not concede, *inter alia*, that the claims are definite or otherwise comply with 35 U.S.C. § 100, *et seq*.

2. "*Particulate* Non-Swelling Clay" & "*Particulate* Swelling Clay."

A person of ordinary skill in the art at the time of the alleged invention would understand and conclude that the proper and *broadest reasonable construction* of the terms "particulate non-swelling clay" and "particulate swelling clay" means separate, discrete, free-flowing, particles of, respectively, non-swelling and swelling clays. Ex. 1005, ¶ 25. This construction is taught by and entirely consistent with the specification and fully conforms with the common and ordinary meaning of the term "*particulate(s)*."[5/] Ex. 1005, ¶ 25.

Throughout the '019 Patent specification, the claimed *particulates* are aptly described as discrete free-flowing particles. Indeed, the '019 Patent states that "[t]he animal litter of this invention is in the form of a *free-flowing admixture* of particulate non-swelling clay material and swelling clay," and "[t]he [non-swelling] clay constituent of the present composition is in the form of *discrete* particles." Ex. 1001, 3:9-11 (emphasis added), *and* 4:6-7. Tellingly, the '019 Patent explains:

> "Samples for testing were created by combining discrete particles of the swelling clay with discrete particles of the non-swelling clay in approximately equal amounts, based on weight, and placing the combination of the two types of particles in a tray. Other than these simple acts, no further steps were taken to prepare the compositions for testing . . . ." Ex. 1001, 5:46-6:3.

[5/] The definition of "Particulate" in 1997, at the time of the alleged invention (and today), is "of or relating to minute separate particles." Ex. 1012 (emphasis added).

The '019 Patent specification is consistent in expressly and only disclosing that the claimed particulates are discrete, free-flowing, particles. Indeed, the very essence of the alleged invention is that the discrete *swelling* clay particles will be better distributed among the *non-swelling* particles if, on average, they have a smaller mean particle size than the discrete *non-swelling* clay particulates. Ex. 1001, 2:49-56; 4:61-63 ("there is more effective distribution of the particles within the animal litter"); *and* Claim 30, 11:3-13 ("mixing the composition to effect a substantially uniform distribution of the two materials"). Both the claims and specification require and describe only prior art *free-flowing*, *separate*, particles – and do not describe or cover, for example, a new connected or agglomerated mass of *swelling* and *non-swelling* fines. Ex. 1001, 9:37, 41; 11:5-6, 10-11; 11:3-13 ("a particulate of non-swelling clay," "a particulate of swelling clay," "distribution of the two materials"); *and* Ex. 1001, 2:49-56 (separate, and a larger number of, *swelling* clay particles).

V. Overview of the Prior Art.

Long before the alleged invention of the '019 Patent, prior art, including issued U.S. patents, clearly and expressly described and taught all of the claimed elements and steps of the Challenged Claims. By way of example, the Hughes '803 and the Pattengill Patents *both* independently recite and expressly disclose the alleged invention including, for example, combining discrete *non-swelling* clay particulates (including calcium bentonite), with discrete *swelling* clay particulates (sodium bentonite), with the claimed size limitations and percentages, to form clumpable

animal litters. *Both* prior art patents expressly describe a plurality of mixtures of separate *swelling* and *non-swelling* clay particles including, *inter alia*:

(i) mixtures where the *non-swelling* clay particles, by weight, far exceed the percentage of *swelling* clay particles (including the required percentages of the Challenged Claims - which include and exceed 60% by weight);

(ii) the benefits of having smaller *swelling* clay particles in a clumping mixture;

(iii) mixtures where the average size of the *non-swelling* clay particles is larger than the *swelling* clay particles;

(iv) the particle sizes covered by the Challenged Claims; and

(iv) mixtures having average particle size ratios (of *non-swelling* clay –to– *swelling* clay particles) that indisputably teach and fall within the Challenged Claims.

The '019 Patent and the Challenged Claims are, as detailed herein, both plainly anticipated by and obvious in view of the cited prior art. 35 U.S.C. §§ 102 & 103

VI. Detailed Explanation of the Challenge.

A. Ground 1: The Hughes '803 Patent Anticipates Every Element of Claims 1-4, 6-13, 30 & 32 of the '019 Patent.

The Hughes '803 Patent issued on February 7, 1995 (two and one-half years before the filing date of the '019 Patent), is specifically directed to animal litter (entitled "Animal Dross Absorbent and Method"), and qualifies as prior art under AIA § 6(b). Ex. 1006. Importantly, the Hughes '803 Patent expressly discloses and teaches every element and limitation of the Challenged Claims:

- A clumping animal litter comprised of: (1) discrete particles of *swelling* clay (sodium bentonite); mixed with (2) discrete particles of *non-swelling* clay (calcium bentonite);
- The benefits of and claims directed to using *swelling* clay particles that are "smaller" than *non-swelling* clay particles in the clumping litter composition;
- The percentages of *non-swelling* and *swelling* clay claimed in the Challenged Claims;
- Clay particle sizes that meet and fall directly within the claimed ranges; and
- Mean particle size ratios that fall directly within the claimed ratios.

The '019 Patent openly acknowledges that prior art litter products comprised of a free-flowing mix of *non-swelling* and *swelling* clay particles were well-known in the art at the time of the alleged invention. Ex. 1001, 1:46-50 ("developers have in the past used blends of sodium bentonite and a non-clumping clay material"). The '019 Patent then strains to try to distinguish its alleged innovation by citing *average* sizes of the two respective types of clay particles (Claims 1, 4, 5, 8, 11, 12 & 30) and the percentages of the clays used (Claims 6, 7, 9, 10 & 32).[6/] Yet, as the art cited herein clearly confirms, the claimed limitations were <u>all</u> well-known and published in the prior art. And, although *misrepresented* during the prosecution of the '019 Patent (as

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[6/] Dependent Claims 2, 3 & 13 simply add that the *swelling* clay is "sodium bentonite" (Claim 2), *non-swelling* clay is smectite (Claim 3), and the use of an organic clumping agent (Claim 13) -- all long known materials disclosed in myriad prior art as, indeed, conceded in the '019 Patent itself. Ex. 1001, 1:35-40, 3:50-56; 1:59-2:1-12.

explained in Section VI.A.1. below), the alleged invention was even disclosed in prior art cited in the '019 Patent. Below is a detailed description of where each limitation of the Challenged Claims is anticipated and rendered obvious by Hughes '803 Patent:

Challenged Claim 1

"A clumping animal litter comprising:"

There is no dispute, the Hughes '803 Patent is plainly directed to and claims a clumping animal litter. *See, e.g.*, Ex. 1006, *e.g.,* Abstract, 1:17-25, 5:11-18, 8:32-43.

(a) "a particulate non-swelling clay material having a predetermined mean particle size no greater than about 4 mm"

Independent Challenged Claims 1 & 30 both claim a free-flowing blend of *non-swelling* and *swelling* clay particulates, which is expressly taught and claimed in the Hughes '803 Patent. Indeed, the Hughes Patent teaches the exact combination of the two blended clays claimed in the '019 Patent; specifically, a *non-swelling* clay (calcium bentonite, of the smectite family) and *a swelling clay* (sodium bentonite). Ex. 1006, 3:46-56; 6:57-59; Ex. 1005 ¶¶ 33, 36-44. Just like the '019 Patent, the swelling and non-swelling particles in the Hughes '803 Patent are a mixed blend of "discrete," "free-flowing" particles. *See, e.g.*, Ex. 1006, 1:18-24, 5: 11-18, 60-66, 8:32-38; Ex. 1005 ¶ 45.

As for the required 4 mm maximum average, or *mean*, particle size of the *non-swelling* clay of Claim 1, the Hughes '803 Patent expressly discloses *non-swelling* calcium bentonite particle sizes ranging between 50μ and 3350μ, and, in the embodiments of

Claims 4 & 16 of Hughes, preferably larger, between 600μ and 3350μ.[7/] Ex. 1006, 7:5-11, Claims 1-2, 4, 12, 16, & 26; Ex. 1005 ¶ 50. A simple calculation of the average, *mean particle* size, of the *non-swelling* clay disclosed in the Hughes Patent reflects a mean of 1.975 mm (1975μ) (the average size in the range disclosed in Claims 4 & 16 [(600μ + 3350μ)/2]), which plainly meets and discloses the claimed limitation "no greater than about 4 millimeters"[8/] as required by Challenged Claim 1.[9/] Ex. 1005, ¶¶ 52-53.

Claim 1 - '019 Patent	Hughes '803 Patent
(a) a particulate *non-swelling* clay material having a predetermined mean particle size no greater than about 4 mm	• Expressly discloses *non-swelling* clay particles between 600μ and 3350μ. • This yields a mean predetermined particle size of: $\frac{600\mu + 3350\mu}{2} = 1.975\ mm$

(b) "a particulate <u>swelling clay</u> having a predetermined mean particle size no greater than about 2 millimeters,"

The Hughes '803 Patent indisputably discloses using and mixing particulates of

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[7/] The symbol "μ" refers to "microns."

[8/] 4 mm = 4,000μ.

[9/] Persons of ordinary skill in the art at the time of the alleged invention, which includes those with a basic understanding of mathematics, understood that if only a range is known, the "*mean*" particle size is determined by adding the largest and smallest sizes in a range and dividing by two. Ex. 1005, ¶ 24.

swelling clay with particulates of *non-swelling* clay. As for the average, *mean*, particle sizes of the *swelling* clay disclosed in Hughes, the Hughes '803 Patent expressly discloses and claims two particle size ranges of *swelling* clay (sodium bentonite), between: (i) 50μ and 3350μ; and (ii) 600μ and 3350μ; both of which plainly meet and have an average, or *mean*, particle size which is "no greater than about 2 millimeters" (1700μ or 1.7 mm, and 1975μ or 1.975 mm, respectively). Ex. 1006, 7:6-11, Claims 1, 2, 5, 12, 17 & 26; Ex. 1005, ¶¶ 50, 52-53. Significantly, the Hughes '803 Patent even explains the benefit of and preference for smaller sizes of sodium bentonite particles. Ex. 1006, 7:23-26 ("smaller diameter water-swellable bentonite particles, upon being wetted, swell and serve as 'bridges'"); Ex. 1005, ¶ 64.

Claim 1 - '019 Patent	Hughes '803 Patent
(b) a particulate *swelling* clay having a predetermined mean particle size no greater than about 2 millimeters	• Expressly discloses *swelling* clay (sodium bentonite) particulates between 50μ and 3350μ, and between 600μ and 3350μ. Yielding, respectively, mean predetermined particle sizes of: $\frac{50\mu + 3350\mu}{2} = 1.7\ mm$, and $\frac{600\mu + 3350\mu}{2} = 1.975\ mm$.

"wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay."

Hughes claims this very limitation. The only purpose of dependent Claims 4 & 16 of the Hughes '803 Patent is to teach and claim a free-flowing combination of *non-*

swelling and *swelling* clay particulates where the average - *mean particle size* - of the *swelling* clay material is smaller than that of the *non-swelling* clay. As cited above, the Hughes '803 Patent even explains the benefit of smaller *swelling* clay particles. Ex. 1005, ¶ 64.

Specifically, Claims 4 & 16 of Hughes increase the size of the *non-swelling* clay (calcium bentonite) particles to a range between "about 600 microns to 3350 microns," while leaving the size of the claimed *swelling* clay (sodium bentonite) smaller, a range between "about 50 to about 3500 microns." Ex. 1006, 8:33-35, 59-61 & 9:24-27, 9:53-55; Ex. 1005, ¶ 50.[10/] This yields a *mean* or average particle size of: (i) *non-swelling* clay of 1975 microns; and (ii) *swelling* clay of 1775 microns. Ex. 1005, ¶¶ 50, 52; Ex. 1006, 8:33-35, 59-61 & 9:24-27, 9:53-55. Thus, it is indisputable that the Hughes '803 Patent expressly teaches and claims embodiments where "the mean particle size of the non-swelling clay material [1975 microns] is greater than the mean particle size of the swelling clay [1775 microns]." Ex. 1001, 9:44-46; Ex. 1005, ¶ 52. Indeed, Claims 4 & 16 of the Hughes '803 Patent recite *smaller* sodium bentonite particles (50μ to 600μ) that are expressly outside the range of the *larger* non-swelling clay particles; and the Hughes '803 Patent indisputably teaches an average size of *swelling* clay particles that are necessarily smaller than the *non-swelling* particles. Ex. 1005, ¶ 52.

[10/] Claims 4 & 16 of the Hughes '803 Patent, which depend, respectively, from Claims 1 & 12, require "sodium bentonite particles of a size ranging from about 50 microns to 3350 microns." Ex. 1006, 8:33-35 & 9:24-27.

And, Hughes emphasizes the critical role that "smaller" sized sodium bentonite particles play to facilitate clumping: "the smaller diameter water-swellable bentonite particles, upon being wetted, swell and serve as 'bridges' between larger, wetted bentonite particles." Ex. 1006, 7:23-26; Ex. 1005, ¶ 64. Requiring the smaller average size swelling clay particles as taught in Claims 4 & 16 of the Hughes '803 Patent necessarily teaches and results in a litter composition having *non-swelling* clay particles that have a larger mean particle size than the *swelling* clay. Ex. 1005, ¶ 52.

Claim 1 - '019 Patent	**Hughes '803 Patent**
wherein the mean particle size of the *non-swelling* clay material is greater than the mean particle size of the *swelling* clay	Discloses and Claims (*e.g.* Claims 4 & 16): • *Non-Swelling* calcium bentonite having a 1.975 mm mean predetermined particle size; • *Swelling* sodium bentonite having a 1.7 mm mean predetermined particle size; and • 1.975 mm (*non-swelling*) > 1.7 mm (*swelling*).

Accordingly, Hughes anticipates and renders obvious each and every element recited in Claim 1 of the '019 Patent. Ex. 1005, ¶ 54.

Claim 1 of the '019 Patent	Hughes '803 Patent
Claim 1. A clumping animal litter comprising:	Ex. 1006, e.g., Abstract, 1:17-25, 5:11-18, 8:32-43
(a) a particulate non-swelling clay material having a predetermined mean particle size no greater than about 4 millimeters; and	Ex. 1006, 1:18-24, 5:60-66; 3:46-56; 6:57-59; 7:5-11; Claims 1, 2, 4, 12, 16 & 26; Ex. 1005, ¶¶ 24, 33, 36-45, 50 & 52-53.
(b) a particulate swelling clay having a predetermined mean particle size no greater than about 2 millimeters,	Ex. 1006, 7:6-11, Claims 1, 2, 5, 12, 17 & 26; 7:23-26; Ex. 1005, ¶¶ 50, 52-53 & 64.
wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay.	Ex. 1006, 8:33-35, 59-61 & 9:24-27, 9:53-55; 7:23-26; Ex. 1005, ¶¶ 50, 52 & 64.

Dependent Claim 2. The animal litter of claim 1 wherein the swelling clay is sodium bentonite:

There can be no dispute – the Hughes '803 Patent expressly uses, discloses, and claims *swelling* clay that is *sodium bentonite*. Ex. 1006, *e.g.,* Abstract ("sodium bentonite'), 3:46-56 ("composition comprises discrete particles of a combination of water-swellable sodium bentonite clay . . ."), 8:32-34 (Claim 1, "sodium bentonite particles"). Hughes plainly anticipates Claim 2 of the '019 Patent.

Dependent Claim 3. The animal litter of claim 1 wherein the non-swelling clay material is smectite.

Again, there can be no legitimate dispute – the Hughes '803 Patent expressly uses, discloses, and claims a *non-swelling* clay that is smectite -- calcium bentonite -- and explains that calcium bentonite is a member of the "smectite group." Ex. 1006, *e.g.,* 6:57-59 ("[t]he bentonite clays can be any member of the dioctahedral or trioctahedral ***smectite*** group…") (emphasis added), 8:44-37 ("calcium bentonite particles"); *see also* Ex. 1005, ¶¶ 40-41, 43, and 56. Claim 3 is anticipated by Hughes.

> ***Dependent Claim 4. The animal litter of claim 1 wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is within the range of about 1.1:1 to about 4:1.***

As addressed regarding Claim 1 of the '019 Patent above, the Hughes '803 Patent expressly teaches and claims larger *non-swelling* clay particles (calcium bentonite) ranging between "about 600μ to about 3350μ" and smaller *swelling* clay particles (sodium bentonite) ranging between "about 50μ to about 3350μ." Ex. 1006, Claim 1-8:32-35, Claim 4 - 59-61; Claim 12 - 9:25-27, Claim 16 - 9:53-55. As Mr. Hughes confirms in his Declaration, a person of ordinary skill in the art at the time of the alleged invention of the '019 Patent would calculate the average, *mean*, particle sizes of the *non-swelling* and *swelling* clay particles described in Claims 4 & 16 of the Hughes '803 Patent, and their ratios to one another, as follows:

- Mean Particle Size of *Non-Swelling* Clay Particles: (3350μ +600μ)/2 = 1975μ
- Mean Particle Size of *Swelling* Clay Particles: (3350μ +50μ)/2 = 1700μ
  - Ratio of Mean Particle Size of *Non-Swelling* Clay –to– *Swelling* Clay:

    (1975μ /1700μ) = 1.16:1

Ex. 1005, ¶ 68. Accordingly, the Hughes '803 Patent anticipates and renders obvious Claim 4 of the '019 Patent as it expressly teaches the claimed clumping litter composition -- a ratio of 1.16 falls squarely within the range "of about 1.1:1 to about 4:1." Claim 4 of the '019 Patent is, and should be held, unpatentable.

Claim 4 - '019 Patent	Hughes '803 Patent
4. The animal litter of claim 1 wherein the ratio of the mean particle size of the *non-swelling* clay material to the mean particle size of the *swelling* clay is within the range of about 1.1:1 to about 4:1.	• Discloses a larger mean particle size of *non-swelling* clay: $\frac{600\mu + 3350\mu}{2} = 1.975\ mm$ • Discloses a smaller mean particle size of *swelling* clay (sodium bentonite): $\frac{50\mu + 3350\mu}{2} = 1.7\ mm$ • Resultant Ratio: $\frac{1.975\ mm}{1.7\ mm} = 1.16{:}1$ • 1.16:1 is squarely within the claimed ratio of "about 1.1:1 to about 4:1."

Dependent Claim 6. The animal litter of claim 1 wherein the non-swelling clay material is at least about 40 percent by weight of the animal litter.

As addressed in Section VI.A.1. below, to achieve patentability, the alleged inventors of the '019 Patent erroneously represented to the PTO that their application was the first to teach using higher percentages of *non-swelling* clay in clumping litter. This is and was simply false. The Hughes '803 Patent indisputably, and extensively,

discloses and claims the '019 Patent's claimed limitation of *non-swelling* clay being "at least about 40 percent by weight of the animal litter" – and, indeed, the Hughes Patent discloses even higher percentages. Specifically, the Hughes '803 Patent undeniably claims *non-swelling* particles comprising between (by weight of the litter):

(1) "50% to about 89%" (*e.g.*, Ex. 1006, Claims 1 & 2 - 8:32-55);
(2) "50% to about 90%" (*e.g.*, Ex. 1006, Claim 12 - 9:24-35);
(3) "60% to about 90%" (*e.g.*, Ex. 1006, Claims 13 & 26 - 9:36-42 & 10:43-54); and
(4) "60% to about 75% by weight" of the animal litter (*e.g.*, Ex. 1006, Claim 14 - 9:43-49).

All of these compositions comprise and disclose *non-swelling* clay of "at least about 40 percent by weight," and accordingly teach the limitation of Challenged Claim 6 of the '019 Patent. Ex. 1005, ¶¶ 77-78. Claim 6 is anticipated and rendered obvious in view of the Hughes prior art '803 Patent. Ex. 1005, ¶ 78, and is unpatentable.

Claim 6 - '019 Patent	**Hughes '803 Patent**
6. The animal litter of claim 1 wherein the *non-swelling* clay material is at least about 40 percent by weight of the animal litter.	Discloses *non-swelling* calcium bentonite particles comprising, between: ➢ "50% to about 89%" (Ex. 1006, 8:32-44, 8:44-55); ➢ "50% to about 90%" (Ex. 1006, 9:24-35); ➢ 60% to about 90%" (Ex. 1006, 9:36-42, 10:43-54); and ➢ "60% to about 75% by weight" (Ex. 1006, 9:43-49); of the animal litter.

***Dependent Claim 7*. The animal litter of claim 6 wherein the non-swelling clay material is preferably about 60 percent by weight of the animal litter.**

As detailed above regarding Challenged Claim 6 of the '019 Patent, the Hughes '803 Patent explicitly teaches and claims a clumping litter comprised of "60 percent" *non-swelling* calcium bentonite. Indeed, Claims 13, 14 & 26 of the Hughes '803 Patent expressly recite "60%" *non-swelling* calcium bentonite. Ex. 1006, Claim 13 - 9:36-42; Claim 14 - 9:43-49; & Claim 26 - 10:43-54. There can be no legitimate argument, Challenged Claim 7 of the '019 Patent is anticipated and rendered obvious in view of the Hughes '803 Patent. Ex. 1005, ¶ 79. Challenged Claim 7 is unpatentable.

Claim 7 - '019 Patent	Hughes '803 Patent
7. The animal litter of claim 6 wherein the *non-swelling* clay material is preferably about 60 percent by weight of the animal litter.	Expressly discloses *non-swelling* calcium bentonite particles comprising 60% by weight of the animal litter (Ex. 1006, 9:36-42; 9:43-49; & 10:43-54).

***Dependent Claim 8*. The animal litter of claim 6 wherein the non-swelling clay material has a particle size in the range of about 6 mesh to about 100 mesh, U.S. Sieve Series.**

Claim 8 of the '019 Patent fares no better. Challenged Claim 8 merely limits the particle size range of the *non-swelling* clay to "about 6 mesh to about 100 mesh." There was absolutely nothing novel about using *non-swelling* clay particles in that range at the time of the alleged invention – and, indeed, the Hughes '803 Patent *explicitly calls out this specific range of non-swelling particle sizes*. Hughes expressly provides that the *non-*

swelling (calcium bentonite) particle sizes in its litter preferably range "from about 6 mesh to about 100 mesh."[11/] Ex. 1006, 7:5-11 (emphasis added), Claims 12 & 16 - 9:28-30 & 10:47-49; Ex. 1005, ¶ 85.

Not that any more need be shown, but Claims 12 & 26 of the Hughes '803 Patent, for example, are also specifically directed to *non-swelling* clay particle sizes that clearly fall within Challenged Claim 8 -- between about 6 and about 100 mesh. Ex. 1006, 9:24-49. Claims 12 & 16 of Hughes recite "calcium bentonite particles of a size ranging from about 50 microns to about 3350 microns." Ex. 1006, 9:28-30 and 10:47-49; *see also* Ex. 1007, pp. 1-2

As the Hughes '803 Patent indisputably teaches the identical claimed sizes of *non-swelling* clay particles in Challenged Claim 8 of the '019 Patent, the alleged invention was far from new and is invalid. Claim 8 of the '019 Patent is unpatentable.

Claim 8 - '019 Patent	Hughes '803 Patent
8. The animal litter of claim 6 wherein the *non-swelling* clay material has a particle size in the range of about 6 mesh to about	Expressly discloses *non-swelling* (calcium bentonite) particle sizes preferably ranging "from about 6 mesh to about 100 mesh." Ex. 1006, 7:5-11, Claims 12 & 16 - 9:28-30 & 10:47-

[11/] The claimed U.S. Sieve Series mesh sizes correlate to the size of the pore openings in a screen or filter bag through which particles may pass. Ex. 1005, ¶ 48. These mesh sizes directly correspond and convert to inches and microns.

100 mesh, U.S. Sieve Series.	49; Ex. 1005, ¶ 85.

<u>Dependent Claim 9</u>. The animal litter of claim 1 wherein the swelling clay is at most about 60 percent by weight of the animal litter.

As with all of the "percentage" mixture claims of the '019 Patent, the prior art Hughes '803 Patent explicitly discloses and claims litter compositions that read upon, and thereby anticipate and render obvious, the limitations of Challenged Claim 9.

The Hughes '803 Patent teaches and claims free-flowing litter blends containing *swelling clay* (sodium bentonite), which by weight comprises less than the 60 percent limit of <u>Claim 9</u>, for example: (i) between "about 1% to about 50%" of the total weight of the litter (*e.g.,* Ex. 1006, 5:61-63 & 6:52-54); (ii) between "about 11% to about 50%" of the litter product (*e.g.,* Ex. 1006, Claims 1 & 2 - 8:32-55); (iii) between "about 10% to about 50%" of the litter product (*e.g.,* Ex. 1006, Claim 12 - 9:24-35); (iv) "about 10% to about 40%" (Ex. 1006, Claim 13 - 9:36-42); (v) "about 10% to about 25%" (Ex. 1006, Claim 14 - 9:43-49); & (vi) "25%" (*e.g.*, Ex. 1006, 7:63-69, Claim 11- 9:21-23, & 1:31-34); *see also* Ex. 1005, ¶ 80.

All of these recited weight percentages read on and anticipate Challenged Claim 9 of the '019 Patent. <u>Claim 9</u> of the '019 Patent is invalid and unpatentable.

Claim 9 - '019 Patent	Hughes '803 Patent
9. The animal litter of claim 1 wherein the *swelling clay* is at most about 60 percent by	Discloses litter blends containing *swelling clay* (sodium bentonite) in the following ranges of the total weight of the litter:

weight of the animal litter.	➢ Between "about 1% to about 50%" ➢ Between "about 11% to about 50%" ➢ Between "about 10% to about 50%" ➢ Between "about 10% to about 40%" ➢ Between "about 10% to about 25%" and ➢ of "25%" (*see* citations provided above).

<u>Dependent Claim 10</u>. The animal litter of claim 9 wherein the swelling clay is preferably about 40 percent by weight of the animal litter.

In addition to the four prior art specification references cited directly above that indisputably disclose compositions having 40 percent by weight *swelling* clay, Claims 13 & 26 of Hughes both expressly claim a clumping litter having *swelling* clay particles (sodium bentonite) comprising 40 percent by weight of the litter product:

- <u>Claim 13</u>: "sodium bentonite clay particles are present in an amount of about 10% to about 40% by weight" (Ex. 1006, 9:36-42); and
- <u>Claim 26</u>: "about 10% to about 40% by weight of sodium bentonite particles" (Ex. 1006, 10:43-54).

All of these references unmistakably establish that the Hughes '803 Patent discloses the litter of Challenged Claim 10 of the '019 Patent where the *swelling clay* is preferably about 40 percent by weight. Ex. 1005, ¶ 82. Claim 10 is invalid and unpatentable.

Claim 10 - '019 Patent	Hughes '803 Patent
10. The animal litter of claim 9	• Discloses: "sodium bentonite clay particles are

wherein the *swelling* clay is preferably about 40 percent by weight of the animal litter	present in an amount of about 10% to about 40% by weight" (Ex. 1006, 9:36-42); and • Discloses: "about 10% to about 40% by weight of sodium bentonite particles" (Ex. 1006, 10:43-54).

<u>Dependent Claim 11</u>. The animal litter of claim 9 wherein the swelling clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series.

Challenged Claim 11 of the '019 Patent merely adds a range of particle sizes of *swelling* clay of "about 12 mesh to about 325 mesh, U.S. Sieve Series." Using *swelling* clay particle sizes within this range was known, disclosed, and published, long prior to the alleged invention of the '019 Patent and, moreover, as confirmed by Mr. Hughes, would have been obvious to a person of ordinary skill in the art at the time of the alleged invention. Ex. 1005, ¶ 89.

The Hughes '803 Patent, for example, includes Claims 7 & 19, which expressly claim clumping litter products having *swelling* clay particles (sodium bentonite) that clearly fall within the claimed particle sizes. The "about 12 mesh to about 325 mesh" range of Claim 11 of the '019 Patent converts to a range of 44 to 1680 microns. Ex. 1007, pp. 1-2. Claims 7 & 19 of the Hughes '803 Patent identify *swelling* clay particles having "a size within the range of about 50 microns to about 600 microns." Ex. 1006, 9:1-4 & 10:1-3. As such, the swelling clay particle size ranges of the Hughes '803 Patent directly read on and meet the limitation of Challenged Claim 11. Ex. 1007, pp.

1-2; Ex. 1005, ¶¶ 89-90. *See ClearValue Inc. v. Pearl River Polymers Inc.*, 668 F.3d 1340, 1345 (Fed. Cir. 2012) (claim directed to a process of clarifying water with alkalinity below 50 ppm invalidated by prior art which taught that the same process works for systems with alkalinity of 150 ppm or less).

Moreover, as Mr. Hughes himself confirms, it would have been obvious to a person of ordinary skill in the art at the time of the alleged invention of the '019 Patent, in view of the Hughes '803 Patent, to use *swelling* particle sizes in the range of "about 12 mesh to about 325 mesh." Ex. 1005, ¶ 89. Indeed, the Hughes '803 Patent discloses *swelling* clay "in particle sizes across substantially the entire range of about 600μ to 3350μ" (Ex. 1006, 7:19-23) which fall within and overlap the claimed range of about 12 mesh to about 30 mesh (44μ to 1680μ). Ex. 1005, ¶ 89.

Claim 11 - '019 Patent	Hughes '803 Patent
11. The animal litter of claim 9 wherein the *swelling* clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series [*i.e.,* 44 microns to 1680 microns].	• Discloses *swelling* sodium bentonite particles of "a size within the range of about 50 microns to about 600 microns." (Ex. 1006, 9:1-4 & 10:1-3) • Discloses *swelling* sodium bentonite particles "in particle sizes across substantially the entire range of about 600μ to 3350μ." (Ex. 1006, 7:19-23)

<u>Dependent Claim 12</u>. The animal litter of claim 11 wherein the swelling clay has a particle size preferably in the range of about 16 mesh to about 80 mesh, U.S. Sieve Series.

Challenged Claim 12 of the '019 Patent does nothing more than further narrow the sizes of swelling clay to sizes also disclosed, taught, claimed, and rendered obvious by the Hughes '803 Patent. Challenged Claim 12 of the '019 Patent recites *swelling* clay particle sizes between "about 16 mesh to about 80 mesh" which converts to a range of 177 microns to 1190 microns (U.S. Sieve Series). Ex. 1007, pp. 1-2.

As detailed above regarding Challenged Claim 11 of the '019 Patent, the Hughes '803 Patent expressly teaches *swelling* clay particles that are squarely within and overlap the recited particle size range – *swelling* clay particles that "include a size within the range of about 50 microns to about 600 microns." Ex. 1006, 9:1-4 & 10:1-3. Hughes also discloses *swelling* clay particles in "sizes across substantially the entire range of about 600μ to 3350μ." Ex. 1006, 7:19-23. These *swelling* clay particles fall within the claimed range of about 16 mesh to about 80 mesh. Ex. 1005, ¶ 89. Further, as Mr. Hughes explains, not only does the Hughes '803 Patent anticipate Claim 12 of the '019 Patent, as the claimed range is squarely within that disclosed in Hughes – the range would have also been obvious to a person of ordinary skill in the art at the time of the alleged invention. Ex. 1005, ¶¶ 89-90. Claim 12 is unpatentable.

Claim 12 - '019 Patent	Hughes '803 Patent
12. The animal litter of claim 11 wherein the *swelling* clay has a particle size preferably in the range of about 16 mesh to about	• Discloses *swelling* sodium bentonite particles of "a size within the range of about 50 microns to about 600 microns." (Ex. 1006, 9:1-4 & 10:1-3)

80 mesh, U.S. Sieve Series [*i.e.*, 177 microns to 1190 microns].	• Discloses *swelling* sodium bentonite particles "in particle sizes across substantially the entire range of about 600μ to 3350μ." (Ex. 1006, 7:19-23)

***Dependent Claim 13*. The animal litter of claim 1 and further comprising an organic clumping agent.**

Claim 13 does nothing more than add a well-known ingredient, an organic clumping agent. Ex. 1001, 10:11-12. The '019 Patent itself acknowledges that this is taught by the prior art. Ex. 1001, 1:59-2:12 ("gums" as "clumping agents," "starch as a binder," "wheat starch paste as a liquid activated adhesive binding agent"). Thus, as the '019 Patent makes clear, it would have been obvious to one of ordinary skill in the art at the time to add "an organic clumping agent." Claim 13 is obvious and unpatentable. 35 U.S.C. §§ 102, 103. And, the Hughes '803 Patent expressly states that its compositions may include other materials, such as "cellulose based materials" (*cellulose is organic*), and, of course, teaches that cat urine itself is an organic binding agent. Ex. 1006, 7:38-41; 8:1-6.[12/]

Challenged Independent Claim 30

Challenged Claim 30 is virtually identical to Challenged Claim 1, varying only in that Claim 30 is a method claim which adds: (i) further confirmatory language as to

[12/] This Section, as continued below, also establishes that Pattengill clearly anticipates the *alleged* invention of Claim 13 – including employing an *organic clumping agent*.

the free-flowing, distinct, particles (having different *mean* particle sizes); (ii) mixing the two types of distinct particles to uniformly distribute them among each other; and (iii) the inherent and plainly obvious step of packaging the litter. The Hughes '803 Patent anticipates and renders Claim 30 of the '019 Patent obvious and unpatentable.

"A method for making a clumping animal litter comprising the steps of:

a. combining a particulate non-swelling clay material with a suitable particulate swelling clay to form a composition wherein the mean particle size of the particulate non-swelling clay material is greater than the mean particle size of the particulate swelling clay,"

As explained in addressing Claim 1 of the '019 Patent above, the Hughes '803 Patent expressly discloses and claims all of the steps and elements of Claim 30 (*e.g.*, a clumping litter composition comprised of a blend of free-flowing, discrete, particles of *non-swelling* and *swelling* clay, where the mean particle size of the non-swelling clay is larger than that of the swelling clay). *See* Section VI.A. above; *and, e.g.*, Ex. 1006, Abstract, 1:13-18, 6:34-36, 7:63-69; Ex. 1005 ¶¶ 47-52.

b. "mixing the composition to effect a substantially uniform distribution of the two materials."

Claim 30, just as is required by all of the other claims of the '019 Patent, simply corroborates that the alleged invention of the '019 Patent is a blend of free-flowing discrete particulates of *non-swelling* and *swelling* clay that must be mixed to distribute the two types of particles. It is inherent in the prior art, including the Hughes '803 Patent, and certainly was obvious to persons of ordinary skill in the art at the time, that a "mixture" of two different types of clay particles should be mixed to uniformly

distribute the free-flowing blend of particulates. Ex. 1005, ¶¶ 58-61. A substantially uniform distribution of the materials is inherent in the description and teaching of the Hughes Patent and was necessary to achieve the claimed composition and described benefits. Ex. 1005, ¶¶ 58-61. Indeed, just like Challenged Claim 30 of the '019 Patent, the Hughes '803 Patent describes an identical composition and blend of free-flowing *non-swelling* and *swelling* clay particulates. Ex. 1006, 3:46-50, 5:8-18.

The Hughes '803 Patent expressly, and inherently, explains that the two types of clay particulates are and must be uniformly distributed. If the two different types of clay particles were segregated, they would not agglomerate together when wetted with urine – as *non-swelling* clay particles do not agglomerate in the absence of a blend:

> "when an animal urinates on the litter box absorbent of the present invention, the urine is absorbed by the sodium and calcium bentonite clays to form an agglomerated mass of sodium and calcium bentonite clays and urine;" Ex. 1006, 5:27-31.

As people of ordinary skill in the art at the time of the alleged invention understood, the Hughes '803 Patent teaches that the sodium and calcium bentonite particles necessarily need to be substantially uniformly distributed to achieve the claimed results of the Hughes '803 Patent. Ex. 1005, ¶¶ 58-61.

c. "packaging a quantity of the mixed composition."

Packaging animal litter can hardly be described as newly disclosed by the '019 Patent. There can be no dispute that prior to the *alleged* invention of the '019 Patent, all commercial litter products sold in retail stores were "packaged." Ex. 1005, ¶ 62.

Further, it is expressly taught and inherent in the Hughes prior art patent that the litter of the invention will be sold to "household" consumers in "packaging" for use with pets, such as cats. *See, e.g.*, Ex. 1006, Fig. 1, 7:49-57. And, of course, people of ordinary skill in the art at the time of the alleged invention understood from the Hughes '803 Patent that the product would be placed in packages. Ex. 1005, ¶ 62.

> ***Dependent Claim 32. The method of claim 30 wherein the step of combining comprises the step of utilizing at most about 60 percent by weight of the swelling clay, based on the weight of the animal litter.***

Just as with Challenged Claim 9 of the '019 Patent above, the prior art Hughes '803 Patent explicitly discloses and claims litter compositions that read upon, and anticipate and render obvious, the claimed limitation of Challenged Claim 32.

The Hughes '803 Patent teaches and claims free-flowing litter blends containing *swelling* clay (sodium bentonite), which by weight comprise less than the *60 percent limit* of Claim 32, for example: (i) between about 1% and about 50% of the total weight of the litter (*e.g.*, Ex. 1006, 5:61-63 & 6:52-54); (ii) between about 11% and about 50% of the litter product (*e.g.*, Ex. 1006, Claims 1 & 2 - 8:32-55); (iii) between about 10% and about 50% of the litter product (*e.g.*, Ex. 1006, Claim 12 - 9:24-35); (iv) about 10% to about 40% (Ex. 1006, Claim 13 – 9:36-42); (v) about 10% to about 25% (Ex. 1006, Claim 14 - 9:43-49); and (vi) 25% (*e.g.,* Ex. 1006, 7:63-69, Claim 11- 9:21-23, and 1:31-34); *see also* Ex. 1005, ¶ 76.

All of the recited *swelling* clay percentages read on and anticipate Claim 32 of the '019 Patent. Claim 32 of the '019 Patent is unpatentable.

1. Alleged Inventors'/Patent Owner's Material Mischaracterization of the Hughes Prior Art.

In their zeal to procure allowance of the '019 Patent, during the prosecution of the application for the '019 Patent, the alleged inventors/patent owner materially mischaracterized the plain disclosures contained in the Hughes Family[13/] of patents. A telling example is the following material mischaracterization in the '019 Patent:

> "Interparticle interaction enables sodium bentonite to clump. In order to clump properly the particles of sodium bentonite must be allowed to interact with one another. To insure such interaction is capable of taking place those skilled in the art have used weight percentages of sodium bentonite well in excess of 60 percent. This is, in part, because animal litter developers have in the past used blends of sodium bentonite and a non-clumping clay material in weight-to-weight ratios. However, a good clumping performance with a composition containing sixty-percent (60%) by weight or less of sodium bentonite heretofore was not readily attainable.
>
> For example, U.S. Pat. No. Re. 33,983 and U.S. Pat. No. 5,503,111 to Hughes, each describe a method and composition for absorbing animal dross

[13/] The '803 Patent is a continuation-in-part of U.S. Pat. No. 5,000,115 (the "'115 Patent") and is the first-filed "child" in this family. Other family members include U.S. Pat. No. 5,129,365 (the "'365 Patent"), a continuation-in-part of the '803 Patent and U.S. Pat. No. 5,503,111 (the "'111 Patent"), a continuation of the '365 Patent. In total, five (5) issued U.S. patents claim priority to U.S. Pat. No. 5,000,115, one of which (U.S. Pat. No. Re. 33,983) is a reissue of the '115 Patent (the "Hughes Family").

> using at least about 65 percent by weight of water-swellable bentonite clay, based on the total amount of litter used."

Ex. 1001, 1:42-58 (emphasis added). These statements, including the mischaracterization of the prior art Hughes Family, are simply and blatantly *false*.

The '111 Patent (of the prior art Hughes Family) expressly and conspicuously discloses litter embodiments having "25% by weight sodium bentonite and 75% by weight calcium bentonite." Ex. 1009, 11:22-35. Beyond disclosing the low 25% *swelling* clay composition, the '111 Patent explains, in detail, actual successful tests performed using the 25% *swelling* clay composition – yet, Patent Owner *erroneously* represented to the PTO that the Hughes '111 Patent did not teach less than 65% *swelling* clay. Ex. 1009, 11:29-34. Importantly, this very example is also expressly disclosed in the Hughes '803 Patent. Ex. 1006, 7:63-68. And, the Hughes '803 Patent includes claims specifically directed to this embodiment (Ex. 1006, Claims 11 & 23), as well as numerous embodiments that employ quantities of *swelling* clay far below the 60% by weight threshold wrongly represented in the '019 Patent. S*ee, e.g.,* Ex. 1006, 6:50-47. Indeed, despite the Patent Owner's misrepresentation, the Hughes '803 Patent expressly provides:

> "The remaining bentonite clays…can be added as well, so long as the sodium bentonite comprises about 1% to about 50% based on the total dry weight of bentonite clays in the composition and the calcium bentonite comprises about 50% to about 99% based upon the total dry weight of bentonite clays in the composition." Ex. 1006, 6:50-47.

This disclosure is the "second embodiment" identified in the '111 Patent. Ex. 1009, 8:52-63. Applicants for the '019 Patent not only failed to disclose its teaching, they instead elected to materially misrepresent it. Perhaps it is was the applicants'/Patent Owner's egregious and blatant mischaracterization of the prior art Hughes Family that resulted in the Examiner missing both the disclosures and import of the invalidating prior art. Regardless of whether the error was the result of the applicants'/Patent Owner's misrepresentations, the fact remains that the prior art Hughes Family anticipates and renders obvious the alleged invention of the '019 Patent.

B. Ground 2. Pattengill Anticipates Every Element of Claims 1-4, 6-13, 30 & 32 of the '019 Patent.

The Pattengill prior art patent, like the Hughes '803 Patent, teaches each and every limitation of the Challenged Claims of the '019 Patent, rendering them anticipated and obvious. The Pattengill patent, entitled "Clumpable Animal Litter Mixture," issued on October 17, 1995 – *almost two years prior to the application filing date of the '019 Patent* – and is indisputably prior art under AIA § 6(b). Ex. 1008.

Just like the '019 Patent, the Pattengill prior art patent expressly discloses and claims a "clumpable animal litter" comprised of a blend of *swelling* and *non-swelling* clay particles. Indeed, the Pattengill patent, remarkably, publishes a plethora of prior art combinations of *swelling* and *non-swelling* clay particles, with corresponding measured and identified particle sizes. Moreover, the Pattengill patent is replete with test data reflecting the clumping abilities of the various blended clay particle compositions.

The Pattengill patent anticipates and renders obvious each and every element and limitation of Challenged Claims 1-4, 6-13, 30 & 32 of the '019 Patent.

Challenged Claim 1

"A clumping animal litter comprising:"

There can be no dispute that Pattengill teaches a clumping animal litter – indeed, its very title reflects this fact: "Clumpable Animal Litter Mixture." Ex. 1008.

Pattengill explains that prior art litters comprising mixtures of *swelling* and *non-swelling* clay particles were well known in the art. *See, e.g.,* Ex. 1008, 1:38-43. Indeed, Pattengill specifically references the prior art '365 Patent,[14/] the parent to the Hughes '803 Patent, which expressly teaches and claims mixtures *swelling* and *non-swelling* clay particles. Ex. 1011, *e.g.* Abstract (composition of discrete particles of sodium and calcium bentonite clays that absorb animal dross and agglomerate into a stable mass). Pattengill discloses and teaches numerous mixtures, examples, and myriad corresponding tests, of anticipating combinations and blends of different amounts and sizes of *swelling* and *non-welling* clay compositions.

"(a) a particulate non-swelling clay material having a predetermined mean particle size no greater than about 4 mm."

Just as in Challenged Claim 1, the Pattengill patent discloses and teaches prior art mixtures and tests of blended *non-swelling* and *swelling* clay litter where the *non-*

[14/] The Hughes '365 Patent was filed as a continuation-in-part on July 16, 1990, and issued July 14, 1992 - *over five years prior to the filing date of the '019 Patent.* Ex. 1011.

swelling clay particles are less than 4 mm. For example, Pattengill expressly discloses litter *Mixture No. 11* comprised of separate particles of *non-swelling* and *swelling* clays in Table 11, where the *non-swelling* clay particles have sizes between 0.6 mm and 2.36 mm. Ex. 1008, 13:10-65; Ex. 1005, ¶¶ 103, 106-107.[15/] *Mixture No. 11* includes Samples identified in Table 8. Tables 8 & 11 of the Pattengill patent are reproduced below:

TABLE 8

SAMPLE NO.	BRAND NAME	DESCRIPTION
25	Scoop Away	Clumping litter
26	N/A	Zeolite
27	Precious Cat	Clumping litter (Bentonite)
28	Kha Kha Grade Psyllium	75% Grade Ground Plantago
29	Tidy Cat with Baking Soda	Clay & Baking Soda

TABLE 8-continued

SAMPLE NO.	BRAND NAME	DESCRIPTION
30	Soil Semen	Dust Suppressant
31	N/A	Tap Water
32	Stabilizer	>75% Grade Plantago
33	Scoop Fresh	Clumping Litter (Bentonite)
34	Calgon	Soap
35	Shoppers Value	Clumping Litter (Bentonite)
36	REALITE ®	Expanded Shale
37	N/A	$CaCl_2$ Solution
38	Arm & Hammer Baking Soda	Sodium Bicarbonate
39	N/A	Deionized Water
40	Mefoam	Sulfonate in Propylene Glycol

TABLE 11

Mixture	Composition[(1)]	1 Minute	3 Minutes	16 Hours
10	49.4%(29)*, 49.4%(29)**, 1.2%(32)***	Water Ran Off	(<1) Fall Apart	No Clump
11	49.4%(29)*, 19.8%(29)**, 29.6%(33)**, 1.2%(32)***	(3) Firm Clump	(3) Firm Clump	(3) Firm Clump
12	49.0%(29)*, 39.5%(29)**, 10.0%(33)**, 1.0%(32)	(<1) Fell Apart	(<1) Removed with Spoon	(<1) Crumbled
13	49.5%(29)*, 29.5%(29)**, 20.0%(33)**, 1.0%(32)	(1) Removed with Fingers	(1) Removed with Fingers	(3) Firm Easily Broken
14	49.5%(36)*, 29.5%(36)**, 20.0%(33)**, 1.0%(32)	(2) Soft Clumps	(2) Soft Clumps	(<1) Crumbled
15	49.5%(36)*, 29.5%(26)**, 20.0%(33)**, 1.0%(32)	(3) Firm Clumps	(3) Firm Clump	(3) Firm (Rubbery)

[(1)]Values in () correspond to the samples of Table 8
*–8 + 16 M (–2.36 mm + 1.18 mm)
**–16 + 30 M (–1.18 mm + 0.60 mm)
***–200 M (–75 μm)

[15/] For ease of reference, the compositions in Tables 10 & 11 reference clay samples identified in Table 8 (Ex. 1008, 11:58 – 12:18). Table 8 identifies ingredient #29, *Tidy Cat with Baking Soda* (*non-swelling* clay with a small amount of baking soda) & ingredient #33, *Scoop Fresh* (*swelling* clay, sodium bentonite). Ex. 1008, 13:10-24 & 44-62.

Ex. 1008, 11:57-12:17, 13:44-62. Table 11 identifies the sizes of the particles used with asterisks (*, **, ***) and the corresponding sizes below the chart. Specifically, Table 11 identifies prior art *Mixture 11* having the following composition:

(a) "49.4%" of Sample 29 (*non-swelling clay* - Tidy Cat with Baking Soda), having a size range between 2.36 mm and 1.18 mm;

(b) "19.8%" of Sample 29 (*non-swelling clay* - Tidy Cat with Baking Soda), having a size range between 1.18 mm to 0.60 mm;

(c) "29.6%" of Sample 33 (*swelling clay* – sodium bentonite), having a size range between 2.36 mm and 1.18 mm; and

(d) "1.2%" of Sample 32, stabilizer/Plantago, at a much smaller particle size.

Ex. 1008, 13:44-62; Ex. 1005, ¶ 107.[16/] Thus, there can be no dispute that *Mixture 11* expressly discloses a blend of *swelling* and *non-swelling* clays where the *non-swelling* clay particles are between 0.6 and 2.36 mm – plainly meeting the limitation "no greater than about 4 mm" of Challenged Claim 1. Ex. 1005, ¶¶ 108-110.

[16/] The mesh sizes in the Tables are the sizes of screens/sieves used to separate and measure particle sizes. A plus sign ("+") designates retention on a screen of a min. particle size, and a minus sign ("-") designates the corresponding max. particle size that will pass through the screen. U.S. Standard Sieve Series sizes correspond to *mm* measurements. Ex. 1005, ¶ 105. For example, particles that are -8 to +16 mesh are 1.18 to 2.36 *mm*. Ex. 1007; & 1005, ¶ 106. Particles -16 to +30 mesh are between 1.19 and 0.60 *mm*, and -200 mesh refers to sizes smaller than 0.075 *mm* (75μ). Ex. 1007.

Claim 1 - '019 Patent	Pattengill Patent
(a) a particulate *non-swelling* clay material having a predetermined mean particle size no greater than about 4 mm.	*Mixture No. 11*: *Non-swelling* clay particles (*Tidy Cat with Baking Soda*) with predetermined sizes between 0.6 mm & 2.36 mm, in respective amounts, having a predetermined mean particle size of 1.52 mm. Ex. 1008, 13:10-65; Ex. 1005, ¶ 108.

"(b) a particulate swelling clay having a predetermined mean particle size no greater than about 2 millimeters,"

Prior art *Mixture 11* in Pattengill expressly teaches employing *swelling* clay (*Scoop Fresh*, sodium bentonite; Sample No. 33) with particle sizes in the range of 0.6 mm to 1.18 mm – which are plainly below the claimed "no greater than about 2 mm." Ex. 1008, 12:9, 13:10-24, 13:43-65 (-16 +30 M, -1.18 mm + 0.60 mm); Ex. 1005, ¶¶ 99, 103-104. Pattengill plainly discloses and anticipates Claim 2.

Claim 1 - '019 Patent	Pattengill Patent
(b) a particulate *swelling* clay having a predetermined mean particle size no greater than about 2 millimeters.	*Mixture No. 11*: *Swelling* sodium bentonite particles with predetermined sizes between 0.6 and 1.18 mm, having a predetermined mean particle size of: $\frac{0.6\ mm + 1.18\ mm}{2} = 0.89\ mm.$ Ex. 1008, 12:9, 13:43-65.

"wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay."

Of course, no calculations of the average sizes of the *non-swelling* and *swelling* clays in Pattengill - *Mixture 11* are necessary to readily conclude that the average, *mean*, particle size of the *non-swelling* clay "is greater" than that of the *swelling* clay. This is because the Pattengill patent identifies that 49.4% of *Mixture 11* is comprised of larger *non-swelling* clay particles in the range of 1.18 to 2.36 mm, and 29.6% of the mixture comprises smaller *swelling* clay particles in the range of 0.60 to 1.18 mm. Ex. 1005, ¶ 107. The remainder is comprised of mostly (19.8%) *non-swelling* clay particles of the same size range as the *swelling* particles. Ex. 1005, ¶ 107.

Moreover, a simple calculation of the average, *mean*, particle size of the *non-swelling* clay particles of *Mixture No. 11* yields a mean particle size of 1.52 mm. *See* Ex. 1005, ¶ 108. And, the mean particle size of the swelling clay is 0.89 mm.[17/] Ex. 1005, ¶ 108. As such, there can be no legitimate dispute that the Pattengill prior art patent discloses a clumping litter having *non-swelling* clay particles that have a mean particle size greater than that of the *swelling* clay particles.

Claim 1- '019 Patent	**Pattengill Patent**
wherein the mean particle size of the *non-swelling* clay material is greater than the mean particle size of the	*Mixture No. 11*: Average size of *non-swelling* clay particles (1.52 mm) is greater than the average size of the *swelling* clay particles (0.89 mm). Ex.

[17/] With a given range of 0.60 to 1.18 mm, the mean particle size is calculated as follows: [(0.60 mm + 1.18 mm)/2] = 0.89 mm.

swelling clay.	1008, 13:10-65; Ex. 1005, ¶ 108.

Accordingly, Pattengill anticipates and renders obvious each and every element recited in Challenged Claim 1 of the '019 Patent. Ex. 1005, ¶ 111.

Claim 1	Pattengill Patent
A clumping animal litter comprising:	
(a) a particulate *non-swelling* clay material having a predetermined mean particle size no greater than about 4 millimeters; and	Ex. 1008, 1:38-43; 13:10-65; 13:44-62; 11:58-12:18; Ex. 1005, ¶¶ 103, 105-110.
(b) a particulate *swelling* clay having a predetermined mean particle size no greater than about 2 millimeters,	Ex. 1008, 12:9, 13:10-24, 13:43-65; Ex. 1005, ¶¶ 99, 103-104.
wherein the mean particle size of the *non-swelling* clay material is greater than the mean particle size of the *swelling* clay.	Ex. 1008, 13:10-65; Ex. 11:58-12:18; Ex. 1005, ¶¶ 107-108.

Dependent Challenged Claims 2-4, and 6 through 13

Pattengill also discloses and renders obvious each and every element and limitation of Claims 2-4 and 6-13 of the '019 Patent as set forth below:

Dependent Claim 2. The animal litter of claim 1 wherein the swelling clay is sodium bentonite:

Pattengill is indisputably replete with disclosures that sodium bentonite is used as a *swelling* clay including, for example, in *Mixture No. 11* of Table 11. Ex. 1008, 13:44-

65. The disclosed sodium bentonite was procured from a commercially available "*Scoop Fresh*" branded product as identified in Table 8. Ex. 1008, 12:9. And, of course, the specification and claims of the Pattengill Patent all recite using sodium bentonite. *See, e.g.,* Ex. 1008, Claim 1, 17:67-18:1. A person of ordinary skill in the art at the time of the alleged invention understood both that *Scoop Fresh* comprised sodium bentonite and that Pattengill taught using sodium bentonite as *swelling* clay in the claimed mixture. Ex. 1005, ¶¶ 99, 112. Claim 2 is anticipated, obvious, and unpatentable.

Dependent Claim 3. The animal litter of claim 1 wherein the non-swelling clay material is smectite.

Pattengill recites and expressly discloses combining *non-swelling* clay particles (described as "filler particulate") with *swelling* clay particles (sodium bentonite). Indeed, the Pattengill patent specifically claims a clumpable animal litter comprising filler particulate "selected from a group" which includes "**smectite**-containing clays" – *i.e.*, *non-swelling* clay. Ex. 1008, *e.g.*, 18:12-15, 13:45-62 (emphasis added). And, the Pattengill clumping litter *Mixture 11* describes a composition containing *non-swelling* clay that is smectite. Ex. 1005, ¶¶ 95-96, 113. Further, as Mr. Hughes confirms, a person of ordinary skill in the art at the time of the alleged invention of the '019 Patent would plainly understand from Pattengill that a *non-swelling* clay material, including smectite, is and may be used in the clumping litter. Ex. 1005, ¶¶ 96-98, 113.

Dependent Claim 4. The animal litter of claim 1 wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is within the range of about 1.1:1 to about 4:1.

The Pattengill prior art expressly teaches and discloses size ratios squarely falling within those claimed in Challenged Claim 4. For example, as addressed regarding Challenged Claim 1 above, Pattengill *Mixture 11* employs *non-swelling* clay particles having a mean particle size of 1.52 mm, and *swelling* clay particles having a mean particle size of 0.89 mm. The plain ratio of this Pattengill embodiment alone is 1.7:1 – which falls directly within and anticipates the claimed range. Ex. 1005, ¶¶ 108-110, 119. Challenged Claim 4 of the '019 Patent is invalid in view of Pattengill.

Claim 4 - '019 Patent	Pattengill Patent
The animal litter of claim 1 wherein the ratio of the mean particle size of the *non-swelling* clay material to the mean particle size of the *swelling* clay is within the range of about 1.1:1 to about 4:1	• Discloses the mean particle size of the calcium bentonite particles is $\frac{1.18\ mm+2.36\ mm}{2} = 1.52\ mm$ • Discloses the mean particle size of the sodium bentonite particles is $\frac{0.6\ mm+1.18\ mm}{2} = 0.89\ mm$ • $\frac{1.52\ mm}{0.89\ mm} = 1.7{:}1$ • 1.7:1 is within the range of about 1.1:1 to about 4:1.

Dependent Claim 6. The animal litter of claim 1 wherein the non-swelling clay material is at least about 40 percent by weight of the animal litter.

The Pattengill patent discloses numerous compositions that expressly teach and claim compositions of clumping litter where the percentage of *non-swelling* clay *is at least 40 percent*. For example, Pattengill *Mixture 11* discloses a composition containing 69.2% *non-swelling* clay. Ex. 1008, 13:45-62. Of course, 69.2% meets and exceeds the claimed "at least about 40 percent." As Mr. Hughes explains, the animal litter of Challenged Claim 6 was plainly taught by and would have been obvious to a person of

ordinary skill in the art at the time of the alleged invention. Ex. 1005, ¶ 124.

Claim 6 - '019 Patent	Pattengill Patent
6. The animal litter of claim 1 wherein the *non-swelling* clay material is at least about 40 percent by weight of the animal litter.	*Mixture 11* publishes a composition containing 69.2% *non-swelling* clay. Ex. 1008, 13:45-62; Ex. 1005, ¶ 124.

Dependent Claim 7. The animal litter of claim 6 wherein the non-swelling clay material is preferably about 60 percent by weight of the animal litter.

The Pattengill patent also plainly teaches and discloses compositions containing about 60 percent *non-swelling* clay. For example, as discussed above, Pattengill *Mixture 11* teaches a composition containing 69.2% *non-swelling* clay and 69.2% is "*about*" 60% by weight of the animal litter. Ex. 1008, 13:45-62, Ex. 1005, ¶ 124.

Claim 7 - '019 Patent	Pattengill Patent
7. The animal litter of claim 6 wherein the *non-swelling* clay material is preferably about 60 percent by weight of the animal litter.	Mixture 11 from Table 11 of Pattengill discloses a composition containing 69.2% *non-swelling* clay.

Dependent Claim 8. The animal litter of claim 6 wherein the non-swelling clay material has a particle size in the range of about 6 mesh to about 100 mesh, U.S. Sieve Series.

Pattengill, including *Mixture 11*, expressly discloses a blended, free-flowing, composition of *non-swelling* and *swelling* clay particulates having *non-swelling* clay particles ranging from 8 to 30 mesh, U.S. Sieve Series, which plainly fall within the claimed range of "about 6 mesh to about 100 mesh." Ex. 1008, 13:45-62; Ex. 1005, ¶ 129.

Challenged Claim 8 is anticipated, invalid and unpatentable.

Claim 8 - '019 Patent	Pattengill Patent
8. The animal litter of claim 6 wherein the *non-swelling* clay material has a particle size in the range of about 6 mesh to about 100 mesh, U.S. Sieve Series.	*Mixture 11* discloses *non-swelling* clay particle sizes between 8 and 30 mesh – which fall within the claimed range of "about 6 mesh to about 100 mesh."

Dependent Claim 9. The animal litter of claim 1 wherein the swelling clay is at most about 60 percent by weight of the animal litter.

Challenged Claim 9 claims the amount of *swelling clay*, as opposed to the amount of *non-swelling* clay, by weight of the animal litter. Not surprisingly, the Pattengill Patent teaches embodiments having "at most about 60 percent" *swelling* clay -- just as it discloses *non-swelling* clay percentages of about 40 percent. For example, Pattengill *Mixture 11* expressly discloses compositions where the *swelling* clay is less than the 60% limitation. Ex. 1008, 13:45-62. Specifically, the *Mixture 11* discloses 29.6% by weight swelling clay. Claim 9 is anticipated and unpatentable.

Claim 9 - '019 Patent	Pattengill Patent
9. The animal litter of claim 1 wherein the *swelling clay* is at most about 60 percent by weight of the animal litter.	*Mixture 11* discloses a percentage of *swelling* clay of 29.6% by weight of the animal litter. Ex. 1008, 13:45-62.

Dependent Claim 10. The animal litter of claim 9 wherein the swelling clay is preferably about 40 percent by weight of the animal litter.

Mixture 11 of Pattengill discloses a composition containing 29.6% *swelling* clay.

This percentage is "about 40% by weight" of the litter composition. Ex. 1005, ¶ 126.

Claim 10 is anticipated and unpatentable in view of Pattengill.

Claim 10 - '019 Patent	Pattengill Patent
10. The animal litter of claim 9 wherein the *swelling* clay is preferably about 40 percent by weight of the animal litter.	*Mixture 11* discloses a composition containing approx. 40% (29.6%) *swelling* clay by weight of the animal litter.

Dependent Claim 11. The animal litter of claim 9 wherein the swelling clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series.

The Pattengill Patent expressly discloses using *swelling* clay particles ranging in size between 16 and 30 mesh (*see, e.g., Mixture 11*). Ex. 1008, 13:45-62 ("-16 [to] +30 M"). The Pattengill particle sizes plainly fall within the range of 12 mesh to about 325 mesh as recited by Challenged Claim 11 of the '019 Patent. Ex. 1005, ¶ 131.

Claim 11 – '019 Patent	Pattengill Patent
11. The animal litter of claim 9 wherein the *swelling* clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series.	*Mixture 11* includes *swelling* clay particles ranging in size from 16 to 30 mesh, U.S. Sieve Series.

Dependent Claim 12. The animal litter of claim 11 wherein the swelling clay has a particle size preferably in the range of about 16 mesh to about 80 mesh, U.S. Sieve Series

The Pattengill prior art patent expressly discloses using *swelling* clay particle sizes ranging between 16 to 30 mesh, as reflected in *Mixture 11*. Ex. 1008, 13:45-62. The *swelling* clay particle sizes identified in Pattengill plainly fall within the claimed

range of 16 mesh to about 80 mesh of Challenged Claim 12. Ex. 1005, ¶ 131.

Claim 12 – '019 Patent	Pattengill Patent
12. The animal litter of claim 11 wherein the *swelling* clay has a particle size preferably in the range of about 16 mesh to about 80 mesh, U.S. Sieve Series.	*Mixture 11* teaches *swelling* clay particles ranging in size from 16 to 30 mesh, U.S. Sieve Series (these fall within the about 16 to about 80 mesh range).

Dependent Claim 13. The animal litter of claim 1 and further comprising an organic clumping agent.

Pattengill not only anticipates Claim 1, it also anticipates and renders Claim 13 obvious. Claim 13 only adds an organic clumping agent, which is expressly disclosed in Pattengill *Mixture 11*: "1.2% Plantago stabilizer by weight of the animal litter."[18/] Ex. 1008, 12:8 (Sample 32 in Table 8); 13:44-62 (*Mixture 11* in Table 11); 2:67-3:2 ("Ground vegetative material from the Plantago family … has been found to form a particularly effective clumping agent"). Accordingly, Pattengill anticipates and renders Claim 13 obvious, invalid, and unpatentable.

[18/] The '019 Patent explains that "starch" is an organic clumping agent. Ex. 1001, 3:12-13. Plantago is a "known and reliable" source of starch and is, of course, organic. Ex. 1014, *Starch: Structure, Analysis and Application*, Henry F. Zobel and Alistair M. Stephen, in *Food Polysaccharides and Their Applications*, edited by Alistair M. Stephen, pp. 22-23; *and* Ex. 1015, Stedman's Medical Dictionary definition of "Plantago."

Challenged Independent Claim 30

The Pattengill patent discloses and anticipates each and every element recited in Challenged Claim 30.

"A method for making a clumping animal litter comprising the steps of:

a. combining a particulate non-swelling clay material with a suitable particulate swelling clay to form a composition wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay . . ."

As previously discussed, Pattengill teaches and discloses combining *non-swelling* and *swelling* clay particulates to produce, for example, *Mixture 11*. Ex. 1008, 11:55-12:17, 12:10-24, & 13:45-62. The *swelling* clay particles disclosed in Pattengill *Mixture 11* have an average, mean, particle size of 0.89 mm, and the *non-swelling* clay particles have a larger average, mean, particle size of 1.52 mm. Ex. 1008, 11:55- 12:17, 12:10-24 & 13:45-62; Ex. 1005, ¶ 109. Pattengill indisputably expressly discloses combining particulate *non-swelling* and *swelling* clays to form a composition wherein the mean particle size of the *non-swelling* clay material is greater than the mean particle size of the *swelling* clay. Ex. 1001, Claim 30, 11:3-9; Ex. 1005, ¶¶ 109-110.

"b. mixing the composition to effect a substantially uniform distribution of the two materials."

Pattengill discloses, expressly and inherently, that the identified clumpable animal "mixtures" taught by the patent are "*mixed*" and substantially uniformly distributed. For example, throughout Pattengill, the inventors explain that the various admixtures of particles are *mixed* and stirred to achieve *uniform distribution*. *See, e.g.*, Ex.

1008, 15:22-24 ("After the non-bentonite clay was mixed, the bentonite clay was admixed and stirred *until it was uniformly distributed*"). Mr. Hughes also verifies that persons of ordinary skill in the art at the time of the alleged invention of the '019 Patent understood that litter compositions of *swelling* and *non-swelling* clay particles should be mixed to achieve a "substantially uniform distribution" – also as taught by Pattengill. Ex. 1005, ¶¶ 100, 115. There can be no doubt that Pattengill expressly and inherently discloses "mixing the composition to effect a substantially uniform distribution of the two materials."

"c. packaging a quantity of the mixed composition."

Again, packaging animal litter can hardly be described as newly disclosed by the '019 Patent. There can be no dispute that prior to the alleged invention of the '019 Patent, all commercial litter products sold in retail stores were "packaged." Ex. 1005, ¶¶ 62, 116. And, indeed, the Pattengill patent itself references that the inventors procured samples of animal litter in "consumer packaging." Ex. 1008, 4:5-7. Further, packaging the litter taught by Pattengill for sale is inherent to the disclosure. And, of course, people of ordinary skill in the art at the time of the alleged invention understood, including from Pattengill, that litter would be packaged. Ex. 1005, ¶ 116. Accordingly, Pattengill discloses and/or renders obvious each and every element recited in Challenged Claim 30. Ex. 1005, ¶ 117.

Dependent Claim 32. The method of claim 30 wherein the step of combining comprises the step of utilizing at most about 60 percent by weight of the swelling clay, based on the weight of the animal litter.

Just as addressed with respect to Dependent Claim 9 above, the Pattengill prior art teaches embodiments having "at most about 60 percent" *swelling* clay. For example, *Mixture 11* in Table 11 of Pattengill meets this limitation, which discloses and teaches a composition where the *swelling* clay is less than the "at most about 60 percent" limitation of Claim 32. Ex. 1008, 13:45-62. Specifically, the identified mixture discloses a percentage of *swelling* clay of 29.6%, by weight of the animal litter. Ex. 1005, ¶ 126. Claim 32 is anticipated and unpatentable in view of Pattengill.

C. Ground 3: Claims 1-13, 30 & 32 are Obvious and Invalid in View of the Hughes '803 Patent, Pattengill, and/or the Combination Thereof.

Any of Challenged Claims 1-13, 30 & 32 of the '019 Patent not otherwise anticipated by the Hughes '803 Patent or Pattengill, would have been obvious to a person of ordinary skill in the art at the time of the alleged invention of the '019 Patent, under 35 U.S.C. § 103, in view of either the Hughes '803 Patent or Pattengill, or in view of the combination of the two references. Ex. 1005, ¶ 136.

Challenged Claims 1, 30 & 32:

As discussed above, both the Hughes '803 and Pattengill (*e.g.*, *Mixture 11*) Patents indisputably expressly disclose mixes of *non-swelling* and *swelling* clay particles having mean particle sizes below 4 mm and 2 mm, respectively -- and the average particle size of the *non-swelling* clay material is greater than that of the *swelling* clay. Even

ignoring these clear anticipatory references, Challenged Claims 1, 30 & 32 would have been obvious in view of Hughes and Pattengill.

For example, with respect to the "substantially uniform distribution" requirement of Claim 30, it would have been obvious to persons of ordinary skill in the art at that time of the alleged invention to mix and distribute the clay particles in both Hughes and Pattengill. Ex. 1005, ¶¶ 58-61. Indeed, Hughes teaches that the sodium and calcium bentonite particles need to be substantially uniformly distributed to achieve the claimed results. Ex. 1006, 5:27-31, 6:2-10. Further, Pattengill discloses, expressly, that its litter must be "*mixed*" to obtain a substantially uniform distribution. *See, e.g.*, Ex. 1008, 15:22-24. Mr. Hughes, a person of ordinary skill in the art at the time, verifies that those in the art understood at the time of the alleged invention, and would have appreciated from the Hughes '803 and/or Pattengill Patents, that it is obvious and inherent to mix the *swelling* and *non-swelling* clay particles to obtain a "substantially uniform distribution." Ex. 1005, ¶¶ 100, 115.

The Hughes '803 Patent also provides, and it was obvious from the disclosure, that the disclosed litter will be packaged when sold to "households." *See, e.g.*, Ex. 1006, Fig. 1, 7:49-57. Pattengill also references that the inventors procured samples of animal litter in "consumer packaging." Ex. 1008, 4:5-7. And, of course, people of ordinary skill in the art at the time understood from both the Hughes and Pattengill Patents that the products would be placed in packages. Ex. 1005, ¶¶ 62, 116.

<u>Dependent Claim 3</u>. The animal litter of claim 1 wherein the non-swelling clay material is smectite.

The Hughes Patent expressly uses, discloses, and claims a *non-swelling* clay that is **smectite** -- calcium bentonite. Ex. 1006, *e.g.* 6:57-59. Pattengill similarly discloses a *non-swelling* filler particulate that includes "smectite-containing clays." Ex. 1008, *e.g.*, 18:12-15, 13:45-62. While no one can reasonably challenge that Pattengill discloses using smectite as a *non-swelling* clay, Mr. Hughes, a person of ordinary skill in the art at the time of the alleged invention, confirms that it would have been obvious to use: (1) smectite as the *non-swelling* clay; and (2) the *non-swelling* smectite disclosed in the Hughes '803 Patent as the *non-swelling* clay in Pattengill. Ex. 1005, ¶¶ 98, 113.

<u>Dependent Claim 4</u>. The animal litter of claim 1 wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is within the range of about 1.1:1 to about 4:1.

As detailed above, the Hughes Patent expressly discloses a mean particle size ratio of *non-swelling* to *swelling* clay of 1.16:1 -- and Pattengill discloses a composition having a ratio of 1.7:1. If one were to ignore the specific anticipatory mixture references in Hughes and Pattengill, it is important to note that the Hughes '803 Patent also discloses broad ranges of sizes of both *non-swelling* and *swelling* particulates including, as identified, embodiments requiring *non-swelling* clay having a larger mean particle size. *See, e.g.*, Ex. 1006, Claims 4 & 16, 4:59-61, 9:53-55; & 7:5-8. The Hughes '803 Patent also teaches the importance of having the importance of using smaller size *swelling* particles to serve as "bridges." Ex. 1006, 7:24-26; Ex. 1005, ¶ 72. As such, as

Mr. Hughes confirms, it would have been obvious to a person of ordinary skill in the art at the time of the alleged invention, from the disclosures in Hughes, to select variations of particles covering the claimed range between 1.1:1 to 4:1.[19/] Ex. 1005, ¶ 76. Moreover, it would have been obvious to combine any of the particle sizes of Pattengill with those of the Hughes '803 Patent to achieve the ratios required by Challenged Claim 4. Ex. 1005, ¶ 136. Claim 4 is obvious and unpatentable.

> ***Dependent Claim 5. The animal litter of claim 4 wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is preferably within the range of about 2:1 to about 3:1.***

As addressed above, the Hughes '803 Patent expressly teaches litter having *non-swelling* clay particles with an average size greater than the *swelling* clay particles - and explains the importance of using smaller size *swelling* particles to serve as "bridges." Ex. 1006, 7:24-26; Ex. 1005, ¶ 72. And, the Hughes Patent teaches embodiments having particle sizes between "about 50 μ (microns) to about 3350 μ in diameter" and

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[19/] It is entirely appropriate to combine two independently disclosed ranges to confirm the teaching and disclosure of a broader range. *See, e.g.*, *Santarus, Inc., v. Par Pharmaceutical, Inc.*, 694 F.3d 1344, 1353-54 (Fed. Cir. 2012) (disclosure of first ingredient in a concentration rate range varying by a factor of 2, used in combination with a second ingredient in a disclosed concentration range varying by a factor of 50, were properly mathematically combined to evidence disclosure of the concentration of the combined ingredients in a range varying by a factor of 100).

"from about 6 mesh to about 100 mesh." Ex. 1006, 7:6-11. As such, as Mr. Hughes confirms, it would have been obvious to a person of ordinary skill in the art at the time of the application for the '019 Patent, to select and use *non-swelling* and *swelling* particles having mean particle size ratios between 2:1 and 3:1. Ex. 1005, ¶¶ 71-72.

Moreover, all the particle size ranges for *swelling* and *non-swelling* clay disclosed in the Pattengill Patent are also squarely within the sizes claimed in the '019 Patent. The Pattengill reference teaches particle sizes for *swelling* clay between, for example, 0.60 mm and 1.18 mm, and for *non-swelling* clay between, for example, 0.60 and 2.36 mm. *See* Ex. 1008, *Mixture 11*, 13:44-65. And, like the Hughes and '019 Patents, the prior art Pattengill Patent teaches and claims compositions of *non-swelling* clay particles that are larger than the *swelling* clay particles. As Mr. Hughes explains, it would have been obvious to a person of ordinary skill in art at the time of the alleged invention, based on the ranges disclosed in Pattengill (and, of course, the Hughes '803 Patent) to select mean particle sizes of *non-swelling* and *swelling* clay materials within the claimed range of *about* 2:1 to *about* 3:1. Ex. 1005, ¶¶ 121-122. As one simple example, one could simply use the larger size *non-swelling* clay identified in *Mixture 11* of the Pattengill reference (and simply omit the smaller of the two sizes of *non-swelling* clay), resulting in a mean particle size ratio of about 2:1 (1.77/.89 = 1.99:1). Ex. 1005, ¶ 122.

Further, one of ordinary skill in the art at the time would have known of the option to select particle sizes within the ranges taught in Pattengill (and Hughes) to meet the claimed ratio of "about 2:1 to about 3:1." A telling example, if the 2.36 mm

non-swelling clay taught in Pattengill were used with a *swelling* clay in the mid-range of the sizes taught (*e.g.*, 0.78 mm and/or 1.18 mm, respectively), the sizes directly meet the claimed 3:1 and 2:1 ratios. Ex. 1005, ¶ 121 (2.36/.78 = 3.03:1; 2.36/1.18 = 2.00:1).

Given the ranges of particle sizes taught by the Hughes and Pattengill Patents, and the ranges of tested-acceptable compositions of *non-swelling* and *swelling* particles, as Mr. Hughes confirms, it would have been obvious to a person of ordinary skill in the art at the time of the alleged invention to select *non-swelling* and *swelling* particles having average particle size ratios between 2:1 and 3:1. Ex. 1005, ¶¶ 71-73, 120-122.

Dependent Claim 6. The animal litter of claim 1 wherein the non-swelling clay material is at least about 40 percent by weight of the animal litter.

Dependent Claim 7. The animal litter of claim 6 wherein the non-swelling clay material is preferably about 60 percent by weight of the animal litter.

As discussed above, the Hughes '803 Patent discloses *non-swelling* particles comprising between "50% to about 89%," "50% to about 90%," "60% to about 75%" and "60% to about 90%" by weight. Ex. 1006, Claim 14 - 9:43-49. And, Pattengill discloses *Mixture 11* containing 69.2% *non-swelling* clay. All of these references meet the limitations of Claims 6 & 7. Moreover, as Mr. Hughes confirms, in view of these prior art references, it would have been obvious to one skilled in the art at the time of the alleged invention to use *non-swelling* clay at an amount of "at least about 40 percent" or "about 60 percent" by weight of the animal litter. Ex. 1005, ¶ 124.

Dependent Claim 8. The animal litter of claim 6 wherein the non-swelling clay material has a particle size in the range of about 6 mesh to about 100 mesh, U.S. Sieve Series.

The Hughes '803 Patent expressly discloses *non-swelling* clay particles ranging "from about 6 mesh to about 100 mesh." Ex. 1006, 7:5-11. Setting aside this exact disclosure, Pattengill discloses *Mixture 11* having *non-swelling* clay particles between 8 and 30 mesh – which are directly in the range of "about 6 mesh to about 100 mesh." Ex. 1008, 13:45-62; Ex. 1005, ¶ 129. It would have been obvious to a person of ordinary skill in the art at the time of the alleged invention, based on either or both disclosures, to use *non-swelling* clay having the claimed particle sizes. Ex. 1005, ¶ 129.

Dependent Claim 9. The animal litter of claim 1 wherein the swelling clay is at most about 60 percent by weight of the animal litter.

Dependent Claim 10. The animal litter of claim 9 wherein the swelling clay is preferably about 40 percent by weight of the animal litter.

Dependent Claim 32. The method of claim 30 wherein the step of combining comprises the step of utilizing at most about 60 percent by weight of the swelling clay, based on the weight of the animal litter.

The Hughes '803 Patent discloses litter blends containing *swelling clay* in the following ranges: (i) between "about 1% to about 50%"; (ii) between "about 11% to about 50%"; (iii) between "about 10% to about 50%"; (iv) "about 10% to about 40%"; (v) "about 10% to about 25%"; and (vi) "25%." Ex. 1006, 5:61-63 and 6:52-54; 8:32-55; 9:24-35; 9:36-42; 9:43-49; 10:43-54; 7:63-69, 9:21-23, and 1:31-34; *see also* Ex. 1005, ¶ 80. And, Pattengill *Mixture 11* has 29.6% *swelling* clay. Ex. 1008, 13:45-62.

As Mr. Hughes confirms, from Pattengill alone, or in combination with the

Hughes '803 Patent, it would have been obvious to a person of ordinary skill in the art at the time of the alleged invention to use *swelling* clay percentages no higher than 60%, or about 40%, by weight of the animal litter. Ex. 1005, ¶¶ 126, 136.

> ***Dependent Claim 11*. The animal litter of claim 9 wherein the swelling clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series.**
>
> ***Dependent Claim 12*. The animal litter of claim 11 wherein the swelling clay has a particle size preferably in the range of about 16 mesh to about 80 mesh, U.S. Sieve Series.**

The Hughes '803 Patent discloses *swelling* particles within the ranges of "about 50 microns to about 600 microns" and "600μ to 3350μ." Ex. 1006, 9:1-4 & 10:1-3, 7:19-23. These particles fall squarely within the claimed ranges of "about 12 mesh to about 325 mesh" and "about 16 mesh to about 80 mesh." Ex. 1005, ¶¶ 89-90. And, as Mr. Hughes explains, it would have been obvious to a person of ordinary skill in the art in August, 1997, to use *swelling* particle sizes in the range of "about 12 mesh to about 325 mesh" and "about 16 mesh to about 80 mesh." Ex. 1005, ¶¶ 89-90.

Further, Pattengill *Mixture 11* identifies *swelling* particles that fall within the ranges of 16 to 30 mesh, and 12 mesh to about 325 mesh (these fall within the "about 16 to about 80 mesh range" of Claim 12). Ex. 1008, 13:45-62 ("-16 [to] +30 M"); Ex. 1005, ¶ 131. And, as Mr. Hughes confirms, it would have been obvious to a person of ordinary skill in the art at the time of the alleged invention, based upon the Pattengill reference alone, or in combination with the Hughes Patent, to use *swelling*

clay within the size ranges identified in Claims 11 & 12 – between about 12 mesh and about 325 mesh, or about 16 mesh to about 80 mesh. Ex. 1005, ¶¶ 132, 136.

Dependent Claim 13. The animal litter of claim 1 and further comprising an organic clumping agent.

Pattengill *Mixture 11* expressly discloses using the organic clumping agent of Claim 13 (*e.g.* Plantago, a starch, at 1.2% by weight; is "a particularly effective clumping agent"). Ex. 1008, 2:67-3:2, 12:8 (Sample 32 in Table 8); 13:44-62 (*Mixture 11* in Table 11)). In addition to expressly disclosing the use of an organic clumping agent, it would have been obvious to a person of ordinary skill in the art at the time of the alleged invention, in view of Pattengill, including, but not limited to, *Mixture 11*, to use an organic clumping agent with the alleged invention of Claim 1 of the '019 Patent. 35 U.S.C. § 103. Moreover, *Mixture 11* alone, or in combination with the Hughes disclosure of "cellulose based materials" and cat urine as organic binding agents, anticipates and renders obvious Claim 13 of the '019 Patent. Claim 13 of the '019 Patent is anticipated, obvious, invalid, and unpatentable.

Respectfully Submitted,

Dated: February 13, 2015

By: _____

David A. Roodman, Lead Counsel
Robert G. Lancaster, Backup Counsel
Emma C. Harty, Backup Counsel
BRYAN CAVE LLP
One Metropolitan Square
211 N. Broadway, Suite 3600
St. Louis, MO 63102-2750

Counsel for Petitioner
Nestlé Purina PetCare Company

Trials@uspto.gov
571-272-7822

Paper 12
Entered: July 9, 2015

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NESTLÉ PURINA PETCARE COMPANY,
Petitioner,

v.

OIL-DRI CORPORATION OF AMERICA,
Patent Owner.

Case IPR2015-00737
Patent 5,975,019

Before CARL M. DEFRANCO JR., JO-ANNE M. KOKOSKI, and KRISTINA M. KALAN, *Administrative Patent Judges.*

KALAN, *Administrative Patent Judge.*

DECISION
Institution of *Inter Partes* Review
37 C.F.R. § 42.108

I. INTRODUCTION

Petitioner Nestlé Purina PetCare Company filed a Petition (Paper 1, "Pet.") to institute an *inter partes* review of claims 1–13, 30, and 32 of U.S. Patent No. 5,975,019 (Ex. 1001, "the '019 patent") pursuant to 35 U.S.C. §§ 311–319. Patent Owner Oil-Dri Corporation of America filed a Preliminary Response (Paper 9, "Prelim. Resp."). Applying the standard set forth in 35 U.S.C. § 314(a), which requires demonstration of a reasonable likelihood that Petitioner would prevail with respect to at least one challenged claim, we institute an *inter partes* review of claims 1–13, 30, and 32, as discussed below.

Our preliminary findings of fact and conclusions of law, including those relating to the broadest reasonable construction of patent claim terms, are based on the record developed thus far. This is not a final decision as to the patentability of any challenged claim. Our final decision will be based on the full record developed during trial.

II. BACKGROUND

A. Related Matters

The parties indicate that the '019 patent is the subject of the following district court proceeding: *Oil-Dri Corp. of America v. Nestle Purina PetCare Co.*, Case No. 1:15-cv-01067 (N.D. Ill.). Pet. 1; Paper 7, 1.

B. The '019 Patent

The '019 patent, titled "Clumping Animal Litter," issued on November 2, 1999. The '019 patent is directed to a clump-forming, clay-based composition suitable for use as animal litter. *Id.* at 1:4–6. The '019 patent describes a "clumping animal litter utilizing the interparticle interaction of a swelling clay, such as sodium bentonite, in combination with a non-swelling

clay material." *Id.* at Abstract. The patent discloses a composition of sixty percent (60%) by weight, or less, of sodium bentonite "after the judicious selection of particle size distribution such that the mean particle size of the non-swelling clay material is greater than the mean particle size of the sodium bentonite." *Id.*

C. Illustrative Claim

Of the challenged claims, claims 1 and 30 are independent. Claims 2–13 depend, directly or indirectly, from claim 1. Claim 32 depends from claim 30.

Claim 1 of the '019 patent is reproduced below:

> 1. A clumping animal litter comprising:
> a. a particulate non-swelling clay material having a predetermined mean particle size no greater than about 4 millimeters; and
> b. a particulate swelling clay having a predetermined mean particle size no greater than about 2 millimeters, wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay.

Ex. 1001, 9:37–46.

D. The Prior Art

Petitioner relies on the following prior art:

1. United States Patent No. 5,386,803, issued February 7, 1995 ("Hughes," Ex. 1006);

2. United States Patent No. 5,458,091, issued October 17, 1995 ("Pattengill," Ex. 1008).

E. The Asserted Grounds

Petitioner challenges claims 1–13, 30, and 32 of the ’019 patent as follows:

Reference(s)	**Basis**	**Claims Challenged**
Hughes	§ 102	1–4, 6–13, 30, and 32
Pattengill	§ 102	1–4, 6–13, 30, and 32
Hughes	§ 103	1–13, 30, and 32
Pattengill	§ 103	1–13, 30, and 32
Hughes and Pattengill	§ 103	1–13, 30, and 32

F. Claim Interpretation

The Board interprets claims in an unexpired patent using the “broadest reasonable construction in light of the specification of the patent in which [they] appear[].” 37 C.F.R. § 42.100(b); *see In re Cuozzo Speed Techs., LLC*, 778 F.3d 1271, 1281 (Fed. Cir. 2015) (“We conclude that Congress implicitly adopted the broadest reasonable interpretation standard in enacting the AIA.”). Under the broadest reasonable interpretation standard, claim terms are given their ordinary and customary meaning in view of the specification, as would be understood by one of ordinary skill in the art at the time of the invention. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). A “claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history.” *CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002). Such definitions must be set forth with reasonable clarity, deliberateness, and

precision. *In re Paulsen*, 30 F.3d 1475, 1480 (Fed. Cir. 1994). In the absence of such a special definition or other consideration, "limitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184 (Fed. Cir. 1993).

We determine that only the following term requires construction for the purposes of this Decision.

"mean particle size" ("MPS")

Petitioner argues that the term "mean particle size" should be construed as "the average of the known particle sizes or sizes of groupings of particle sizes." Pet. 10. Petitioner cites to a dictionary definition of "arithmetic mean" as "a value that is computed by dividing the sum of a set of terms by the number of terms." Ex. 1013, 3. To support its claim construction, Petitioner relies on and cites to the Declaration of John Hughes (Ex. 1005, the "Hughes Declaration"):

> In my opinion, a person of ordinary skill in the art of animal litter on August 19, 1997, would conclude that the proper, and broadest reasonable interpretation, of the term "mean particle size" as used in the '019 Patent is: the average of the known particle sizes or sizes of groupings of particle sizes. This meaning is entirely consistent with the specification of the '019 Patent as well as the common and ordinary meaning of the mathematical term "mean" in August, 1997. Exh. 1013. If only the top and bottom sizes of a group of particles are known, the "mean particle size" for the group is the average of the known top and bottom values.

Ex. 1005 ¶ 24.

Patent Owner proposes that the proper construction of the term "mean particle size" is "the mean particle size determined using sieve analysis and a corresponding weight distribution technique." Prelim. Resp. 12. Patent

Owner argues that the Specification makes clear that "to obtain MPS, particle size distributions of a clay sample must first be obtained from sieve analysis, and the MPS may then be obtained using a technique that accounts for weight distribution." *Id.* at 9. Patent Owner argues that Petitioner erroneously construes MPS as "an arithmetic MPS," which Patent Owner alleges is an "oversimplified, inaccurate interpretation." *Id.* at 12, 15. Patent Owner further argues that MPS does not correlate to the arithmetic mean, because using an arithmetic mean results in an MPS different than that disclosed in the '019 Patent. *Id.* at 16.

The Specification discusses ways to determine the "mean particle size" of clay samples. Ex. 1001, 4:13–40. With respect to non-swelling clay materials, the Specification provides:

> The clays were run through a particle sizing table using screen sizes from 6 mesh to 100 mesh, United States Sieve Series. The results are reported in Table 1 below. From the particle size analysis the mean particle size (ū) of each clay sample was determined using Promesh graph paper. See, Falivene, P.J. Graph Paper for Sieve Analysis, Chemical Engineering 87-88 (Feb. 23, 1981). The mean particle size (ū) for the non-swelling clay materials are also reported in Table I below.

Id. at 13–21.

In reference to Table II, tabulating the sieve analysis of sodium bentonite, i.e. swelling clay, the Specification expressly states: "From the particle size distributions the mean particle size (ū) of each sample was determined using Promesh graph paper." *Id.* at 5:8–10.

Petitioner does not explain sufficiently why it relies upon a definition of "arithmetic mean" to arrive at its definition of mean. Petitioner also does not explain how an average of only "known" particle sizes could lead to an

accurate determination of mean for an entire group of particle sizes, particularly if only a limited number of particle sizes are known.

Patent Owner's proposed construction, however, imports limitations from the Specification, which uses a specific method or methods to determine mean particle size. Importation of limitations from the Specification, when those limitations are not set forth in the claims, is improper. *See In re Van Geuns,* 988 F.2d at 1184.

Thus, based on the current record, we construe the term "mean particle size" as "the average of a representative sample of particle sizes or groupings of particle sizes."

III. ANALYSIS

We turn now to Petitioner's asserted grounds of unpatentability and Patent Owner's arguments in the Preliminary Response to determine whether Petitioner has met the threshold standard of 35 U.S.C. § 314(a).

A. Asserted Anticipation Ground Based on Hughes

Petitioner challenges claims 1–4, 6–13, 30, and 32 as anticipated by Hughes. Pet. 13–34. Hughes is directed to an animal dross absorbent and method. Ex. 1006. Hughes's composition combines bentonite clays, particularly about 1 to 50% by weight sodium bentonite, and about 50 to 99% by weight Fuller's Earth, or calcium bentonite. *Id.* at Abstract. The mixture absorbs animal dross and related liquids, agglomerating into a sufficiently large and stable mass when contacted with the animal dross. *Id.*

Petitioner argues that Hughes discloses all the elements of claims 1–4, 6–13, 30, and 32, directing its arguments in large part to the MPS limitation. Pet. 13–34. With respect to claim 1, Petitioner argues that a "simple calculation of the average, *mean particle* size, of the *non-swelling* clay

disclosed in the Hughes Patent reflects a mean of 1.975 mm (1975μ) (the average size in the range disclosed in Claims 4 & 16 [(600μ + 3350μ)/2]),” which meets and discloses the Claim 1 limitation of “no greater than about 4 millimeters.” *Id.* at 16. In support of its method of calculation of mean particle size, Petitioner states that persons of ordinary skill in the art at the time of the invention, “which includes those with a basic understanding of mathematics, understood that if only a range is known, the ‘*mean*’ particle size is determined by adding the largest and smallest sizes in a range and dividing by two.” *Id.* at 16 n.9 (citing Ex. 1005 ¶ 24). With respect to swelling clays, Petitioner argues that Hughes expressly discloses “two particle size ranges of *swelling* clay (sodium bentonite), between: (i) 50μ and 3350μ; and (ii) 600μ and 3350μ; <u>both</u> of which plainly meet and have an average, or *mean*, particle size which is ‘no greater than about 2 millimeters’ (1700μ or 1.7 mm, and 1975μ or 1.975 mm, respectively).” *Id.* at 17.

Patent Owner argues that Hughes “does not disclose MPS as properly defined, and also does not teach or suggest a composition that satisfies the MPS Limitation claimed in the ‘019 Patent.” Prelim. Resp. 20. Patent Owner further argues that Hughes does not disclose weight distributions or particle sizes “across substantially the entire range,” even though Hughes teaches that sodium and calcium bentonite clays “should be present in the composition in particles sizes across substantially the entire range.” *Id.* at 21 (citing Ex. 1006, 7:19–23). Finally, Patent Owner also argues that Hughes expressly teaches not to differentiate between particle sizes of the disclosed sodium and calcium bentonite clays, but rather teaches using the same ranges of particle sizes for both sodium and calcium bentonite clays. *Id.* at 21–22.

"A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." *Verdegaal Bros. v. Union Oil Co.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Petitioner must demonstrate, particularly with respect to independent claims 1 and 30, a reasonable likelihood that it will prevail on its arguments that Hughes anticipates every element. Petitioner does not make an inherency argument, but rather argues that Hughes expressly discloses MPS. Specifically, Petitioner argues that the MPS of Hughes's non-swelling clay and swelling clay may be calculated according to Petitioner's proposed construction of "mean particle size." We have not, however, adopted Petitioner's construction of "mean particle size."

Hughes does not disclose or discuss MPS, so there is no express disclosure of MPS of non-swelling clay or of swelling clay in Hughes. Although the clays described in Hughes may have a mean particle size, it is neither expressly disclosed nor readily ascertainable based on the information given in Hughes. Petitioner's hypothetical MPS calculations are extrapolated from the highest and lowest values of ranges given by Hughes. This does not provide a sufficient basis for Petitioner's anticipation argument. Petitioner's calculations are theoretical; no experiments or further measurements support Petitioner's assertion that the Hughes's clays have any specific MPS values, or that those values, even if they were calculated or calculable, meet the MPS limitations of claim 1. Nor does Hughes expressly disclose, as required by claim 30, that the mean particle size of the non-swelling clay material is greater than the mean particle size of the particulate swelling clay.

Without further support, the evidence before us does not establish sufficiently that Hughes's disclosure anticipates the MPS limitations of

claims 1 and 30. We also are not persuaded, given the evidence before us, that Petitioner has demonstrated that dependent claims 2–4, 6–13, and 32 are anticipated by Hughes. Thus, Petitioner has not, on this record, demonstrated a reasonable likelihood of prevailing on its argument that Hughes anticipates claims 1–4, 6–13, 30, and 32 of the ’019 patent.

B. Asserted Anticipation Ground Based on Pattengill

Petitioner challenges claims 1–4, 6–13, 30, and 32 as anticipated by Pattengill. Pet. 37–52. Pattengill discloses a clumpable animal litter mixture having about 5 to 50 weight percent bentonite, about 0.1 to 25 weight percent gum-containing clumping agent, and balance filler particulate. Ex. 1008, Abstract. Upon contact with urine, the mixture agglomerates such that the clump of agglomerated bentonite, gum-containing clumping agent, filler particulate and urine is capable of removal with a perforated scoop after as little as one minute of formation. *Id.* at 2:41–44.

Petitioner argues that Pattengill discloses all the elements of claims 1–4, 6–13, 30, and 32, directing certain arguments to the MPS limitation. Pet. 37–52. With respect to claim 1, Petitioner argues that “Pattengill expressly discloses litter *Mixture No. 11* comprised of separate particles of *non-swelling* and *swelling* clays in Table 11, where the *non-swelling* clay particles have sizes between 0.6 mm and 2.36 mm.” *Id.* at 39. Petitioner notes that Table 8 identifies “ingredient #29, *Tidy Cat with Baking Soda* (*non-swelling* clay with a small amount of baking soda).” *Id.* at 39 n.15. With respect to swelling clays, Petitioner argues that “*Mixture 11* in Pattengill expressly teaches employing *swelling* clay (*Scoop Fresh*, sodium bentonite; Sample No. 33) with particle sizes in the range of 0.6 mm to 1.18 mm – which are plainly below the claimed ‘no greater than about 2 mm.’”

Id. at 41. Regarding MPS, Petitioner averages the upper and lower bounds of the disclosed non-swelling and swelling clay particle size ranges of Pattengill to conclude that "a simple calculation of the average, *mean*, particle size of the *non-swelling* clay particles of *Mixture No. 11* yields a mean particle size of 1.52 mm. *See* Ex. 1005 ¶ 108. And, the mean particle size of the swelling clay is 0.89 mm. Ex. 1005 ¶ 108." *Id.* at 42 (footnote omitted). Patent Owner notes that "[w]ith a given range of 0.60 to 1.18 mm, the mean particle size is calculated as follows: [(0.60 mm + 1.18 mm)/2] = 0.89 mm." *Id.* at 42 n.17.

Patent Owner argues that Pattengill "does not contain sufficient information to determine whether it teaches or suggests a composition that satisfies the MPS Limitation." Prelim. Resp. 23. Specifically, Patent Owner argues that "Pattengill does not disclose the ingredients contained in 'Tidy Cat with Baking Soda' or 'Scoop Fresh,' or any information about the MPS of any of the sample products disclosed therein." *Id.* at 24. Patent Owner argues that Petitioner's citation of the testimony of Mr. Hughes, who relies on his knowledge of the general ingredients of "Tidy Cat with Baking Soda" or "Scoop Fresh," cannot be the basis for a patentability determination. *Id.* at 25. Finally, Patent Owner argues that Pattengill fails to disclose any information about the actual particle sizes of the clays, stating that "[a]ll that can be deduced from the disclosure is that the top and bottom ranges are somewhere between -8 and +16M or -16 and +30 M." *Id.* at 26 (citing Ex.1008, Table 11, 13:35–65).

We are not persuaded that Petitioner has demonstrated a reasonable likelihood that it will prevail on its arguments that Pattengill anticipates every element of the challenged claims. Petitioner argues that Pattengill expressly

discloses MPS of non-swelling clay and swelling clay, which may be calculated according to Petitioner's proposed construction of 'mean particle size." We have not, however, adopted Petitioner's construction of "mean particle size."

Pattengill does not disclose or discuss MPS, so there is no express disclosure of MPS of non-swelling clay or of swelling clay in Pattengill. Although the clays of Pattengill may have a mean particle size, it is neither expressly disclosed nor readily ascertainable based on the information given in Pattengill. Petitioner's hypothetical MPS calculations are extrapolated from the highest and lowest values of ranges given by Pattengill. This does not provide a sufficient basis for Petitioner's anticipation argument. Petitioner's calculations are theoretical; no experiments or further measurements support Petitioner's assertion that Pattengill's clays have any specific MPS values, or that those values, even if they were calculated or calculable, meet the MPS limitations of claim 1. Nor does Pattengill expressly disclose, as required by claim 30, that the mean particle size of the non-swelling clay material is greater than the mean particle size of the particulate swelling clay.

The evidence before us does not establish sufficiently that Pattengill's disclosure anticipates the MPS limitations of claims 1 and 30. We also are not persuaded, given the evidence before us, that Petitioner has demonstrated that dependent claims 2–4, 6–13, and 32 are anticipated by Pattengill. Thus, Petitioner has not, on this record, demonstrated a reasonable likelihood of prevailing on its argument that Pattengill anticipates claims 1–4, 6–13, 30, and 32 of the '019 patent.

C. Asserted Obviousness Grounds

Petitioner argues that claims 1–13, 30, and 32 are obvious over Hughes, Pattengill, or the combination of Hughes and Pattengill. Pet. 52–60. Specifically, Petitioner argues that "[e]ven ignoring these clear anticipatory references, Challenged Claims 1, 30 & 32 would have been obvious in view of Hughes and Pattengill." *Id.* at 52–53.

Regarding the independent claims, Petitioner argues that the references' respective disclosures would have rendered those claims obvious in view of the combination of references. *Id.* at 53. With respect to claim 30, Petitioner argues that it would have been obvious for one of ordinary skill in the art, given the disclosures of Hughes and Pattengill, to mix swelling and non-swelling clay particles to obtain a substantially uniform distribution, and to place the products in packages. *Id.* (citing Ex. 1005 ¶¶ 58–62, 100, 115–16). With respect to claim 5, the only claim not included in Petitioner's anticipation challenges, Petitioner argues that it would have been obvious, "based on the ranges disclosed in Pattengill (and, of course, the Hughes '803 Patent) to select mean particle sizes of *non-swelling* and *swelling* clay materials within the claimed range of *about* 2:1 to *about* 3:1." *Id.* at 56 (citing Ex. 1005 ¶¶ 121–122).

Patent Owner counters that the Petition "provides no explanation of how or why any of the challenged claims would have been obvious if not found anticipated, and provides no teaching, suggestion or motivation to combine any aspects of Hughes '803 in view of Pattengill or Pattengill in view of Hughes '803." Prelim. Resp. 27. Patent Owner argues further that Petitioner's anticipation and obviousness arguments are often combined with no difference between the two. *Id*. at 27–28.

After carefully considering the Petition and Preliminary Response, we are persuaded that there is a reasonable likelihood that Petitioner would prevail in showing that claims 1–13, 30, and 32 are unpatentable over the combination of Hughes and Pattengill. Regarding the MPS limitation, as well the limitation requiring the MPS of the non-swelling clay material to be greater than the MPS of the swelling clay, Petitioner argues that Hughes discloses broad ranges of sizes of both non-swelling and swelling particulates including embodiments requiring non-swelling clay having a larger mean particle size. Pet. 54. Petitioner highlights Hughes's teaching of "the importance of using smaller size *swelling* particles to serve as 'bridges.'" *Id.* (citing Ex. 1006, 7:24–26; Ex. 1005 ¶ 72). Petitioner also notes that "all the particle size ranges for *swelling* and *non-swelling* clay disclosed in the Pattengill Patent are also squarely within the sizes claimed in the '019 Patent." *Id.* at 56. Petitioner maintains that it is appropriate to combine independently disclosed ranges to confirm the teaching and disclosure of a broader range. *Id.* at 55 n.19. Petitioner concludes that it would have been obvious to combine any of the particle sizes of Pattengill with those of Hughes to achieve the ratios required. *Id.* at 55 (citing Ex. 1005 ¶ 136).

Petitioner's arguments concerning the remaining claims similarly refer to both references and cite to the Hughes Declaration in support of Petitioner's assertions that it would have been obvious to combine the two references. *Id.* at 53–60. As a result, we are persuaded, based on the current record, that Petitioner has demonstrated a reasonable likelihood of prevailing on its assertion that claims 1–13, 30, and 32 would have been obvious under 35 U.S.C. § 103(a) over the combination of Hughes and Pattengill.

D. Conclusion

We conclude that Petitioner has demonstrated a reasonable likelihood of prevailing with respect to its challenge of claims 1–13, 30, and 32 of the ’019 patent. We have not made a final determination under 35 U.S.C. § 318(a) with respect to the patentability of the challenged claims.

IV. ORDER

In consideration of the foregoing, it is hereby:

ORDERED that an *inter partes* review is authorized on the following ground of unpatentability asserted in the Petition:

Whether claims 1–13, 30, and 32 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hughes and Pattengill.

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(a), *inter partes* review of the ’019 patent is hereby instituted commencing on the entry date of this Decision, and pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, notice is hereby given of the institution of a trial; and

FURTHER ORDERED that the trial is limited to the ground identified above, and no other ground set forth in the Petition as to any challenged claim is authorized.

FOR PETITIONER:

David Roodman
Reg. No. 35,663
BRYAN CAVE LLP
One Metropolitan Square
211 N. Broadway, Suite 3600
St. Louis, MO 63102
General Tel: (314) 259-2000
Fax: (314) 259-2020
daroodman@bryancave.com

FOR PATENT OWNER:

Michael P. Mazza
Registration No. 34,092
Michael P. Mazza, LLC
686 Crescent Blvd.
Glen Ellyn, IL 60137-4281
P: 630-858-5071
F: 630-282-7123
Email: mazza@mazzallc.com

Filed on behalf of Oil-Dri Corporation of America

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

_____

NESTLÉ PURINA PETCARE COMPANY,
Petitioner,

v.

OIL-DRI CORPORATION OF AMERICA,
Patent Owner.

_____

Case IPR2015-00737
Patent 5,975,019

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PATENT OWNER'S RESPONSE TO THE PETITION INSTITUTED ON JULY 9, 2015

Mail Stop PATENT BOARD, PTAB
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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Exhibit 2002: *Manual On Test Sieving Methods*, ASTM STP 447A (1972).

Exhibit 2003: *Standard Test Method For Particle Size Distribution of Granular Carriers and Granular Pesticides*, ASTM E726-01 (originally approved 1980).

Exhibit 2004: *Perry's Chemical Engineers' Handbook* (6th ed. 1984), p. 8-5.

Exhibit 2005: Comparison of MPS Values Given In '019 Patent (Tables I-II) Versus MPS Values Calculated Using The Arithmetic Mean

Exhibit 2006: *Perry's Chemical Engineers' Handbook* (6th ed. 1984), pp. 8-1 to 8-19.

Exhibit 2007: *Particle Size Distributions And The Sequential Fragmentation/ Transport Theory Applied To Volcanic Ash*, K.H.Wohletz et al, Journal Of Geophysical Research, Vol. 94, No. B11, 15-703 to 15-721 (1989)

Exhibit 2008: *Particle Size Distributions In Mesh Cuts And Microscopically Estimated Volumetric Shape Factors*, J.T. Carstensen et al, Drug Development And Industrial Pharmacy, 25:3, 347-352 (1999)

Exhibit 2009: *Image Analysis Of Narrow Size Fractions Obtained By Sieve Analysis – An Evaluation By Log-Normal Distribution And Shape Factors*, A. Tasdemir et al, Physicochem. Probl. Miner. Process. 46 (2011), 95-106

Exhibit 2010: U.S. Patent No. 6,050,509 to Clarey, assigned to AMCOL Int'l Corp.

Exhibit 2011: Comparative Drawings 1A-1B (examples of linear distribution of particle size) and 2A-2B (examples of non-linear distribution of particle size)

Exhibit 2012: U.S. Patent No. 5,000,115 to Hughes

Exhibit 2013: Declaration of Marc Herpfer dated September 25, 2015

Exhibit 2014: Promesh graph results

Exhibit 2015: Declaration of Dr. Robert D. DeLuca dated September 25, 2015

Exhibit 2016: *Manual Of Mineralogy*, Revised 21st Edition, C. Klein et al (1999), pp. 441, 498, 524.

Exhibit 2017: Data referenced in Paragraph 6 of DeLuca Declaration

I. INTRODUCTION

Pursuant to 37 C.F.R. §42.120, Patent Owner Oil-Dri Corporation of America ("Patent Owner") respectfully asserts that Petitioner Nestle Purina PetCare Company ("Petitioner") has failed to prove that claims 1-13, 30 and 32 ("challenged claims") of U.S. Patent No. 5,975,019 (Ex. 1001, "the '019 Patent") are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Hughes (Ex. 1006, U.S. Patent No. 5,386,803, hereinafter "Hughes '803") and Pattengill (Ex. 1008, U.S. Patent No. 5,458,091, hereinafter "Pattengill") (collectively "the Cited Prior Patents").

II. STATEMENT OF MATERIAL FACTS IN DISPUTE

Petitioner did not submit a statement of material facts in its IPR petition. As such, no response is due pursuant to 37 C.F.R. §42.23(a), and no facts are admitted.

III. STATEMENT OF RELIEF REQUESTED

Pursuant to 35 U.S.C. § 316, Patent Owner respectfully requests that the Board confirm the patentability of claims 1-13, 30 and 32 of the '019 Patent.

IV. SUMMARY OF PATENT OWNER'S ARGUMENT

The Board ordered *inter partes* review on only the following ground: "Whether claims 1–13, 30, and 32 are unpatentable under 35 U.S.C. § 103(a) as

obvious over the combination of Hughes ['803] and Pattengill." "Decision," p. 15 (Paper 12, dated July 9, 2015).

Patent Owner asserts that neither the Petition nor the Hughes declaration (Ex. 1005) provides a sufficient explanation as to how or why the challenged claims would have been obvious to a person of ordinary skill in the art ("POSIA") at the time of invention, and further provides no teaching, suggestion or motivation to combine any aspects of Hughes '803 and Pattengill to arrive at the claimed invention.

The '019 Patent concerns an innovation in the animal litter field which enables a reduction in the use of swellable clay while still providing a clumping, scoopable product, by controlling the "mean particle size" ("MPS") of the swellable and non-swellable clay blend. Independent claims 1 and 30 of the '019 Patent recite that the MPS of the non-swelling clay is greater than the MPS of the swelling clay (the "MPS Ratio") (Ex.1001, 9:44-46, 11:5-9). Claim 1 also recites that the MPS of the non-swelling clay is less than 4mm (4000μ), while the MPS of the swelling clay is less than 2mm (2000μ) ("the MPS Sizes"). Ex. 1001, 9:39-43. (The MPS Ratio and MPS Sizes are collectively referenced here as "the MPS Limitations.") The Board correctly determined that neither Hughes '803 nor Pattengill expressly discloses or discusses MPS, and that there is no disclosure of MPS of non-swelling clay or of swelling clay. Decision pp. 9, 12. As the Cited

Prior Patents provide no reason or suggestion for calculating and utilizing a preselected MPS that differs as to swelling and non-swelling clays, neither MPS nor the MPS Ratio nor the MPS Sizes should be found obvious. Additionally, the Decision (p. 7) properly found that calculating MPS requires a "representative sample," and that no such information is disclosed in the Cited Prior Patents.

Further, a POSIA at the time of invention would have understood Hughes '803 to teach using the *same* ranges of particle sizes for both non-swelling-clay and swelling-clay (Ex. 1006, 7:5-11) and not the recited MPS Ratio requiring the MPS of the non-swelling clay to be greater than the MPS of the swelling clay. Also, a POSIA at the time of invention would have understood Pattengill to teach either not to manipulate relative particle sizes or to use the same particle sizes. (Ex. 2013, Declaration of Marc Herpfer, ¶9). As to Pattengill, Petitioner relies solely on a single composition, Mixture 11, using hindsight analysis to ignore the dozens of other compositions disclosed there, and despite the fact that a POSIA would not have known what was in Mixture 11 or its alleged relevance (see Section V.D., below).

Finally, Hughes '803 discloses mixtures of sodium and calcium bentonite clays to form an animal litter which allegedly forms clumps which will disperse in a sewer line, while Pattengill discloses adding a non-clay-based binder, Plantago, to animal litter in order to achieve clumping. Without the benefit of impermissible

hindsight, a POSIA would have had no reason to combine Hughes '803 and Pattengill (collectively the "Cited Prior Patents") to arrive at the claimed invention.

V. ARGUMENT

The '019 Patent discloses and claims a clumping animal litter combining "non-swelling" and "swelling" clays, in which the "non-swelling" clay (e.g., calcium bentonite or "CaB") has a MPS that is greater that the MPS of the "swelling" clay (e.g., sodium bentonite or "NaB") ("the MPS Ratio"). Each of the challenged claims, *i.e.* independent claims 1 and 30, and dependent claims 2-13 and 32, recite the MPS Ratio. Independent claim 1 (and its dependent claims 2-13) requires, in addition, the MPS Sizes, in which the CaB has a particle size less than about 4mm (4000μ), and the NaB has a particle size less than about 2mm (2000μ).

The '019 Patent teaches that "[i]nterparticle interaction enables sodium bentonite to clump" (Ex. 1001, 1:42-43), explaining that the "judicious selection process [of CaB and NaB] provides a composition in which a substantially larger number of swelling clay particles is present while the total amount of swelling clay present in the litter composition is relatively low" (Ex. 1001, 2:50-53). In other words, the '019 Patent teaches that by selecting NaB particles with a *smaller* MPS, a *greater* relative number of NaB particles (than CaB particles) may be used (Ex. 1001, 2:50-53, 4:54-63), allowing the overall weight of the litter to be lowered,

while still retaining its clumping effectiveness (Ex. 1001, 2:49-55), *i.e.,* the ability to scoop out animal dross (Ex. 1001, 2:53-56, 3:14-26).

NaB is heavier than CaB (Ex. 2013, Herpfer Dec., ¶11). The '019 Patent teaches to reduce the amount of the heavier NaB and still maintain clumpability (Ex. 1001, 2:49-55, 4:58-63), even though in 1997 manufacturers sold animal litter by weight, which provided economic incentives not to reduce litter weight (Ex. 2013, ¶11). Since that time, lighter-weight animal litters have captured a price premium due to a reduction in shipping costs and customer convenience, creating greater economic incentive to sell a lighter animal litter, while achieving the advantageous clumping effects of the MPS Limitations (Ex. 2013, ¶11).

The Cited Prior Patents fail to disclose or suggest a clumping animal litter that includes manipulating the MPS of swelling and non-swelling clays to be different, let alone clay blends of the MPS Ratio or the MPS Sizes. The Petition also fails to establish any reason why a POSIA reading the Cited Prior Patents would have considered MPS to be a result-effective variable, or why a POSIA would have sought to modify animal litter disclosed by either Hughes '803 or Pattengill to include the MPS Limitations recited in the '019 Patent. Not surprisingly, the Petition does not point to any MPS teaching in the Cited Prior Patents; indeed, as the Board has recognized, neither Hughes '803 nor Pattengill

discloses or discusses MPS. Given this silence, the challenged claims would not have been obvious over a combination of Hughes '803 and Pattengill.

Petitioner's obviousness arguments also confuse what is *possible* with what a POSIA *would have* known and *would have* done. Of the dozens of different litter compositions disclosed in the Cited Prior Patents Petitioner -- using hindsight analysis -- chooses a *single one* of these compositions from Pattengill (Table 11, Mixture 11), while giving no reason why a POSIA would do so. Further, the Petition does not provide any indication how either Hughes '803 or Pattengill would have been modified to arrive at the challenged claims.

Even picking and choosing from the Cited Prior Patents, the primary deficiency of the Petition – the failure to show that the Cited Prior Patents teach or suggest anything about MPS or the MPS Limitations -- cannot be overcome.

A. The Petition Fails To Make Out A Prima Facie Case That The Challenged Claims Are Unpatentable

1. The Cited Prior Patents Do Not Teach Or Suggest The MPS Limitations

The Board correctly found that neither Hughes '803 nor Pattengill expressly discloses MPS or the MPS Limitation (Decision, pp. 9-10, 12). Following this finding, the Board refused to adopt Petitioner's proposed rejections that Hughes '803 and Pattengill each alone rendered the challenged claims unpatentable for

anticipation or obviousness. Instead, the Board found an IPR would proceed[1] as to whether claims 1-13, 30 and 32 of the '019 Patent are unpatentable only over the *combination* of Hughes '803 and Pattengill. The Board explained its obviousness rejection as follows:

> Regarding the MPS limitation, as well the limitation requiring the MPS of the non-swelling clay material to be greater than the MPS of the swelling clay, Petitioner argues that Hughes discloses broad ranges of sizes of both non-swelling and swelling particulates including embodiments requiring non-swelling clay having a larger mean particle size. Pet. 54. Petitioner highlights Hughes's teaching of "the importance of using smaller size *swelling* particles to serve as 'bridges.'" *Id.* (citing Ex. 1006, 7:24–26; Ex. 1005 ¶ 72). Petitioner also notes that "all the particle size ranges for *swelling* and *non-swelling* clay disclosed in the Pattengill Patent are also squarely within the sizes claimed in the '019 Patent." *Id.* at 56. Petitioner maintains that it is appropriate to combine independently disclosed ranges to confirm the teaching and disclosure of a broader range. *Id.* at 55 n.19. Petitioner concludes that it would have been obvious to

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[1] In the Decision on Rehearing (Paper 16), the Board stated that the Petition did not need to present a *prima facie* case of obviousness to initiate the proceeding, and notably made no finding that the Petition had presented a *prima facie* case of obviousness.

> combine any of the particle sizes of Pattengill with those of Hughes to achieve the ratios required. *Id.* at 55 (citing Ex. 1005 ¶ 136).

Decision p. 14.

Each of these points are addressed below, and the arguments and testimony relied upon by the Board do not establish a *prima facie* case of obviousness. In particular, as stated by the Board, neither Hughes '803 nor Pattengill discloses or discusses MPS, and the Petition does not establish that a POSIA would have understood the MPS Limitations to have been a *result effective variable*, as explained below. The Petition fails to provide any rational basis or evidence as to why the combination of the Cited Prior Patents would have arrived at the recited MPS Limitations, especially since the MPS Limitations are not disclosed or discussed in either. Accordingly, the initial threshold assessment of patentability made by the Board cannot stand, as the Petition and supporting evidence fail to establish unpatentability of the challenged claims.

a. Hughes '803

Hughes '803 discloses NaB and CaB bentonite clay blends that absorb animal dross/waste, and that are said to agglomerate, permitting physical removal of the soiled and wetted litterbox materials from the unwetted materials; the removed materials are also said to be capable of dispersion in water so that they can be discarded by, e.g., flushing down a toilet or sewer line without clogging (Ex. 1006, e.g., 3:44-56). Hughes '803 says that "wetted, swelled bentonite

particles" interact with "nearby wetted and swelled bentonite particles" to agglomerate and form a wetted mass of sufficient stability and size such that the mass can be removed from the unwetted particles of the bentonite clay combination (Ex. 1006, 5:10-19).

Further, Hughes '803 discloses using the *same* size particle ranges of sodium and calcium bentonite clays in his disclosed litters (Ex. 1006, 7:5-23). The Hughes '803 specification never discloses using different particle sizes for sodium and calcium bentonite clays, saying instead that "the sodium *and* calcium bentonite clays in the litter box absorbent composition have a particle size ranging from about 50u (microns) to about 3350u in diameter, and preferably in a particle size ranging from about 600u to about 3350u in diameter…" (Ex.1006, 7:5-11; emphasis added).

Hughes '803 repeatedly reinforces the lack of any differentiation between particle sizes for sodium and calcium bentonite clays. Thus, when Hughes '803 discusses an upper limit of particle size (Ex.1006, 7:12-15), it again does not distinguish between sodium and calcium bentonite particles: "It has been found that the sodium *and* calcium bentonite particles appreciably greater than about 3350u in diameter do not sufficiently cohesively agglomerate to allow facile physical separation of the wetted, agglomerated mass from the litter box" (emphasis added). And when a lower limit of particle size is disclosed, Hughes

'803 once again equates sodium and calcium bentonite particles: "Furthermore, it has been found that sodium *and* calcium bentonite particles appreciably smaller than about 50u in diameter produce a litter box absorbent composition that is too dusty" (Ex. 1006, 7:16-19; emphasis added).

Hughes '803 further equates the same particle sizes of NaB and CaB when disclosing the use of such particle sizes across an entire range: "....the sodium *and* calcium bentonite clays should be present in the composition in particle sizes across substantially the entire range of about 600μ to about 3350μ...." (Ex. 1006, 7:19-26; emphasis added).

The independent claims of Hughes '803 also recite the same particle size ranges for NaB and CaB, i.e., each of claims 1, 2 12 and 26 recite a particle size range of 50-3350μ for each of NaB and CaB (Ex. 1006, cols. 8-10). Hughes '803 also includes a number of dependent claims, including dependent claims 4-7 and 16-19, in which particles size ranges are recited. The MPS cannot be calculated based upon the upper and lower limits of the ranges, as there is simply insufficient information to do so (Ex. 2013, Herpfer Dec., ¶¶5-7; Ex. 2015, DeLuca Dec., ¶¶3-6). Further, these ranges recited in the dependent claims of Hughes '803 must be interpreted as a POSIA would, in conformance with the teaching of the specification. 37 C.F.R. § 1.75(d)(1). A POSIA at the time of invention, reading Hughes '803 *as a whole*, including the claims, would not have understood anything

other than using the same particle size ranges for NaB and CaB. That dependent claims recite using (1) NaB particles sized larger than CaB particles, or (2) CaB particles sized larger than NaB particles, only adds confusion, not clarity, as the specification says nothing about *relative* NaB/CaB particles sizes. The ranges in claims 4 and 5 merely recite preferred particle size ranges as disclosed in the specification (Ex. 1006, 7:5-11), and the specification does not disclose an embodiment which uses different ranges of NaB and CaB particle sizes. In fact, claim 6, which recites that "said sodium bentonite particles and said calcium bentonite particles have a size over the full range of 600 microns to 3350 microns," confirms that a POSIA would have understood that Hughes '803 teaches using NaB and CaB particles having the same range. Nor does Hughes '803, including any of its claims, disclose: (1) MPS for either the NaB or CaB particles or; (2) the MPS Limitations.

Petitioner places much emphasis on the so-called "bridges" statement in Hughes '803, but this statement supports Patent Owner's position. The "bridges" statement says nothing at all about MPS or about the relative particle sizes of NaB and CaB. Instead, the "bridges" statement teaches a POSIA to use the *same ranges of particles sizes for NaB and CaB* (Ex. 2013, Herpfer Dec., ¶8; Ex. 1006, 7:19-26). The complete statement in Hughes '803 pertaining to "bridges" reads as follows:

> To achieve the fullest advantage of the present invention, *the sodium and calcium bentonite clays* should be present in the composition in particle sizes across substantially the entire range of about *600μ to about 3350μ* because the smaller diameter water-swellable bentonite particles, upon being wetted, swell and serve as 'bridges' between larger, wetted bentonite particles.

(Ex. 1006, 7:19-25; emphasis added). A POSIA would have understood the first 3 lines of this statement to mean that NaB and CaB should have the *same* particle sizes within the 600μ-3350μ range (Ex. 2013, ¶8). The last 2 lines of this statement describe the interaction of smaller *NaB* particles ("smaller diameter water-swellable") and larger *NaB* particles ("larger, wetted bentonite"), and say nothing about the *relative* NaB and CaB particle sizes (Ex. 2013, ¶8). For example, earlier, Hughes '803 explains that the "wetted, swelled bentonite particles then interact with nearby wetted *and swelled* bentonite particles…" (Ex. 1006, 5:11-13; emphasis added) – making it clear that when it refers to "smaller" and "larger" particles, Hughes '803 is, in each instance, referencing "swelled" bentonite, *i.e., NaB*[2]. Thus, the "bridges" statement would have been understood

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[2] Through repeated argument, Petitioner has conceded that a reference to "swellable bentonite" is a reference to NaB, not CaB, while a reference to "non-swelling bentonite" is a reference to CaB, not NaB *(e.g.,* Pet., pp. 14, 17, 18, etc.).

by a POSIA to mean that smaller *NaB* particles serve as "bridges" between larger *NaB* particles, and says nothing about the relative NaB and CaB particle sizes, which are disclosed as having the same size ranges (Ex. 2013, ¶8).

This understanding by a POSIA of the "bridges" statement is confirmed by the parent of Hughes '803, U.S. Patent No. 5,000,115 ("Hughes '115," Ex. 2012), as well as U.S. Patent No. 5,503,111 ("Hughes '111," Ex. 1009). Each states that "wetted, *swelled* bentonite" interacts with "nearby wetted *and swelled* bentonite particles…" (Ex. 2012, 4:35-36; Ex. 1009, 6:58-60; emphasis added), *i.e.,* smaller NaB particles "bridge" between larger NaB particles. Additionally, in Hughes '111, the same 25%NaB/75%CaB example is disclosed (Ex. 1009, 11:22-29) as in Hughes '803 (Ex. 1006, 7:63-8:24), and it is expressly stated in Hughes '111 that the NaB and CaB clays each have the *same particle size ranges* of 600μ-3350μ (Ex.1009, 11:22-29). Thus, viewing Hughes '803 as a whole, and also taking into account its related patents, the meaning of the "bridges" statement is unambiguous; it only references NaB-NaB particle interaction, and says *nothing* about MPS, *nothing* about the MPS Limitations, and *nothing* about selecting MPS of NaB particles that are smaller than MPS of CaB particles in an animal litter.

In summary, a POSIA would have understood Hughes '803 to teach using the *same* ranges of particle sizes for both non-swelling-clay and swelling-clay, and

certainly not the MPS Limitations recited in the challenged claims (Ex. 2013, Herpfer Dec., ¶8).

b. Pattengill

Pattengill would have been understood by a POSIA to teach that gum-containing plantago additives may be added to clumping and non-clumping materials (Ex. 1008, 2:34-51). Pattengill discloses numerous examples adding plantago to combinations of commercial animal litter products, such as disclosed beginning at Example 1 and Table 1 of Pattengill, and further evaluation of plantago-containing clumpable animal litters beginning at Example 7 and Table 8.

Pattengill is directed to adding plantago to numerous animal litter mixtures using various application techniques. Pattengill discloses mixtures of different particles, such as in Tables 11 and 14. However, Pattengill does not disclose or discuss the significance or desirability of MPS or the MPS Limitations, or that MPS is a result-effective variable. Pattengill also fails to disclose the content of the commercial litters in Mixture 11 relied upon by Petitioner, and such information was not generally available or known to a POSIA (Ex. 2013, Herpfer Dec., ¶10).

2. Petitioner's Arguments Referred To On Page 14 Of The Decision Do Not Establish A *Prima Facie* Case Of Obviousness

The Decision states that "Petitioner argues that Hughes discloses broad ranges of sizes of both non-swelling and swelling particulates including

embodiments requiring non-swelling clay having a larger mean particle size. Pet. 54." (Decision, p. 14.) The arguments at page 54 of the Petition (which actually pertain to dependent claim 4) are initially based upon the Petitioner's assertion: "As detailed above, the Hughes Patent expressly discloses a mean particle size ratio of *non-swelling* to *swelling* clay of 1.16:1 – and Pattengill discloses a composition having a ratio of 1.7:1" Pet. p. 54. However, because the Board found that neither Hughes '803 nor Pattengill discloses MPS, this assertion cannot reasonably be considered to be supported by the evidence of record.

The Petitioner next argues to ignore the specific mixtures disclosed in Hughes '803 and Pattengill, and instead look at the "broad ranges of sizes" of particulates and "embodiments requiring *non-swelling* clay having a larger mean particle size." Pet. p. 54. However, this argument is also deficient, because disclosure of "broad ranges of sizes" is not disclosure of MPS, the MPS Limitations, or that MPS is a result-effective variable. Moreover, because Hughes '803 does not disclose or discuss MPS, the Petition has not established that Hughes '803 discloses MPS in any context, let alone establishing that Hughes '803 discloses a non-swelling clay having a larger MPS than a swelling clay.

A POSIA reviewing Hughes '803, without the benefit of the disclosure of the '019 Patent, would not have understood the desirability of using MPS as a parameter, let alone designing an animal litter with an MPS of one particle, *i.e.,* a

non-swelling particle, larger than the MPS of a different particle, *i.e.,* a swelling particle. As shown above, the "bridges" statement says nothing about relative NaB and CaB particle size, and instead teaches they should have the same size range when it says: "the sodium and calcium bentonite clays should be present in the composition in particle sizes across substantially the entire range of about 600μ to about 3350μ…" (Ex. 1006, 7:20-23). A POSIA would not have understood the "bridges" statement as teaching or suggesting a MPS of NaB clay that is different from the MPS of CaB clay (Ex. 2013, ¶8).

Petitioner concludes that it would have been obvious to combine any particle sizes of Pattengill with those of Hughes '803 to achieve the ratios required. (Pet., p.57). This general statement relies upon a general assertion of obviousness of Mr. Hughes. However, this statement is devoid of any indication as to (a) how this obviousness assertion pertains to MPS or the MPS Limitations; (b) how any composition and/or component of Hughes '803 and Pattengill would have been combined; (c) how the challenged claims would have been arrived at; or (d) why a POSIA would have arrived at the claimed MPS Limitations. In an obviousness rejection, a parameter will only be manipulated if it is a result-effective variable. A parameter must first be *recognized* as a result-effective variable before its optimization can be relied upon as part of a prior art rejection. *In re Antonie*, 559 F.2d 618 (CCPA 1977) (holding that it could not have been recognized from the

prior art that "'treatment capacity' is a function of 'tank volume' or the tank volume-to-contactor area ratio); *In re Yates*, 663 F.2d 1054, 1054-55 (CCPA 1981) (claims requiring 25-80% conversion of olefin to product with acid production of less than 2%, were not obvious where POSIA would not have expected the degree of olefin conversion to be result-effective given the percentage production of unsaturated acid). *See also KSR Int'l. Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) (patent claim can be proved obvious where "there is a design need or market pressure to solve a problem, and there are a finite number of identified, predictable solutions [that a POSIA] has good reason to pursue"). Here, there was market pressure in 1997 when the invention was filed to *maintain a heavier litter, not* to solve the problem of providing a lighter litter (Ex. 2013, ¶11), and no good reason or even any indication that a POSIA reading the Cited Prior Patents would understand that controlling MPS is result-effective for lightening an animal litter by reducing the heavier NaB, while still maintaining clumping effectiveness.

The Board has also relied upon the assertion in the Petition "that it is appropriate to combine independently disclosed ranges to confirm the teaching and disclosure of a broader range. *Id.* at 55 n.19." This assertion fails in a similar manner to the other assertions in the Petition because there is no disclosure or discussion in the Cited Prior Patents of the MPS Limitations. Accordingly, merely combining ranges of NaB and CaB particles, such as the ranges of particle sizes

disclosed in the Hughes '803 "bridges" disclosure, would not arrive at the claimed MPS Limitations.

3. Petitioner Failed To Meet Its Burden Of Making A *Prima Facie* Showing Of Obviousness By A Preponderance Of The Evidence

Petitioner has the burden to make a *prima facie* showing of obviousness by the preponderance of the evidence, 35 U.S.C. §316(e), which must set forth an explicit rationale as to why the claimed invention as a whole would have been obvious to a POSIA at the time of the invention, despite the differences between the claimed invention and the prior art, and without reference to or knowledge of the patent disclosure. *See, e.g., Proctor & Gamble Co. v. Teva Pharm. USA, Inc.,* 566 F.3d 989, 995 (Fed. Cir. 2009).

Where the Petitioner attempts to show obviousness through the testimony of an expert, the expert testimony must explain in detail how specific references could be combined, which combinations of elements in specific references would yield a predictable result, and how any specific combination would operate or read on the asserted claims. *Activevideo Networks, Inc. v. Verizon Comm'ns, Inc.,* 694 F.3d 1312, 1327 (Fed. Cir. 2012). As the Federal Circuit has stated:

> Whether prior art invalidates a patent claim as obvious is determined from the perspective of one of ordinary skill in the art. Through the lens of one of ordinary skill in the art, even when all claim limitations are found in prior art references, the fact-finder must

> not only determine what the prior art teaches, but whether prior art teaches away from the claimed invention and whether there is a motivation to combine teachings from separate references. *See DyStar Textilfarben GmbH & Co. Deutschland KG v. C.H. Patrick Co.,* 464 F.3d 1356, 1360 (Fed. Cir. 2006) (citing *In re Fulton*, 391 F.3d 1195, 1199–1200 (Fed. Cir. 2004)). Ultimately, obviousness requires careful judgment and analysis in light of technical facts. *KSR,* 550 U.S. at 419, 127 S.Ct. 1727.

Star Scientific v. SJ Reynolds, 655 F.3d 1364, 1374-75 (Fed. Cir. 2011).

Here, the Board found that Petitioner failed to show that either Hughes '803 or Pattengill discloses or discusses MPS or the MPS Limitations, or even provides enough information to permit their calculation (Decision, pp. 9-10, 12). The Board's finding is amply supported by the record. The sole evidence presented as to MPS or the MPS Limitations is by Petitioner's expert, Mr. Hughes. Mr. Hughes is not a POSIA, and with but a few exceptions, has not given testimony as a POSIA. As explained further in Section V.C., below, Mr. Hughes' testimony is from his expert perspective rather than the perspective of a POSIA, and is conclusory, with no details as to how or why Hughes '803 and Pattengill would have been combined, and includes no attendant factual underpinning whatsoever.

In short, the only factual evidence in the record which may be appropriately considered shows that a POSIA would *not* have understood the MPS Limitations to

have been obvious from the combination of Hughes '803 and Pattengill (e.g., Ex. 2013, ¶¶3-10), and there is no contrary evidence.

Because the Petition and Mr. Hughes do not provide any *reason* why a POSIA would have understood the MPS Limitations to have been obvious, or even why a POSIA would have considered MPS to be a result-effective variable in either Hughes '803 or Pattengill, the obviousness rejection is unsupported and cannot be maintained. *See Callcopy, Inc. v. Verint Americas, Inc.*, Case IPR2013-00492, p.8 (PTAB Decision, 2/5/14) (conclusory statements by expert and Petitioner that POSIA "would have been motivated" to implement "audio processing disclosed in Bronson" on the "service node of Howe" in order to "limit the amount of information to be recorded" does not "articulate sufficient reasoning with rational underpinnings to support the legal conclusion of obviousness" as required in *KSR*); *Shopkick, Inc. v. Novitaz, Inc.*, IPR2015-00277 et al, p.20 (5/29/15 PTAB Decision) ("Petitioner's statement that 'Ogasawara's method naturally extends Marshall's method of wirelessly identifying preferred customers in-store'… does not compensate for the lack of any meaningful analysis of the differences between the prior art and the claims at issue. Moreover, there is no persuasive evidence that a [POSIA] would have modified, selected and/or combined prior art elements in the normal course of research and development to yield the claimed invention."); *Kinetic Tech., Inc. v. Skyworks Solutions, Inc.*,

IPR2014-00529, p.15 (9/23/14 PTAB Decision) ("[Petitioner's] Declaration does not explain the 'how,' 'what,' and 'why' of the proposed combination of references…. Petitioner's and Dr. Mohapatra's statements of general principles from the case law that a proposed combination 'involves no more than a combination of known elements,' or … 'is the predictable use of such elements according to their establish functions,' or … 'yields predictable results,' … are conclusions; they are not a substitute for a fact-based analysis of the proposed combination of references necessary to support those conclusions… [nor do they explain why a POSIA] would have combined elements from specific references *in the way the claimed invention does*…. Accordingly, we give Dr. Mohapatra's Declaration no probative weight.") (emphasis added).

In fact, Petitioner and Mr. Hughes never state *how or why* the *combination* of Hughes '803 and Pattengill discloses MPS or the MPS Limitations. Instead, as to this *combination,* Mr. Hughes says only, in conclusory fashion, in Paragraph 136 of his Declaration (Ex. 1005):

> any of the Subject Claims … not otherwise disclosed by [Hughes] or [Pattengill] individually, most certainly … would have been obvious to a person of ordinary skill in the art at the time of the alleged invention…in light of these references taken together.

That single, conclusory statement is legally insufficient to support a *prima facie* case of unpatentability. *KSR Int'l Co.,* 550 US at 418 ("[R]ejections on

obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."); *Rohm & Haas Co. v. Brotech, Corp.*, 127 F.3d 1089, 1092 (Fed. Cir. 1997) ("[n]othing in the rules or in our jurisprudence requires the fact finder to credit the unsupported assertions of an expert witness.").

Obviousness requires "a showing that a [POSIA] at the time of the invention would have selected and combined those prior art elements . . . ." *Unigene Labs, Inc. v. Apotex Inc.,* 655 F.3d 1352, 1360 (Fed. Cir. 2011). Mr. Hughes says *nothing* about why a POSIA either would have combined the Cited Prior Patents, or how or why that combination teaches anything specific concerning MPS or the MPS Limitations. Using the '019 Patent as the basis for the selection of clays to be combined, rather than solely using information available to a POSIA at the time of the invention, is not a rationale for combining, but, rather, constitutes impermissible hindsight. *In re McLaughlin*, 443 F.2d 1392, 1395 (CCPA 1971). This is especially true given the Board's findings that the MPS Limitations are not disclosed or suggested in either Hughes '803, alone, or Pattengill, alone (Decision, pp. 9-12):

> Pattengill does not disclose or discuss MPS …. no experiments or further measurements support Petitioner's assertion that Pattengill's

> clays have any specific MPS values, or that those values, ***even if they were calculated or calculable, meet the MPS Limitations of claim 1.***

(Decision, p. 12; emphasis added). The Board made the same findings as to Hughes '803 (Decision, pp. 9-10). These findings support Patent Owner's position that the Cited Prior Patents do not render the challenged claims unpatentable for obviousness.

B. Petitioner Cannot Now Supplement The Record

The Petition lacks sufficient evidence and information to support the argument that a combination of Hughes '803 and Pattengill renders the challenged claims unpatentable for obviousness. Despite the Board's finding that neither Cited Prior Patent discloses MPS, and despite Patent Owner's request for rehearing, Petitioner did not file a motion to submit supplemental information in accordance with 37 C.F.R. §42.123 within one month of the date the trial was instituted, and there is no reason why supplemental information could not have been obtained earlier. As such, the Board and Petitioner are limited by the record filed with the Petition.

Petitioner also should not be permitted to rectify its failure to meet its burden, as it has waived the right to do so. 37 C.F.R. §42.23(b) (a reply may "only respond to arguments raised in the patent owner response"); Office Patent Trial Practice Guide, 77 Fed.Reg. 48,756, 48,767 (Aug. 14, 2012) (a reply "that raises a new issue or belatedly presents evidence will not be considered and may be

returned."); *Corning Inc. v. DSM IP Assets BV,* IPR2013-00047 (Paper 84, at 14) (PTAB May 1, 2014) (new rebuttal testimony in reply excluded as untimely and unfairly prejudicial); *Berk-Tek LLC v. Belden Techs., Inc.*, IPR2013-00057 (Paper 29) (PTAB May 14, 2013) (finding that a factual dispute which reasonably should have been anticipated required a supporting declaration not present in the Petition). Thus, the Board must determine patentability based upon the record.

C. No Weight Should Be Given To Mr. Hughes' Expert Testimony, As He Provides His Own Opinion Rather Than What Would Have Been Understood By A POSIA At The Time Of The Invention

Mr. Hughes, the sole inventor of the Hughes '803 patent, is someone of extraordinary, not ordinary, skill in the art. Mr. Hughes has a research chemistry background, holds 30 U.S. patents in the field of clays (Ex. 1005, ¶¶ 2, 3, 5, 7, 13), and has worked actively in the clay field for nearly 50 years (Ex. 1005, ¶¶ 5,14). He is a former President, CEO and Chairman of the Board of American Colloid Company or its successor, and served on the American Petroleum Institute's panel on bentonite quality (Ex. 1005, ¶¶ 9, 10, 14). Mr. Hughes' knowledge and experience far exceeds that of a POSIA as Mr. Hughes himself defines one, i.e., a person with an "undergraduate scientific or engineering degree in a relevant field" "and/or" "approximately three years of relevant industry or academic experience relating to clays and/or animal litter" (Ex. 1005, ¶22). Patent Owner agrees with this POSIA definition (Ex. 2013, ¶3). *See KSR Int'l Co,* 550 U.S. at 420 ("The

question is not whether the combination was obvious to the patentee but whether the combination was obvious to a person of ordinary skill in the art."); *Unigene Labs,supra,* 655 F.3d at 1363 (holding that no reasonable jury could have found the patent obvious, based on the testimony of the prior art inventor, because the standard requires evidence from a person of *ordinary* skill, who was "not Dr. Stern, a co-inventor of the '014 patent…."); *Standard Oil Co. v. American Cyanamid Co.*, 774 F.2d 448, 454 (Fed. Cir. 1985) (Rich, J.) ("[o]ne should not go about determining obviousness under §103 by inquiring about what patentees (i.e., inventors) would have known or would likely have done, faced with the revelations of references. A [POSIA] is also presumed to be one who thinks along the line of conventional wisdom in the art and is not one who undertakes to innovate…."); *Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc.*, 796 F.2d 443, 448 (Fed. Cir. 1986) (relying on *Standard Oil* and reversing obviousness finding by district court as relying too heavily on opinion of inventor; stating that "[i]nventors, as a class, possess something … which sets them apart from the workers of *ordinary* skill…"); *Schneider (Eur.) AG v. Scimed Life Sys.*, 1995 U.S.App. LEXIS 9754, *3 (Fed. Cir. 1995) (citing *Standard Oil* and stating that a POSIA is "one who thinks along the line of conventional wisdom in the art and is not one who undertakes to innovate…"); *Amgen, Inc. v. Hoffman-LaRoche, Ltd.*, 580 F.3d 1340, 1363 (Fed. Cir. 2009) (applying *Standard Oil* rule).

The Board correctly rejected Mr. Hughes' simple "midpoint" definition (Ex. 1005, ¶51) for MPS. Indeed, this oversimplified definition does not comport with the known particle size distribution of the clays used in the cat litter industry, which are non-linear distributions, as Dr. DeLuca, a particle size expert, explains (Ex. 2015, DeLuca Dec., ¶¶3-6; *see also* Ex. 2013, Herpfer Dec., ¶¶4-6).[3] In fact, use of Petitioner's "midpoint" definition provides results which entirely ignore the *majority* of particle sizes within a sample. This is because a POSIA, having read the disclosure of the '019 Patent, would have understood that such a non-linear distribution generally provides a histogram or bell curve, so that taking a simple average of the largest and smallest particle sizes completely ignores the top portions of the histogram or bell curve, where the majority of particles reside. *See also* 2013, ¶¶5-6 and Ex. 2011, comparing examples of linear and non-linear particle size distributions.

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[3] Mr. Hughes finds that a sample disclosed in Table I of the '019 Patent, Blue Mtn. 8/16, which provides data for sieve sizes 6 and 12, was "unacceptable" due to the "omission of the intermediary screen sizes" between 6 and 12 (Ex. 1005, ¶71, f/n 4), but this is inconsistent with Mr. Hughes' position that MPS can be obtained from just two data points: upper and lower particle size ranges.

D. A POSIA Would Not Have Known The Actual Composition Of Pattengill Mixture 11

Of the *dozens* of animal litter compositions disclosed in Pattengill, Petitioner – relying upon impermissible hindsight – myopically focuses on a single composition disclosed in Table 11, Mixture 11 (Ex. 1008, 13:44:65). Punctuating Petitioner's failure to meet its burden, Mixture 11 would have been *meaningless* to a POSIA, who would not have known the actual components of Scoop Fresh and Tidy Cat with Baking Soda, the two litters combined in Mixture 11. (Ex. 2013, Herpfer Dec., ¶10). The ingredients in Scoop Fresh and Tidy Cat with Baking Soda were not available on the product packaging, and not otherwise readily available to the public or POSIAs (Ex. 2013, ¶10). Mr. Hughes naked testimony, lacking any documentary support as to the alleged compositions of Pattengill Sample Nos. 29 (Tidy Cat with Baking Soda) and 33 (Scoop Fresh) of Mixture No. 11 in Table 11 (Ex. 1005, ¶¶96, 99) -- compositions from nearly two decades ago that Mr. Hughes claims to recall without reference to any background source – should be given no weight here. *Rohm & Haas Co., supra,* 127 F.3d at 1092 (unsupported assertions of an expert witness should not be credited).

Mr. Hughes is not a POSIA, and only purports to know what is in Mixture 11 because he is allegedly "personally familiar" with these products due to "competitive analysis conducted under my tenure at and by American Colloid Company" (Ex. 1005, ¶96), and also because he was personally privy to licensing

by American Colloid to Clorox/Excel (Ex. 1005, ¶99) – information that would have not been generally known by a POSIA (Ex. 2013, ¶10). Without Hughes' own personal, specialized information, Mixture 11 simply has no relevance to a POSIA, as she would not have known the ingredients of Scoop Fresh and Tidy Cats with Baking Soda. *In re Donohue*, 766 F.2d 531, 533 (Fed. Cir. 1985) ("[E]ven if the claimed invention is disclosed in a printed publication, that disclosure will not suffice as prior art if it was not enabling."); *Otsuka Pharm. Co. v. Sandoz, Inc.*, 678 F.3d 1280, 1299 (Fed. Cir. 2012) (accepting expert testimony explaining why the prior art would not have been meaningful to a POSIA, and thus did not render the claim obvious); *Source Search Techs., LLC v. LendingTree, LLC*, 588 F.3d 1063, 1071-73 (Fed. Cir. 2009) (reversing obviousness finding where prior art failed to disclose any meaningful filtering process, and factual issues also existed as to whether POSIA would have even recognized problem addressed by filtering feature).

That a POSIA would *not* have known what is in the composition of Mixture 11 is shown by Pattengill itself. For example, Table 1 of Pattengill (Ex. 1008, col. 3) lists Sample No. 11 as "Tidy Cat w/ baking soda" – the exact same description as Sample No. 29 – while Sample No. 11's "Major Components" are listed as "N/A" (not available). Why are the "Major Components" of Sample No. 11 listed as N/A if a POSIA would have known the constituents? Why does the

"Description" of Sample No. 29 only say "Clay & Baking Soda" (Ex. 1008, 11:67), if the exact components were known? Pattengill itself suggests that *not even Mr. Pattengill* knew what was in Mixture 11.

There is good reason to doubt Mr. Hughes on his unsubstantiated views, too: Mr. Hughes says Pattengill Sample No. 33 is 100% NaB (Ex. 1005, ¶99); yet, Pattengill Sample No. 35, described in the identical manner as Sample No. 33 in Table 8, *i.e.,* "Clumping Litter (Bentonite)," *did not clump* (Ex. 1008, Table 12, Mixture No. 17). In sum, a true POISA at the time of invention (*i.e.,* not expert Hughes[4]), would not have known the ingredients of Scoop Fresh and Tidy Cat with Baking Soda, and thus would not have known whether Tidy Cat with Baking Soda contained only non-swelling clay and/or whether Scoop Fresh contained only swelling clay.

E. The Cited Prior Patents Do Not Disclose, Teach Or Suggest MPS

The Cited Prior Patents do not disclose, teach or suggest MPS. Petitioner and Mr. Hughes repeatedly contend that a mathematical average *can* be calculated

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[4] Mr. Hughes, the inventor, and senior executive and Board member at American Colloid, a long-time competitor of Patent Owner in the animal litter market, as well as the hired expert for Petitioner, another long-time competitor of Patent Owner in the same market, has a clear bias.

using largest and smallest particle sizes. But as stated by the Board in its July 9, 2015 Decision (pp. 9-10, 12), a value that is calculated by using only the largest and smallest particles size is not MPS as recited in the MPS Limitations in the challenged claims. Petitioner has not provided any evidence, including any showing of MPS in the Cited Prior Patents, or why a POSIA would have considered MPS to have been a result-effective variable. A POSIA would not have sought to vary the MPS in either of Hughes '803 or Pattengill unless the POSIA would have understood that MPS was a *result-effective variable*. The Cited Prior Patents explicitly demonstrate that the *most likely possibilities* – the paths that a POSIA would most likely have gone down if she were following explicit teachings in the Cited Prior Patents – are either to ignore relative particle size altogether, or to *equalize* the particle size ranges of the swelling and non-swelling clays. Either path would have lead a POSIA *away* from the MPS Limitations. *See Kinetic Concepts, Inc. v. Smith & Nephew, Inc.*, 688 F.3d 1342, 1366 (Fed. Cir. 2012) ("[P]ost-*KSR*, 'some kind of motivation must be shown from some source, so that the jury can understand why a [POSIA] would have thought of either combining two or more references or modifying one to achieve the patented [invention].'"; finding no motivation to combine where defendant failed to present evidence as to appropriate combination and the technology at issue was not the type where common sense would motivate the combination); *Innogenetics, N.V. v. Abbott*

Labs., 512 F.3d 1363, 1373 (Fed. Cir. 2008) (finding nonobviousness where expert made an unsupported assertion without appropriate combination evidence).

F. The Cited Prior Patents Do Not Disclose, Teach Or Suggest The Need To Manipulate MPS

The lack of any disclosure in the Cited Prior Patents regarding MPS – let alone its selective utilization to obtain a lighter litter while maintaining clumpability – is powerful evidence that the MPS Limitations in the challenged claims would not have been obvious. *Eurand, Inc. v. Mylan Pharms., Inc.*, 676 F.3d 1063, 1071 (Fed. Cir. 2012) (finding nonobviousness in a chemical case and stating: "[T]he prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful."); *Eli Lilly & Co. v. Teva Parenteral Meds., Inc.*, 2014 U.S. Dist. Lexis 43885, 40-41 (S. D. Ind. 2014) (claim for cancer treatment drug was not obvious because "there [was] no indication in the prior art of what amount of B_{12} would be successful in the treatment of cancer patients, nor any indication that vitamin B_{12} deficiency was a contributing factor to pemetrexed toxicity."); *In re Deuel*, 51 F.3d 1552, 1557-58 (Fed. Cir. 1995) (claim for cDNA molecule not obvious in light of prior art because no relevant cDNA molecules, or close chemical relatives, were disclosed in prior art); *Rockwell Int'l Corp. v. United States*, 147 F.3d 1358, 1365 (Fed. Cir. 1998) (grant of summary judgment of obviousness overturned by Federal Circuit where the defendant "did not show the trial court any prior art patent or

combination of prior art patents that taught with a reasonable likelihood of success how to grow a single crystal film of Group III/V semiconductor material on a substrate using organometallic reagents.”).

Indeed, the Cited Prior Patents address a completely different problem than the challenged claims: flushability (Ex. 1006, Hughes ‘803, repeatedly, throughout; Ex. 1008, Pattengill, 1:43-48). Further, Pattengill teaches to *avoid* the use of smectite clays (Ex. 1008, 17:22-23) like CaB and NaB (Ex. 1005, ¶41). *See Broadcom Corp. v. Emulex Corp.,* 732 F.3d 1325, 1334 (Fed. Cir. 2013) (claim for digital communication system not obvious where prior art addressed a different problem (of clock recovery) than the claim (of clock and data recovery)).

Petitioner repeatedly argues that a mathematical average *could possibly* be taken of the upper and lower particle size ranges in the Cited Prior Patents but, tellingly, never once explains why a POSIA *would have been motivated* to calculate an average – which is not a disclosure of MPS or the MPS Limitations, as the Board found. (Decision, pp. 9-12).

Because Hughes ‘803 and Pattengill both fail to appreciate the need to analyze and experiment with MPS, and also fail to appreciate the need to modify *relative* particle sizes of swelling and non-swelling clays using “representative samples,” they discourage investigation into the MPS Limitations, and therefore teach away from the claimed invention. *See DePuy Spine, Inc. v. Medtronic*

Sofamor Danek, Inc., 567 F.3d 1314, 1326-7 (Fed. Cir. 2009) (references teach away where they discourage investigation into the invention claimed). For this reason, alone, Petitioner's obviousness argument should be rejected.

G. The Cited Prior Patents Teach Either To Equalize NaB And CaB Particle Sizes (Hughes '803) Or That Particle Size Is Not Important (Pattengill)

1. Hughes '803 Teaches Equalizing NaB And CaB Particle Sizes

Viewing Hughes '803 (Ex. 1006) as a whole, as is proper (*Litton Indus. Prods., Inc. v. Solid State Systems Corp.*, 755 F.2d 158, 164 (Fed. Cir. 1985) ("It is elementary that the claimed invention must be considered as a *whole* in deciding the question of obviousness.")), its primary teaching is the use of the *same* particle size ranges for both NaB and CaB (Ex. 1006, 7:5-23).

Petitioner refers to claims 4 and 16 of Hughes '803 as basis for an argument that a smaller NaB particle size range is disclosed. But there are two flaws with this argument. First, it is only with the benefit of impermissible hindsight that a POSIA would focus on claims 4 and 16, and ignore the substantial teaching-away in Hughes '803, as there is *nothing* in the specification of Hughes '803 to suggest to a POSIA that a smaller NaB particle size is somehow superior or even desirable (the "bridges" statement does not, as discussed above). Second, Claims 4 and 16, consistent with the Hughes '803 specification, teach away in an important respect, as they permit a much larger NaB size of 3350μ (3.35mm) (Ex. 1006, 7:10, 7:13,

7:23, 8:32-10:54) than claim 1 allows, i.e., an MPS of swelling clay less than 2mm (<2000μ) (Ex. 1001, '019 Patent, claim 1). Claims 5 and 17 of Hughes '803 similarly teach away, as they recite a range of NaB particle sizes *larger* than the range of CaB particle sizes (Ex. 1006, 8:32-10:54).

Pattengill does not cure this deficiency, either, as it teaches that the "most preferred size distribution" includes particle sizes that exceed 2mm/2000μ (2360μ, per Pattengill, Ex. 1008, 17:20).

Petitioner improperly places great reliance on the so-called "bridges" statement in Hughes '803. But this statement says nothing at all about relative NaB and CaB MPS and, further, actually teaches a POSIA to use the same relative particles size ranges for NaB and CaB (Ex. 1006, 7:20-23: … the sodium and calcium bentonite clays should be present in the composition in particle sizes across substantially the entire range of about 600μ to about 3350μ….").

2. Pattengill Does Not Teach The Importance Of Relative Particle Sizes Of Different Materials

Prior art patents are to be read as a whole; in chemical cases, as here, direction given to a POSIA as to the "lead" composition(s) is particularly useful. *Takeda Chem. Indus. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356 (Fed. Cir. 2007). Pattengill (Ex. 1008) discusses particle sizes at 17:15-25, but it draws no distinction between relative or different particle sizes or particle size ranges for different materials:

> Advantageously, the particulate material used is screened to remove fines that tend to cause dusting during pouring when required. (With some organic particulate, dusting is not a problem.) Limiting the particulate to +30 mesh (600 microns) or 50 mesh (300 microns) tends to provide effective dust control. The most preferred size distribution is -16 mesh (1,180 microns) or -8 mesh (2360 microns) to +30 mesh (600 microns) or +50 mesh (300 microns). To avoid sewer damage, smectite-free clays are advantageously used.

Ex. 1008, 17:15-25.

Additionally, Pattengill discloses disparate experiments, from which no meaningful conclusions can be drawn about particle sizes of preferred compositions, but a POSIA would make the following observations:

a) *With non-swelling clay, smaller particles should be used.* (The Example 2/Table 4 and Example 3/Table 5 results, using Samples Nos. 1-21, which were "non-clumping commercial products" (3:20-21), generally show better clumping with .6-1.18mm particles than with .6-3.35mm particles.)

b) *Non-swelling clay and 3% Plantago, as well as non-swelling/swelling clay with 3% Plantago, provides "commercially acceptable" clumping results (12:53-54), without regard to particle size.* (The Example 7/Tables 8-9 results, per Mixture Nos. 1-6, which use various particle sizes.)

c) *29% NaB, without regard to its particle size, produces an acceptable clumping animal litter (13:25-26).* (Example 8/Table

10; in Mixture Nos. 7-9, non-swelling clay particle size ranges shown; swelling clay particle size ranges not shown.)

d) *20% NaB and zeolite clumps as well 30%NaB and CaB (both with about 1% Plantago)* (Example 9/Table 11, comparing Mixture Nos. 11 and 15.)

e) *Use of 20-45% NaB with zeolite in 14 different compositions produces acceptable clumping (16:14-15), without regard to the varying particle size of the clay.* (Example 10/Table 14: .6-1.4mm, 1.4-2.35mm and 50/50 blends with these particle size ranges, were used.)

(Ex. 2013, ¶9). To summarize, a POSIA would conclude from Pattengill that: (1) relative particle size control is not important (Ex. 1008, 17:15-25 and Observations b-c above); (2) smaller CaB particle sizes may work better (Observation a); and (3) as a non-swelling material, zeolite works better or more consistently well than CaB (observations d-e). Ex. 2013, ¶9. Zeolite even allowed a 10% reduction in NaB (Observation d), and it is not a "clay material" (Ex. 2013, ¶9).

Given these conclusions, there is no reason why a POSIA would consider Table 11, let alone Mixture 11 of Pattengill. Instead, a POSIA would focus on Table 14, using zeolite, which would be of particular relevance, since this is the only Table in which every result yielded acceptable clumping (Ex. 1008, 16:15-16: "All the samples of Table 14 produced clumps that could be removed one minute after formation."). This is particularly true given that a POSIA would not know

the actual ingredients of each of the litters used in Mixture 11 (Ex. 2013, Dec., ¶10).

Moreover, the test of obviousness is "whether the teachings of the prior art, taken as a whole, would have made obvious the claimed invention." *In re Gorman,* 933 F.2d 982, 986 (Fed. Cir. 1991). Thus, "[i]t is impermissible within the framework of section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art." *In re Hedges,* 783 F.2d 1038, 1041 (Fed. Cir. 1986), quoting *In re Wesslau,* 353 F.2d 238, 241 (CCPA 1965).

H. The Dependent Challenged Claims Are Separately Patentable

Certain dependent challenged claims should be found patentable for additional reasons. Preliminarily, Petitioner and Mr. Hughes merely state that certain limitations in the dependent claims may be found somewhere in Hughes '803 or Pattengill, without viewing those patents as a whole, as required. *Litton Indus. Products, Inc.,* 755 F.2d at 164 ("It is elementary that the claimed invention must be considered as a *whole* in deciding the question of obviousness."); *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537 (Fed. Cir. 1983) ("the question under 35 U.S.C. §103 is not whether the differences *themselves* would have been obvious. Consideration of differences … is but an aid in reaching the

ultimate determination of whether the claimed invention *as a whole* would have been obvious.”).

In arguing that claim limitations would have been obvious by asserting that various disparate disclosures in the Cited Prior Patents should be combined, without explaining why a POSIA would have been motivated to make the claimed combinations, Petitioner engages in impermissible hindsight analysis:

> [A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art…. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known.

KSR Int’l, 550 U.S. at 418-419.

1. Claims 7 And Claim 10 Are Separately Patentable

Claim 7 recites that “the non-swelling clay material is preferably about 60 percent by weight of the animal litter.” Claim 10 recites that “the swelling clay is preferably about 40 percent by weight of the animal litter.”

With respect to Claim 7, Petitioner argues without any evidentiary support that 69.2% CaB is “about” 60% CaB (Pet., p.46; Ex. 1005, ¶124). Such an argument is insufficient. *KSR Int’l Co.*, 550 U.S. at 418. 69.2% does not render obvious about 60% CaB. *In re Patel*, 566 Fed. Appx. 1005, 1010 (Fed. Cir. 2014) (where differences exist between the range limitations of the claim and the prior

art, proximity alone is not sufficient to establish a *prima facie* case of obviousness). Petitioner also relies upon the disclosure in Hughes' Claims 13, 14 and 26 (Pet., p. 26; Ex. 1005, ¶79) but, as discussed above, each of these claims teaches away from the challenged claims by requiring the *same* particle size ranges for NaB and CaB.

Regarding Claim 10, without explanation, Petitioner and Mr. Hughes argue that Pattengill's Mixture 11 discloses 29.6% NaB, and thus renders obvious the 40% NaB recited in Claim 10. (Pet., p. 58, penultamite line; Ex. 1005, ¶¶125-126). Such lack of reasoning, devoid of "rational underpinnings," is legally insufficient to support a conclusion of obviousness. *KSR Intern. Co. v. Teleflex Inc.*, 550 U.S. 398 at 418. 29.6% does not render obvious 40%. *In re Patel,* 566 Fed.Appx. at 1010.

Petitioner points to Hughes '803 claims 13 and 26 as allegedly disclosing ranges encompassing 40% NaB (Pet., p.27; Ex. 1005, ¶82)[5]; however, each of

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[5] Petitioner also, in passing, references Hughes '803 Claims 1-2, 12 and 14 as allegedly disclosing ranges covering 40% NaB (Pet., pp.26-27; Ex. 1005, ¶80), but these claims also recite the *same* particle size ranges for NaB and CaB, and therefore do not render the challenged claims unpatentable, which recite that the

these claims teaches *away* from challenged claim 1, from which claim 10 depends, because each claim requires the *same* particle size ranges for NaB and CaB. Petitioner and Mr. Hughes also disingenuously argue, without support or rational underpinning, that the "25%" recited in claims 11 and 23 of Hughes '803 is "about" 40% NaB (Pet., p. 26; Ex. 1005, ¶80). 25% does not render obvious 40%. *In re Patel*, 566 Fed. Appx. at 1010, *supra*.

Claims 7 and 10 would not have been obvious in light of the Cited Prior Patents, when properly viewed as a whole. Claims 7 and 10 recite specific clay-based litter compositions. Hughes '803 discloses and claims broad ranges for NaB (10-50%) and CaB (50-90%). Pattengill, too, gives little guidance as to the desirable amount of swelling clay to use, saying only that Plantago with "at least about" 15% or 5-50% or 10-45% "bentonite" should be used (Ex. 1008, 17:32-42).[6] Nothing in the Cited Prior Patents suggests that using about 40% of a

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MPS of the non-swelling clay particles (e.g., CaB) be "*greater*" than the MPS of the swelling clay particles (e.g., NaB).

[6] It is not clear what Pattengill means by "bentonite" since it never uses the terms "sodium bentonite" or "calcium bentonite," and since its Table 8 references to "bentonite" appear inconsistent. *Compare* Sample No. 33, which Mr. Hughes says is 100% NaB (Ex. 1005, ¶99), with Sample No. 35, described in the identical

swelling clay (Ex. 1001, Claim 7), or about 60% of a non-swelling clay (Ex. 1001, Claim 10), would work well.

Claims 7 and 10 should not be found unpatentable for obviousness. *See Atofina v. Great Lakes Chem. Corp.*, 441 F.3d 991, 993 (Fed. Cir. 2006) (finding it "well established" that disclosure of a genus is not necessarily a disclosure of every species that is a member of that genus; holding that 330°-450°C was not anticipated in view of a prior disclosure of 100°-500°C); *In re Jones*, 958 F.2d 347, 350 (Fed. Cir. 1992) (rejecting Patent Office argument that "regardless how broad, a disclosure of a chemical genus renders obvious any species that happens to fall within it.").

2. Claim 5 Is Separately Patentable

Claim 5, which recites a MPS ratio of non-swelling clay to swelling clay within the range of about 2:1-3:1, is separately patentable. Mr. Hughes tacitly admits that Claim 5 is not disclosed by Hughes '803, first finding the MPS_{CaB}/MPS_{NaB} ratio disclosed by Hughes to be 1.16 (Ex. 1005, ¶68), and then vaguely saying only that the MPS_{NaB} is "smaller" than the MPS_{CaB} (Ex. 1005, ¶72);

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manner as Sample No. 33 in Table 8, *i.e.*, "Clumping Litter (Bentonite)," but which *did not clump* (per Table 12, Mixture No. 17). A litter consisting of 100% NaB would clump.

this latter statement, however, is based on an erroneous interpretation of the "bridges" statement in Hughes '803 (Ex. 1006, 7:24-26), as Mr. Herpfer explains (Ex. 2013, ¶8). Figure 1 of the '019 Patent shows that litters with 50/50 NaB/CaB blends (Ex.1001, 2:58-62) and MPS ratios of about 2-3 (Ex.1001, Fig. 1, x-axis) clumped very well (receiving between a "1" and a "2" on a scale of 1-5, Fig. 1, y-axis) following a 1-foot drop test (Ex. 1001, 6:6-6:8), showing the criticality of the Claim 5 MPS ratio, whereas Hughes '803 discloses nothing about such a ratio.

Similarly Mr. Hughes, relying solely on Pattengill Mixture 11, asserts that Pattengill discloses an MPS_{CaB}/MPS_{NaB} ratio of 1.7 (Ex. 1005, ¶¶120-122), which is outside of the 2:1-3:1 range recited in Claim 5. As discussed above, there is no reason to focus on Table 11 of Pattengill, let alone Mixture 11. Further, and again revealing his clear bias, Mr. Hughes argues, instead, that if the smaller non-swelling particles were simply eliminated from Mixture 11 (he gives no reason why this should be done), then the ratio would be closer to 2 than 1.7 (Ex. 1005, ¶122). However, there is no reason or teaching in either of the Cited Prior Patents as to why a POSIA would eliminate the smaller, non-swelling particles from Mixture 11, and Hughes gives none.

Claim 5 should be found patentable. *See In re Patel*, 566 Fed. Appx. at 1010 (distinguishing *ClearValue* and *Santarus* cited by Petitioner (Pet., pp. 29,55), and finding that where differences exist between the range limitations of the claim and

the prior art, and no evidence is admitted to show that the difference is not meaningful or a POSIA would know to disregard the range limitation of the prior art, proximity alone is not sufficient to establish a *prima facie* case of obviousness; holding that a 26-80% weight percentage of monocomponent fibers was not obvious, where prior art disclosed 0.5-25%).

3. Claims 11 And 12 Are Separately Patentable

Claim 11 recites "swelling clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series." (NaB<=60% and 12-325 mesh). Claim 12 recites "the swelling clay has a particle size preferably in the range of about 16 mesh to about 80 mesh, U.S. Sieve Series." (NaB is 16-80 mesh). Claims 11 and 12 are separately patentable.

Mr. Hughes asserts that the disclosure in Hughes '803 Claims 7 and 19 (Pet., pp. 28-29; Ex. 1005, ¶¶89-90) renders claim 11 and 12 obvious. But Hughes '803 Claims 7 and 19 fail to disclose the full range of mesh particle sizes recited in challenged claims 11 and 12. Further, Hughes '803 claims 7 and 19 both teach *away* from the MPS Limitations recited in Claim 1 of the '019 Patent, as each requires that the NaB and CaB have the *same* range of particle sizes. Mr. Hughes does not even acknowledge this shortcoming in his Declaration. *See DePuy Spine, Inc.,supra,* 567 F.3d at 1327 (references teach away where they discourage investigation into the invention claimed).

As to Pattengill, Petitioner relies upon Mixture 11's disclosure of 16-30 mesh (Pet., pp. 48-49; Ex. 1005, ¶131), but this is only within a small part of the claimed ranges (Claim 11: 12-325 mesh; Claim 12: 16-80 mesh). *See Atofina, supra*, 441 F.3d at 993 (disclosure of genus not a disclosure of species); *In re Baird*, 16 F.3d 380, 382 (Fed. Cir. 1994) (same). Additionally, Mixture 11 includes the use of NaB particles which are *the same size range* as CaB particles (8-16 mesh for items 29 and 33), also teaching away from the MPS Limitations. *See DePuy Spine, supra.*

4. Claim 13 Is Separately Patentable

Claim 13 recites the "animal litter of claim 1 and further comprising an organic clumping agent." Mr. Hughes did not consider Claim 13 (Ex. 1005, ¶20, explaining that he has considered Claims 1-12 and 32), so Petitioner has provided no POSIA-based evidence on this claim, and Petitioner cannot make a *prima facie* case of obviousness as to it, as attorney argument is not evidence. *Meitzner v. Mindick,* 549 F.2d 775, 782 (CCPA 1977) (argument of counsel cannot take the place of evidence lacking in the record); *see also In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006). Petitioner's attorneys say that Hughes '803 discloses "cellulose based materials" (Pet., p.31, citing Ex. 1006, 7:38-41), but these are only referred to as "litter box absorbents" (Ex. 1006, 7:39-40) and there is no indication that they

can be used as separate clumping agents or binders. Accordingly, Hughes '803 does not expressly disclose an animal litter with an organic clumping agent.

Petitioner also says that cat urine is an "organic clumping agent," but this argument (Pet., p. 31) must fail, as the "organic clumping agent" recited in claim 13 is a component of the "clumping animal litter", while cat urine clearly is not ('019 Patent, Ex. 1001, *e.g.*, 1:28-31; 3:14-24).

I. Petitioner's Incorrect Statements

Petitioner makes various incorrect statements in its Petition concerning the term "agglomerate." It is noted that the term "agglomerate" is not recited in the challenged claims, however, Patent Owner does not agree with Petitioner's statements, and further notes that the challenged claims are not limited to "discrete and separate" particulate dry blends, for example, as the '019 Patent claims do not recite such limitations.

Petitioner also suggests that certain Table II data in the '019 Patent is "unreliable"; this is incorrect (Ex. 2013, Herpfer Dec., ¶12).

Additionally, Petitioner says that Patent Owner mischaracterized the Hughes '111 Patent as using at least 65% "water-swellable bentonite clay" (Pet., pp.35-37). Hughes '111 always discloses using greater than 65% "bentonite" clays in its compositions, but it does disclose using less of the swelling clay portion than this (e.g., Ex. 1009, '111 Patent, 11:27-28).

Finally, Mr. Hughes states that the water used for testing purposes in the '019 Patent is an "inadequate" substitute for using urine for clump-testing (Ex. 1005, ¶19); however, this conclusion is undermined by the fact that various clumping animal litter patents, including Pattengill and various patents and applications of Petitioner and American Colloid, use water and saline instead of urine for clump and absorbency testing. (Ex. 2013, Herpfer Dec., ¶13).

VI. CONCLUSION

For the foregoing reasons, Patent Owner respectfully requests that the Board confirm the patentability of claims 1-13, 30 and 32 of the '019 Patent over the Cited Prior Patents.

Dated: September 28, 2015

Respectfully submitted by:

/Michael P. Mazza/

Michael P. Mazza
Registration No. 34,092
Michael P. Mazza, LLC
686 Crescent Blvd.
Glen Ellyn, IL 60137-4281
Email: mazza@mazzallc.com

Arnold Turk
Registration No. 33,094
Greenblum & Bernstein, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
Email: aturk@gbpatent.com

Attorneys for Patent Owner,
Oil-Dri Corporation of America

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true copy of the foregoing:

**PATENT OWNER'S RESPONSE TO
THE PETITION INSTITUTED ON JULY 9, 2015**

was served upon the following parties by electronic mail on this 28th day of September, 2015, including Lead Counsel for Petitioner, as follows:

David Roodman, Esq. (daroodman@bryancave.com)
Robert G. Lancaster, Esq. (rglancaster@bryancave.com)
Emma Harty, Esq. (emma.harty@bryancave.com)
Nick Williamson, Esq. (nick.williamson@bryancave.com)

/Arnold Turk/
Arnold Turk
Registration No. 33,094

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NESTLÉ PURINA PETCARE COMPANY,

Petitioner

v.

OIL-DRI CORPORATION OF AMERICA,

Patent Owner

Case IPR2015-00737
U.S. Patent No. 5,975,019
Title: Clumping Animal Litter

Mail Stop *Patent Board*
Patent Trial and Appeal Board
U.S.P.T.O.
P.O. Box 1450
Alexandria, VA 22313-1450

PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE

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Cases

Statutes

Exhibit List

Exhibit	Description
1001	U.S. Patent No. 5,975,019, filed Aug. 19, 1997, issued Nov. 2, 1999
1002	January 29, 1999 Rejection of U.S. Patent Application No. 08/914,406
1003	April 29, 1999 Terminal Disclaimer for U.S. Patent Application No. 08/914,406
1004	Notice of Allowability for U.S. Patent Application No. 08/914,406
1005	Declaration of John Hughes
1006	Hughes U.S. Patent No. 5,386,803, filed Oct. 18, 1989, issued Feb. 7, 1995
1007	U.S. Sieve Series Chart
1008	Pattengill U.S. Patent No. 5,458,091, filed Oct. 14, 1994, issued Oct. 17, 1995
1009	Hughes U.S. Patent No. 5,503,111, filed Feb. 4, 1994, issued Apr. 2, 1996
1010	Proof of Service
1011	Hughes U.S. Patent No. 5,129,365, filed July 16, 1990, issued July 14, 1992
1012	1997 Merriam Webster definition of "Particulate"
1013	1997 Merriam Webster definition of "Arithmetic Mean"
1014	Stedman's Medical Dictionary definition of "Plantago"

1015	Food Polysaccharides and Their Applications, edited by Alistair M. Stephen, excerpts from Ch. 2 Starch: Structure, Analysis and Application, Henry F. Zobel and Alistair M. Stephen
1016	Declaration of Phillip Greene

The Board correctly concluded that Petitioner has demonstrated a reasonable likelihood that "Challenged Claims 1-13, 30 & 32 would have been obvious under 35 U.S.C. § 103(a) over the combination of Hughes and Pattengill." (Paper 12, p. 14). Patent Owner's ("Oil-Dri's") Response attempts to overcome the plain invalidity of the Challenged Claims, and the Board's well-founded conclusions, by, *inter alia*: (i) mischaracterizing plainly invalidating prior art; (ii) miscasting a special significance on a synonym of the word "average"– "*mean*"; (iii) disregarding how POSIA (including its own experts) calculate mean clay particle sizes; (iv) asserting that alternative embodiments disclosed in prior art references require ignoring invalidating disclosures; (v) misapplying outdated law; and (vi) ridiculously - and hypocritically - asserting that a prior art inventor cannot provide opinions regarding what was obvious to a POSIA. Tellingly, as explained in detail below, Oil-Dri's arguments and biased declarations do not withstand scrutiny and, indeed, establish (albeit, inadvertently) that the Challenged Claims are invalid.

The facts overwhelmingly establish that it would have been obvious to a POSIA reviewing Hughes and/or Pattengill that: (1) Hughes expressly teaches using average size smaller swelling clay particles to "bridge" with larger non-swelling particles; (2) both Hughes and Pattengill identify and teach successful free-flowing compositions of swelling and non-swelling clay where the *average* size of swelling clay particles is "smaller" than that of the non-swelling particles;

(3) Pattengill and Hughes each provide exhaustive detail on *groupings* of sizes of the respective particles used; and (4) both references read on all of the limitations of the Challenged Claims. In the end, Oil-Dri is left to argue that it would not be obvious to a POSIA to use a smaller average particle size of swelling clay with a larger average size non-swelling clay. The facts significantly belie the argument.

Oil-Dri's Response, exhibits, and accompanying declarations all fail to overcome the Board's analysis. Indeed, Oil-Dri's arguments actually serve to establish that a POSIA at the time of the alleged invention would understand that the Hughes and Pattengill prior art patents, alone and in combination, teach and render obvious all of the Challenged Claims. The evidence and law establish that Challenged Claims 1-13, 30 & 32 of the '019 Patent are invalid.

I. <u>The Challenged Claims are Obvious and Invalid</u>.

Unable to overcome: (1) the cited invalidating prior art clumping litter ingredients, sizes, and percentages; (2) Hughes' express teaching that smaller swelling particles serve as "bridges" to larger non-swelling clay particles; and (3) the prior art's use of average particulate sizes that read on the Challenged Claims; Oil-Dri resorts to ignoring facts and futilely arguing that the alleged invention was not obvious. Unfortunate for Oil-Dri, its arguments are egregiously flawed.

A. <u>Pattengill & Hughes are Both Directed to Clumping Litter</u>.

In vain, Oil-Dri ineffectively attacks the Board's combination of

Hughes and Pattengill arguing that a POSIA would not recognize their commonality or be motivated to combine them. (Paper 17, pp. 2, 8). Not only does Oil-Dri misapply outdated *pre-KSR* law, its analysis is fatally defective as "both" Hughes and Pattengill are directed to the *exact same thing* - clumping litters comprised of swelling and non-swelling clay:[1/] A POSIA working on clumping litter at the time plainly would have looked to, considered and combined the teachings of Pattengill and Hughes. (Ex. 1016, ¶¶ 32-33, 37-39; *see also Perfect Web Techs., Inc. v. InfoUSA, Inc.*, 587 F.3d 1324, 1329 (Fed. Cir. 2009) (obviousness may include common sense available to a POSIA and does not "require explication in any reference"); *Ball Aerosol & Specialty Container, Inc. v. Ltd. Brands, Inc.*, 555 F.3d 984, 993 (Fed. Cir. 2009) (proper to consider the "inferences and creative steps that a [POSIA] would employ.")[2/]

[1/] The U.S. Patent Office classifies all three patents in the same U.S. Class, 119/173 (Animal Husbandry – Having Clay Component), and Pattengill and the '019 Patent both refer to much of the same prior art. (Ex. 1001, 1:54-58; Ex. 1008, 1:41-43).

[2/] Oil-Dri's attempt to limit Hughes to a "water dispersed" embodiment, and Pattengill to using organic clumping agents, completely misses the mark. Both patents teach "clumping litters" containing the same ingredients as the '019 Patent.

B. Hughes Teaches that Smaller Swelling Particles "Bridge" with Larger Non-Swelling Particles.

Oil-Dri initially tries to escape Hughes' plain teaching that "smaller diameter" swelling particles are desired as they "swell and serve as 'bridges' between larger" non-swelling particles, by arguing that Hughes does not use the word "mean." (Paper 17, p. 2) (Ex. 1006, 7:24-26). Of course, the word "mean" is wholly unnecessary. While Oil-Dri seeks to conjure ambiguity, there is none. As Messrs. Hughes and Greene explain, a POSIA understood that the Hughes patent teaches that smaller "average" size swelling particles are beneficial to "bridge" with larger non-swelling particles. (Ex. 1016, ¶35; Ex. 1005, ¶ 72).

And as fully addressed in the Petition, consistent with the Hughes' disclosure, both Pattengill Mixture 11 and the claims of the Hughes patent describe clumping litters having smaller average particle sizes of swelling clay in detail. Oil-Dri tries to avoid these teachings by first falsely asserting Hughes '803 only teaches "the same range of particle sizes," then retreats to baldly asserting that only Hughes' claims disclose smaller swelling clay (14 & 16) and not the specification (as if that would make a difference), and no one would allegedly understand Pattengill. (Paper 17, pp. 3, 9, 27). But, of course, Hughes' disclosure of the benefit of smaller "bridging" swelling particles directly pairs with the compositions of its Claims 14 & 16. Further, as addressed below, there is no ambiguity in Pattengill's detailed ingredients and disclosure of Mixture 11.

Oil-Dri also tries to alter the Hughes' "bridging" disclosure by arguing that by claiming a range of sizes, the "bridging" disclosure is somehow vitiated – it is not. The disclosure of a range (including by "groupings") of clay particles is not only what the '019 Patent does, it is standard for how people of ordinary skill identify and define "mean/average" clay particle sizes. (Ex. 1016, ¶¶ 6, 13-14). And, Oil-Dri's attempt to tie the "bridging" disclosure to an unrelated passage that sodium bentonite can bond with itself fares no better. (Paper 17, p. 12). The "bridges" teaching, and Claims 4 & 16, are clear and render it obvious to a POSIA that Hughes teaches using smaller average size swelling particles to bridge with larger average non-swelling clay particles. (Ex. 1016, ¶ 33; Ex. 1005, ¶¶ 64, 72).

C. Patent Owner's Misplaced Reliance on "Mean" Particle Size.

The Board construed the term "mean particle size" as "*the average of a representative sample of particle sizes or groupings of particles sizes*." (Paper 12, p. 7). Both Hughes and Pattengill indisputably expressly teach "*groupings*" that are "*representative samples*" of clay particle sizes – what Oil-Dri refers to as "bins" -- from which a POSIA understood average sizes were obvious.

Nevertheless, Oil-Dri puts its head in the litter, arguing that because Hughes and Pattengill do not use the specific word "*mean*," neither reference, alone or in combination, allegedly teach or render it obvious to use smaller "average" particle sizes of swelling clay. (Paper 17, pp. 2-3). In doing so, Oil-Dri tries to dodge the

fact that both prior art references not only fixate on the respective *particle sizes* of swelling and non-swelling clay, and Hughes explains the benefit of "bridging" smaller swelling particles, but also that: (1) Hughes' expressly claims; and (2) Pattengill explicitly defines; clumping mixes having multiple ***groupings*** of swelling and non-swelling clay from which the "average"/"mean" sizes were obvious and calculable to a POSIA (including Oil-Dri's own experts).

1. Patent Owner's Experts Unavoidably Concede that the Prior Art Teaches "*Groupings*" and/or "*Bins*" of Particles.

The Sieve/Mesh nomenclature used by *every* patent here - the subject '019, Hughes and Pattengill patents -- all expressly refer and rely upon measurements of upper and lower *groupings* of particle sizes. Tellingly, Oil-Dri's expert, Herpfer, openly concedes that those skilled in the art measure clay particles using sieves that result in "*groups*" and/or "*bins*" of clay, "e.g., -16, +30 mesh."[3/] (Ex. 2013, p. 6, fn. 3). Oil-Dri's other expert, DeLuca, also admits that the upper and lower particle size ranges used to specify clay materials, employing Mesh sizes, define *groupings* of particles sizes. (Ex. 2015, ¶ 4). There is no legitimate debate – both prior art references disclose "groupings"/"bins" of representative clay particle sizes from which average/mean sizes are obvious and available. (Ex. 1016, ¶ 25).

[3/] Not coincidentally, Mr. Herpfer's example of upper and lower Mesh sizes is *identical* to the groupings disclosed in Pattengill. (Ex. 1008, Table 11).

For example, Pattengill Mixture 11 prominently and indisputably identifies the Mesh sizes used to obtain its *groupings*, respectively, of calcium and sodium bentonite particles in its successful clumping litter composition:[4/]

*–8 + 16 M (–2.36 mm + 1.18 mm)
**–16 + 30 M (–1.18 mm + 0.60 mm)

(Ex. 1008, Table 11). This is *precisely* the measuring system employed in the art – and disclosed in the subject '019 Patent. Indeed, the '019 Patent expressly refers to the same Meshes to determine particle sizes. (Ex. 1001, *e.g.* Claim 8, "particle size in the range of about 6 mesh to about 100 mesh"). The Hughes Patent is no different, specifically identifying Mesh sizes (by micron sizes) defining corresponding *groupings* of particles:

- 600 microns - corresponds to 30 Mesh;
- 3350 microns - corresponds to 6 Mesh; and
- 50 microns - corresponds to 270 Mesh.

(Ex. 1016, ¶ 25). Despite the unquestionable sieve sizing disclosures, Oil-Dri's expert Herpfer speciously contends that neither prior art reference used sieves to determine particle sizes. (Ex. 2013, ¶ 7) ("had any of the disclosed compositions

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[4/] The Mesh sizes identified in Pattengill & Hughes correspond to standard Mesh sizes. (Ex. 1016, ¶ 23). The (-) notation means that groupings of particles "smaller" than the openings will fit through the mesh size, while the (+) notation means that groupings larger than the openings will not pass through. (Ex. 1005, ¶ 106).

undergone sieve analysis"). There is no legitimate dispute, both references teach *groupings* of sizes.

2. It was Well-Known that Groupings of Particle Sizes Correspond to a Bell Curve.

Oil-Dri and its experts assert that it was well known in the art at the time of the '019 Patent that normal distributions of *groupings* of clay particle sizes result in "bell-shaped curves or histograms." (*See* Ex. 2015, ¶ 3, & Ex. 2013, ¶ 4; *word-for-word identical sentences in expert Declarations*) (Paper 17, p. 26). Indeed, Mr. Herpfer illustrates the long well-known, prior art, bell-shaped distribution pattern in Figure 2B of Ex. 2011 ("distribution of particle sizes possessed by mined and processed clays used in animal litter"). (Ex. 2013, ¶ 5); (*see also* Paper 17, p. 26).[5/]

Oil-Dri's Figures 2A & 2B are quite instructive as they concede that "the mean particle size occurs at the highest peak(s) [approximate center] of the curve(s)." (Ex. 2013, ¶ 6):

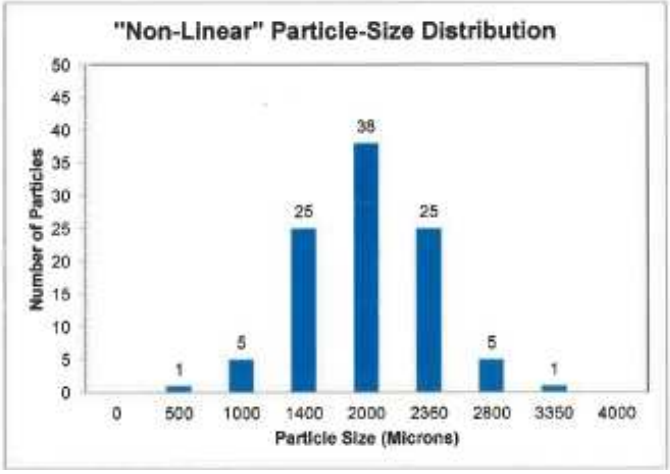
[5/] Oil-Dri wholly mischaracterizes Petitioner as advocating a fictionalized "linear" particle size distribution. Neither Petitioner nor Mr. Hughes' declaration contain any such position. Rather, Petitioner and Mr. Hughes properly explain that a POSIA understood that: (1) upper and lower particle size groupings provide the bounds of a normal distribution of particles; and (2) it was obvious to a POSIA at the time that the "average" of two groupings of sizes yields the "MPS".

Figure 2A

"Non-Linear" Particle-Size Distribution

Particle Size, Microns	Number of Particles
0	
500	1
1000	5
1400	25
2000	38
2360	25
2800	5
3350	1
4000	

Figure 2B



Indeed, Mr. Herpfer's chart demonstrates that a POSIA at the time knew that the MPS is obvious and known from *two* respective normal groupings – just as the *groupings* disclosed in Hughes and Pattengill. Importantly, this is precisely the point made by Petitioner: (1) the prior art Hughes and Pattengill patents disclose multiple *groupings* or *bins* of particle sizes; (2) a POSIA understood the distribution; (3) the mean/average is obvious and calculable; and (4) the prior art teaches and discloses the claimed "mean" particles sizes.

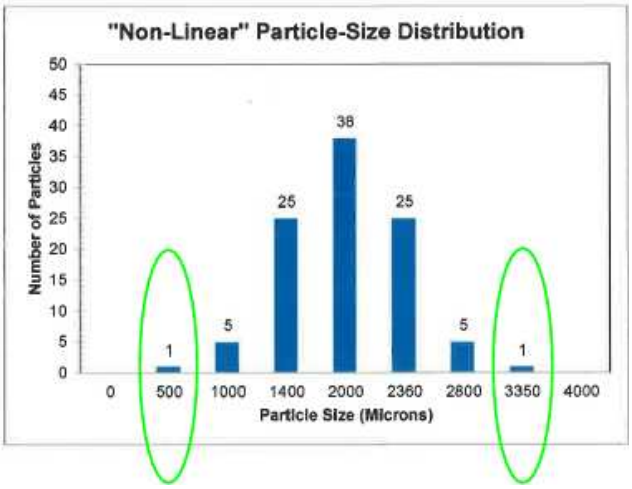
3. <u>Oil-Dri *Admits* Averaging Bins Yields MPS</u>.

Just as the *groupings* of clay particles disclosed in Hughes and Pattengill, Oil-Dri and its expert, Herpfer, admit that "the average of a *representative* number of bins" satisfies the definition of "MPS." (Ex. 2013, p. 6, fn. 3). Two bins are plainly representative. Facing this fact, Oil-Dri resorts to erroneously attacking Petitioner's proper calculation of the average particle sizes disclosed in Hughes and Pattengill as purportedly being based upon a "single bin" (single Sieve size).

(*See*, *e.g.*, Ex. 2013, fn. 3, "Petitioner's MPS method also fails because it uses the average of a single bin . . ."). This is simply false.

As explained in both the Petition and Mr. Hughes' Declaration, the Hughes and Pattengill references each disclose multiple *groupings* or *bins* having upper and lower Mesh sizes. (Paper 1, pp. 15-18, 21-22, 24-25, 28-31, 39-42; 45-49, 55-60; Ex. 1005, ¶¶ 48-51, 68, 85, 89, 103, 106-8, 110, 121, 129-131). For example, Hughes Claim 4 discloses sodium bentonite having "two *groupings*" -- 3350µ and 50µ (Mesh 6 and 270), and calcium bentonite having "two groupings" -- 3350µ and 600µ (Mesh 6 and 30). (Ex. 1006, 8:59-61). Similarly, Pattengill Mixture 11 discloses multiple *groupings* of particle sizes. (Ex. 1008, Table 11; 49.4% -8 + 16 M; 19.8% -16 + 30 M; 29.6% -16 +30 M). Plainly, as Oil-Dri's expert unintentionally concedes, the "MPS" is obvious and directly calculable from Hughes' and Pattengill's "*representative* number of bins." (Ex. 2013, fn. 3).

Oil-Dri itself establishes that Hughes and Pattengill, alone and in combination, disclose average particle sizes used. (Ex. 1016, ¶¶ 10, 25). As Oil-Dri explains with Fig. 2B of Ex. 2011, two *groupings* of Mesh Sizes 6 (3350µ) and 35 (500µ) yield the bell-shaped particle size curve shown. The resulting average particle size is: 3350µ + 500µ = 3,850 ÷ 2 = 1,975µ. Of



course, this is technically and statistically indistinguishable from Expert Herpfer's recognition that the MPS is at the "highest peak" of the curve - 2,000µ estimation. (Ex. 2013, ¶ 6).

Importantly, Oil-Dri's experts make clear that a POSIA understood not only the bell-shaped distribution of clay particle sizes, but also that the "average" particle size is not subject to precise tolerances. (*See, e.g.*, Ex. 2013, ¶ 6; Ex. 2015, ¶ 5) (sizing results in "representative distributions of particle sizes"). This is because clay mining doesn't generate uniform particle sizes, and sizes evolve during mining, transit, loading/unloading, packaging and storage. (Ex. 1016, ¶ 8). And, it is impossible to measure the individual sizes of billions of clay particles. Instead, *bins* of sizes are obtained using Sieves, just as taught in Pattengill and Hughes. As Dr. DeLuca states, "in sieve analyses, it is impossible to precisely know the smallest and largest particle sizes" (Ex. 2015 ¶ 4), and Herpfer explains, "a histogram does not actually capture all the exact particle sizes," rather only "groups of sizes (sometimes called 'bins'), e.g. -16, +30 mesh." (Ex. 2013, fn. 3).

4. The '019 Patent Itself Confirms MPS is <u>Obvious & Available by Averaging Upper & Lower Bins</u>.

As Mr. Greene explains, the '019 Patent fails to provide complete data for normal distributions of clay particles to fully produce the admitted bell-shaped curves. (Ex. 1016, ¶¶ 18-21). Nevertheless, and contrary to Oil-Dri's arguments in its Response, averaging the most-applicable upper and lower *bins* of particles for

the samples in Tables I & II result in MPS that are extremely close and technically indistinguishable from the graph estimation method:[6/]

'019 Patent Clay Samples	Upper & Lower Bins Used for Calculations	MPS (Ave. of Two Bins)	MPS as in '019 Patent
Table I			
Blue Mtn. (1)	30 & 50 Mesh (76.1% / 22.5%)	450	440
Georgia	18 & 60 Mesh (.4% / 99.1%)	625	580
Blue Mtn. (2)	16 & 40 Mesh (1.3% / 99.9%)	802	850
Blue Mtn. 16/30	18 & 30 Mesh (9.7% / 97.4%)	800	850
Table II			
ACC	16 & 30 Mesh (11% / 88.6%)	890	900
FS-30	16 & 30 Mesh (8.2% / 86.5%)	890	920
FS-40	40 & 60 Mesh (25.8% / 80.4%)	337	300
20/40	18 & 30 Mesh (13.1% / 99.8 %)	800	800
20/60 (1)	20 & 50 Mesh (6.9% / 99.5%)	575	520
20/60 (2)	30 & 40 Mesh (34.6% / 66.8%)	513	480
30/60 w/fines	20 & 325 Mesh (5.2% and 99.9%)	448	480

[6/] A POSIA understood that a normal particulate distribution has a similar percentage of clay retained on the largest, and passing through the smallest, mesh, which results in a particulate bell-curve. The MPS is obvious and calculated based upon the bins most closely reflecting a normal distribution. (Ex. 1016, ¶¶ 13-14).

30/60 w/o	20 & 50 Mesh (7.4% and 99.9%)	575	510
40/80	Mesh 30 & 80 7.3% and 99.9 %	390	370

Further, as Oil-Dri's expert demonstrates by his own errors, the plotting method is imprecise, at best.[7/ 8/]

D. <u>The Challenged Claims are Obvious in View of Pattengill</u>.

Pattengill <u>Mixture 11</u> expressly discloses a *successful* clumping blend of swelling (Scoop Fresh®) and non-swelling (Tidy Cat with Baking Soda®) clays – and provides exhaustive detail of: (1) the specific clays; (2) the specific "brands"; (3) Sieve/Mesh analysis of bins of particle sizes; and (4) the precise percentages of

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[7/] The optional graph method described in the '019 Patent, and demonstrated by Mr. Herpfer, is nothing more than an estimate and wrought with potential errors – as Mr. Herpfer himself erred on two of the three clays he plotted. (Ex. 1016, ¶¶ 23-24). Oil-Dri's own Exhibit confirms sieves result in estimates. (Ex. 2002, p. 21).

[8/] Petitioner omits Blue Mtn. 8/16 (Table I) as: (i) it provides insufficient data as it fails to employ an 8 mesh (if such data were present, it would yield consistent results); and (ii) the Promesh paper Oil-Dri relies upon cannot plot data for size 10 Mesh or larger – including the 6 Mesh cited (*see, e.g.*, Ex. 2001, 2014, 1016, ¶ 22). And, we note Blue Mt.(1) data is flawed and unreliable (*e.g. it shows no particles passing through 80 mesh, yet 1.3% passing through 100 mesh).* (Ex. 1016, ¶ 20).

respective sizes; used. A disclosure could not be more detailed:

(a) "49.4%" of Sample 29 (*non-swelling clay* - Tidy Cat with Baking Soda®), with Sieve measurements of bin sizes of -8 +16 M (2.36 mm and 1.18 mm);

(b) "19.8%" of Sample 29 (*non-swelling clay* - Tidy Cat with Baking Soda®), with Sieve measurements of bin sizes -16 + 30 M (1.18 mm to 0.60 mm);

(c) "29.6%" of Sample 33 (*swelling clay* – Scoop Fresh® sodium bentonite), with Sieve measurement of bin sizes -16 + 30 M (1.18 mm to 0.60 mm); and

(d) "1.2%" of Sample 32, stabilizer/Plantago, at a much smaller particle size.

(Ex. 1008, 13:44-62; Ex. 1005, ¶ 107).

Faced with these and other harmful facts, Oil-Dri casts logic to the wind and: (i) ignores that Pattengill easily determined, identified, and distinguished the ingredients of the commercial clay products used; (ii) hypocritically argues that Mr. Hughes knows too much and somehow cannot opine on or as a POSIA; and (iii) conveniently develops amnesia on well-known simple tests to type clays.

1. Pattengill Indisputably Discloses the Ingredients of Mixture 11.

Setting aside Mr. Hughes' valuable testimony, anyone reading Pattengill and Mixture 11 can readily discern its ingredients. Oil-Dri attacks Sample 29 "*Tidy Cat with Baking Soda*" in Table 8 as not identifying that it comprises non-swelling clay. (Paper 17, p. 28). Not true. Table 8 expressly distinguishes between samples of swelling and non-swelling clay by using the terms "Clay" vs. "Clumping Litter" (*See* Sample 29 - "*Clay*"; & Sample 33 - "Scoop Fresh®" ("*Clumping Litter*") (Ex. 1008, 11-12, 59-17). As Mr. Greene confirms, the packaging for "Tidy Cat with

Baking Soda" identified its ingredient as "ground clay" – which a POSIA would have determined to be non-swelling clay. (Ex. 1016, ¶ 30). There is no ambiguity.

(a) Oil-Dri's Ruse Regarding Pattengill Sample 11.

Oblivious to Pattengill's detailed analysis and disclosures, Oil-Dri argues that because Table 1 includes the acronym NA in a "major components" column for already disclosed clays (or other defined ingredients), one must conclude that the inventors blindly used unknown ingredients. (Paper 17, p. 28-29). A casual review of Table 1 reveals that Pattengill discloses the ingredients and only used "NA" when further detail was unnecessary. (Ex. 1016, ¶ 32). And as confirmed in Table 8 (and by Messrs. Greene & Hughes), Sample 29 discloses it is "Clay" (non-swelling clay), not "*Clumping* Litter (Bentonite)." (Ex. 1016, ¶ 29; Ex. 1005, ¶ 99). The ingredients are absolutely evident, unless you wish to ignore the facts.

(b) A POSIA Used Common Tests to Type Clay.

Beyond the fact that Pattengill plainly discloses the specific non-swelling and swelling clays used in Mixture 11, a POSIA at the time regularly used known tests to determine clay types. Had a POSIA, as Oil-Dri contends, disregarded Pattengill's plain language, failed to read the product packaging, and not known the types of clay in Sample 29 (Tidy Cats) or Sample 33 (Scoop Fresh), they still would have readily known how to verify the clay. For example, a POSIA at the time easily identified swelling vs. non-swelling clays: (i) visually; (ii) by using

"free swell tests" (placing water in a graduated cylinder, into which clay is added to assess the amount of expansion over a given period of time); and/or (iii) by simple microscopic analysis. (Ex. 1016, ¶¶ 30, 33). Contrary to Oil-Dri's strained arguments, a POSIA at the time would have known the composition of Mixture 11 and understood that "Tidy Cat with Baking Soda®" comprised non-swelling clay, and "Scoop Fresh®" comprised swelling sodium bentonite. (Ex. 1016, ¶¶ 29-34).

2. No Calculations are Required for a POSIA to Understand the Swelling Clay has a Smaller Average Particle Size.

Pattengill's simple disclosure of the *groupings* of respective particle sizes in Mixture 11 alone teaches that the average particle size of the swelling clay is smaller than that of the non-swelling clay – no complicated calculations are required. A POSIA would have known that Pattengill discloses almost 50% of *Mixture 11* is comprised of larger non-swelling clay particles (1.18 to 2.36 mm), and approximately 30% smaller swelling clay particles (0.060 to less than 1.18 mm). Almost all of the remaining 20% is non-swelling clay having the same average size as the swelling clay. Based upon the known bell-shaped distribution of particle sizes, it is a mathematical certainty that Mixture 11 anticipates Claims 1 & 30 of the '019 Patent, and renders all of the Challenged Claims obvious.

E. Invalidating Disclosures are Not Obviated by Alternative Embodiments.

In desperation, Oil-Dri attempts to obviate the invalidating disclosures of

Pattengill and Hughes '803 by arguing that because the references disclose other allegedly non-invalidating embodiments, the invalidating disclosures must be disregarded. (Paper 17, p. 37). Of course, this is not the law, and a disclosure that renders the alleged invention obvious will render the Challenged Claims invalid.

Overwhelming authority makes it abundantly clear that the mere fact that the Hughes and/or Pattengill prior art provide alternative claims and embodiments does not obviate their teachings and disclosures. *See, e.g., Hewlett-Packard Co. v. Mustek Sys., Inc.*, 340 F.3d 1314, 1324 n. 6 (Fed. Cir. 2003) (the invalidation "analysis asks solely whether the prior art reference discloses and enables the claimed invention, and not how the prior art characterizes that disclosure or whether alternatives are also disclosed"); *Perricone v. Medicis Pharmaceutical, Corp.*, 432 F.3d 1368 (Fed. Cir. 2005) ("Pereira teaches a total of fourteen . . . ingredients. This court rejects the notion that one of these ingredients cannot anticipate because it appears without special emphasis in a longer list.").

Oil-Dri argues that because Pattengill discloses different mixtures, a POSIA would not appreciate that it identifies Mixture 11 as producing "firm clumps" and its specific composition and sizes of sodium and calcium bentonite. (Paper 17, p. 35). Respectfully, Oil-Dri is wearing blinders. Pattengill conspicuously teaches only one successful composition of sodium and calcium bentonite that resulted in "firm clumps" -- *Mixture 11*. Pattengill's only other successful "firm", non-

rubbery, clumping mixtures contains almost 100% sodium bentonite, or a mixture of sodium bentonite with shale and/or zeolite. (Ex. 1008, Tables 9-13). All of the other compositions failed. Plainly, a POSIA trying to solve the litter problem of the '019 Patent would look to and understood Pattengill's successful Mixture 11. There is only one reason Oil-Dri draws "no meaningful conclusions" from Pattengill, because it chooses not to. (Paper 17, p. 35).

F. The Hughes Patent Teaches the Particle Sizes of Swelling and Non-Swelling Clay of the Challenged Claims.

In its quest to overcome Hughes '803, Oil-Dri improperly overlooks the very limitations of the Challenged Claims, as well as the plain teachings of Hughes. First, it argues that one cannot consider alternative embodiments, and misguidedly relies upon the *Litton* case.[9/] It then seeks to dodge: (i) the embodiments of Claims 4 & 16 that require using non-swelling particles having an average larger size (Ex. 1006, 8:59-61, 9:53-55); (ii) Hughes' unambiguous disclosure and recognition that "smaller diameter water–swellable bentonite particles . . . swell and serve as

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[9/] Patent Owner erroneously cites *Litton Indus. Prods., Inc. v. Solid State Systems Corp* for the proposition that a prior art reference must be considered as a whole in deciding questions of obviousness. 755 F.2d 158, 164 (Fed. Cir. 1985). (Paper 17, p. 33, 37). *Litton* actually provides that the claimed invention, not the prior art, must be considered as a whole. *Litton*, 755 F.2d at 164.

'bridges' between larger, wetted bentonite particles" (Ex. 1006, 7:24-26); and (iii) the '019 Patent's requirement of "mean" particle sizes. (Paper 17, p. 34).

Oil-Dri misleadingly asserts that Claims 4 & 16 of Hughes "permit" an allegedly impermissibly "larger" 3350µ sodium bentonite particle (Paper 17, p. 33) – wholly ignoring that the Challenged Claims require only an "*average*" size less than 2mm, which the Hughes' claims satisfy (there is no requirement that the larger bin – one end of the bell-shaped curve -- cannot be greater than 2mm). Claims 4 & 6 undeniably require *swelling* particles between 50µ and 3350µ, resulting in an "*average*" bin size of 1,700µ [(50 + 3350) ÷ 2] – which is squarely less than the 2mm requirement of the Challenged Claims (Ex. 1006, 8:59-61, 9:53-55).[10/] There is no "teaching away" as Oil-Dri advocates. (Ex. 1016, ¶ 36).

G. The Overlapping Particles Sizes Also Establishes Obviousness.

Prima facie obviousness is also established by the fact that the Challenged Claims ranges of particle sizes directly read on and overlap those disclosed in Hughes and Pattengill. (Ex. 1001). It is well settled that in cases involving overlapping ranges, even a slight overlap establishes a *prima facie* case of obviousness. *In re Peterson*, 315 F.3d 1325, 1329 (Fed. Cir. 2003).

[10/] Hughes also requires substantially larger percentages of "sodium bentonite" ("about 1% to about 50%) to "calcium bentonite" ("about 50% to 99%"), further facilitating the Hughes' bridging teaching. (Ex. 1006, 5: 61-65, 6:52-56).

Patents	Sodium Bentonite Particle Size Ranges	Calcium Bentonite Particle Size Ranges
'019 Patent - Claimed	< 2000µ	< 4000µ
Pattengill - Mixture 11 (and 7)	(Mean: 890µ) 600µ to 1180µ	(Mean: 1520µ) 600µ to 2360µ
Hughes '803 Patent - Claims 4 & 16	(Mean: 1700µ) Range: 50µ to 3350µ	(Mean: 1975µ) Range: 600µ to 3350µ

II. Patent Owner Asks the Board to Use an Erroneous Standard to Improperly Exclude Mr. Hughes' Testimony.

Obviously seeking to evade Mr. Hughes' well-founded testimony, Oil-Dri erroneously and *hypocritically* contends that he is someone of "extraordinary" skill and cannot opine as to what was known to a POSIA. (Paper 17, p. 24). Oil-Dri's contention is false, and the law it cites does not support its specious contention.

Most telling is Oil-Dri's own violation of its self-concocted rule. In support of its arguments of what a POSIA would have understood, Oil-Dri tenders the declaration of its VP of R&D, Dr. Herpfer, who professes to be an expert with 23 years of litter experience, is a named inventor on numerous clay patents, and has an advanced education. Yet, remarkably, Oil-Dri has no problem proffering Dr. Herpfer's biased testimony as to what a POSIA would have known, but desperately challenges Mr. Hughes. Oil-Dri's argument is disingenuous and wrong.

There is no dispute that Mr. Hughes has the requisite knowledge and experience in the applicable field.[11/] Further, there is absolutely nothing in the law

[11/] Mr. Hughes plainly meets Patent Owner's definition of a POSIA. (Ex. 2013 ¶ 2).

to preclude Mr. Hughes from opining as to what was understood by a POSIA – *just as Dr. Herpfer* has done – even if one were to conclude that either has a high skill set. *See, e.g., Neutrino Development Corp. v. Sonosite, Inc.*, 410 F.Supp.2d 529, 550 (S.D. Tex. 2006) ("Expert witnesses quite often have *extraordinary* skill in the art and are perfectly capable of evaluation the level of *ordinary* skill and applying that perspective. The witness himself need not be the hypothetical ordinary artisan.); *Farstone Technology, Inc. v. Apple, Inc.*, 2015 WL 857706 (C.D. Cal, 2015). The fact that Petitioner cites the Hughes patent as prior art does not magically disqualify Mr. Hughes from testifying as to what a POSIA at the time understood. Mr. Hughes consistently, just as Dr. Herpfer, provides his opinions as to what a POSIA would have known. (Ex. 1005, *e.g.* ¶¶ 17-18, 24-25, 30, 34, 44, 51, 58, 62, 70-73, 76, 79, 82, 85, 89, 99, 116, 135-136; Ex. 2013, ¶ 3).

Indeed, the Federal Circuit recognizes that "[a]s a general rule, an inventor will be a person of at least ordinary skill in the relevant art, and in many cases the inventor will be one of extraordinary skill in the field of invention." *Byrne v. Wood, Herron & Evans, LLP*, 450 Fed. Appx. 956, 964 (Fed. Cir. 2011) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1313 (Fed. Cir. 2005) (en banc) ("well-settled understanding that inventors are typically persons skilled in the field of the invention"); *see also CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1368

(Fed. Cir. 2002) (inventor is "presumably also an artisan of ordinary skill in the art" for purposes of comparing expert testimony).

Oil-Dri misapplies and misconstrues *Apotex* to argue that Mr. Hughes is somehow not a POSIA. (Paper 17, p. 25, citing *Unigene Labs, Inc. v. Apotex, Inc.*, 655 F.3d 1352, 1363 (Fed. Cir. 2011)). Unlike Mr. Hughes and Dr. Herpfer here, the named inventor of the *asserted* patent in *Apotex* was only found to be unqualified to opine as a POSIA on the obviousness of *his own* invention. *Apotex*, 655 F.3d at 1363. Indeed, the Federal Circuit clearly stated that the inventor's testimony was only improper in that instance *because he was one of the inventors of the challenged patent*: "Dr. Stern would be excluded [as a POSIA] because he was one of the inventors who selected this arguably unobvious 'substitute for BZK'." *Id*. Neither Mr. Hughes nor Dr. Herpfer are named inventors on the '019 Patent and are not precluded from testifying under *Apotex*.

III. Oil-Dri's "Result Effective Variable" Relies on Pre-*KSR* Law.

Oil-Dri incorrectly argues that it is incumbent upon Petitioner to establish that a POSIA would have understood the '019 Patent MPS limitations to have been a "result effective variable," relying on outdated pre-*KSR* case (*e.g. In re Yates*). (Paper 16, p. 16); *Ex Parte Ken Tatebe & Katsuyuki Ooba*, 10/551,279, 2012 WL 253455, at *6 (Jan. 23, 2012) ("[t]he underlying rationale of [*In re Yates* and *In Re Antonie*] was based, at least in part, on the proposition that 'obvious to try' is not a

proper obviousness standard"). Of course, the Supreme Court held in *KSR Int'l Inc. v. Teleflex Inc*. that "obvious to try" is sufficient and, as such, there is no result effective variable requirement. 550 U.S. 380, 421 (2007). Moreover, Hughes '803 explicitly recognizes the benefit of using "smaller" swelling particles, and both Hughes and Pattengill teach using smaller average size swelling particles. And, Oil-Dri's reliance on *In re Patel* ignores that in that case, unlike here, the claimed range fell completely beyond the range of the prior art. *In re Patel*, 566 F. App'x 1005, 1009-10 (Fed. Cir. 2014), *reh'g denied* (Sept. 30, 2014).

IV. <u>Oil-Dri Has Failed to Present any Evidence of Non-Obviousness</u>.

Oil-Dri has wholly failed to present any evidence of non-obviousness. Instead, it relies on its employee's biased and erroneous declaration that at the time of the alleged invention, people desired "heavier" litter. (Paper 17, p. 5, Ex. 2013, ¶ 11).

First, a self-serving, biased, declaration cannot serve as "objective" indicia of non-obviousness. *Belden Inc. v. Berk-Tek LLC*, 2015 WL 6756451, at *5 (Fed. Cir. Nov. 5, 2015). Second, the allegation that heavier litter was desirable in 1997 is simply false. As Mr. Greene attests, litter was not then sold to consumers by the pound and, as early as 1987, a POSIA understood that lighter litter (such as Fresh Step®) had a competitive advantage as it resulted in lower freight costs and was easier for consumers to carry. (Ex. 1016, ¶ 37). Indeed, in 1997, litter manufacturers were interested in reducing the amount of heavier sodium bentonite

as it was almost four times the cost of calcium bentonite. (Ex. 1016, ¶ 38).

V. Oil-Dri Cannot Save the Challenged Dependent Claims.

A. Claims 5, 7 & 10 are Obvious and Invalid.

The Petition lays out specific disclosures of Hughes and Pattengill that fulfill the limitations of Challenged Claims 5, 7 & 10. For example, dependent Claim 7 requires that the non-swelling clay is ***preferably about*** 60 percent and Pattengill *Mixture 11* discloses 69.2% non-swelling clay – which meets this limitation. Ex. 1008, 13:45-62, Ex. 1005, ¶ 124. Oil-Dri's relies upon *In Re Patel* but wholly omits that *In Re Patel* expressly distinguishes between claims that provide an approximate range (as here – "preferably about"), and those requiring specific ranges. 566 F. App'x 1005, 1009-10 (Fed. Cir. 2014) ("a rejection based on ranges approaching each other might well be appropriate where there is a teaching in the prior art that the end points of the prior art range are approximate, or can be flexibly applied"); (Paper 17, p. 38-40, 42). Oil-Dri also disingenuously represents that *In Re Patel* distinguishes *ClearValue* and *Santarus.* (Paper 17, p. 42). In reality, *In Re Patel* does not mention either case.

B. Claims 11 & 12 are Invalid In View of Pattengill & Hughes.

Oil-Dri attempts to avoid the invalidity of Claims 11 & 12 by, again, misleadingly pointing to specific particle sizes disclosed in Pattengill Mixture 11 – not the claimed "average" particle sizes, and ignoring that the Petition and Mr.

Hughes cites to the '803 specification and other claims, not just claims 7 & 19 as it would like the Board to erroneously conclude. (Paper 1, p. 28-31, and Paper 17, pp. 43-44). Moreover, as Oil-Dri concedes and cannot avoid, the Hughes '803 and Pattengill Mixture 11 expressly disclose particle sizes directly within the claimed ranges of Challenged Claims 11 & 12 such that it would have been obvious to a POSIA at the time. (Paper 1, p. 28-31).

C. Pattengill Plainly Discloses the Limitations of Claim 13.

Oil-Dri attempts to save Claim 13 of the '019 Patent by baldly asserting that because Mr. Hughes did not address this claim, there is "no" evidence to support its invalidity. (Paper 17, p. 44). Setting aside Hughes' teachings of cellulose materials: (i) the Petition points out that the '019 Patent itself concedes that organic "clumping agents" were known in the art (Ex. 1001, 1:59-2:12); and (ii) Pattengill (as Oil-Dri admits) expressly teaches using organic clumping agents – including with Mixture 11 (thus anticipating and rendering Claim 13 obvious) (Ex. 1008, 2:67-3:2; 12:8 (Table 8, Sample 32); 13:44-62 (Mixture 11)). Claim 13 is invalid.

Petitioner respectfully submits that the Board should affirm its findings and cancel the Challenged Claims 1-13, 30 and 32 of the '019 Patent.

Respectfully Submitted,

Dated: December 14, 2015

By: /David A. Roodman/

David A. Roodman, Lead Counsel
Robert G. Lancaster, Backup Counsel
Emma C. Harty, Backup Counsel
BRYAN CAVE LLP
One Metropolitan Square
211 N. Broadway, Suite 3600
St. Louis, MO 63102-2750
Counsel for Petitioner
Nestlé Purina Petcare Company

CERTIFICATE OF SERVICE

The undersigned certifies that the foregoing **PETITIONER'S REPLY TO PATENT OWNER'S RESPONSE** was served on **December 14, 2015** to Lead and Back-up Counsel for Oil-Dri Corporation of America at the service e-mail addresses below provided in Oil-Dri Corporation of America's Mandatory Notices. The parties have agreed to electronic service.

Michael P. Mazza
Michael P. Mazza, LLC
686 Crescent Blvd.
Glen Ellyn, IL 60137-4281
P: 630-858-5071
F: 630-282-7123
Email: mazza@mazzallc.com

Arnold Turk
Greenblum & Bernstein, P.L.C.
1950 Roland Clarke Place
Reston, Virginia 20191
P: 703-716-1191
F: 703-716-1180
E-mail: aturk@gbpatent.com

Dated: December 14, 2015

By: /David A. Roodman/
David A. Roodman, Lead Counsel
Robert G. Lancaster, Backup Counsel
Emma Harty, Backup Counsel
BRYAN CAVE LLP
One Metropolitan Square
211 N. Broadway, Suite 3600
St. Louis, MO 63102-2750

Counsel for Petitioner
Nestlé Purina Petcare Company

Filed on behalf of Patent Owner Oil-Dri Corporation of America

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

NESTLÉ PURINA PETCARE COMPANY,
Petitioner,

v.

OIL-DRI CORPORATION OF AMERICA,
Patent Owner.

Case IPR2015-00737
Patent 5,975,019

PATENT OWNER'S SUR-REPLY TO PETITIONER'S REPLY BRIEF

Mail Stop PATENT BOARD, PTAB
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

BACKGROUND

Trial is limited to whether claims 1–13, 30, and 32 are unpatentable under 35 U.S.C. §103(a) as obvious over the combination of Hughes and Pattengill (Paper 12, p.15). Petitioner's Reply introduces new arguments and relies on new evidence as to why a person of ordinary skill in the art ("POSIA") allegedly would have combined Hughes and Pattengill (Reply, pp. 2-3; Ex. 1016, ¶¶39-42, 44). These new arguments, and new evidence (from Petitioner's long-time employee, Mr. Greene), are not contained in the Petition (Petition, pp. 52-60), violate 37 C.F.R. §42.23(b), and are untimely under 37 C.F.R. §42.123. The Petition provides no substantive argument, teaching, suggestion, motivation or rationale for *combining* Hughes and Pattengill to arrive at the claimed subject matter, and is supported solely by a conclusory statement by Mr. Hughes, Petitioner's original declarant (Ex. 1005, ¶136). The new arguments are also incorrect and misleading for, as shown below, *Hughes expressly teaches to avoid using Pattengill-type mixtures.* As authorized by the Board on December 30, 2015, Patent Owner files this 3-page Sur-reply to address these issues.

ARGUMENT -- HUGHES EXPRESSLY TEACHES TO AVOID PATTENGILL-TYPE MIXTURES THAT EMPLOY A SUPPLEMENTARY, NON-CLAY-BASED CLUMPING AGENT

Petitioner newly argues that "A POSIA working on clumping litter at the time plainly would have looked to, considered and combined the teachings of

Pattengill and Hughes." (Reply, p. 3). To the contrary, Hughes explicitly teaches away from using non-clay-based "supplementary" clumping materials (such as polymers and gums): "[T]he combination of bentonite clays of the present invention provide these cost savings and work saving benefits without adding expensive supplementary compounds, such as water-absorbent polymers, that can prohibitively increase the cost of a product competing in a very cost-conscious market." (Ex. 1006, 4:66-5:4); "Before the [] present invention, it was not possible to mechanically remove urine from a litter box utilizing only a clay as the absorbent." (*id.*, 5:39-42); "[T]he water-swellable bentonite clays provide these cost-saving benefits without the addition of expensive polymeric compounds … [which] minimizes the raw material cost of the litter box absorbent composition in a cost competitive market." (*id.*, 6:25-33). Given these clear teachings, a POISA at the time of invention would have understood Hughes to *teach away* from using non-clay-based "supplementary" clumping materials.

In stark contrast to Hughes, Pattengill is directed to the concept of using a supplementary, non-clay-based clumping compound (Plantago) with clay materials to enhance clumping (Ex. 1008). Thus, Hughes and Pattengill teach away from their combination: Hughes directs a POSIA to avoid using non-clay clumping materials such as Plantago, whereas Pattengill, filed years after Hughes, teaches *the exact opposite*.

Also, as acknowledged by the Board, neither Hughes nor Pattengill teaches or discloses using mean particle sizes ("MPS") (Paper 12, pp. 9, 12), and Petitioner did not timely proffer any reason or evidence of how or why the combination of Hughes and Pattengill discloses MPS or the MPS Limitations. *See* Ex. 1005, ¶136; *see also* 37 C.F.R. §42.123. Instead, new evidence by a new declarant is relied upon for the first time in Reply.

Accordingly, Patent Owner requests that the Board find that a POSIA would not have combined Hughes with Pattengill, due to the express teachings in Hughes to avoid Pattengill-type mixtures that employ a supplementary, non-clay-based clumping agent. *See, e.g., DePuy Spine, Inc. v. Medtronic Sofamar Danek, Inc.*, 567 F.3d 1314, 1326 (Fed. Cir. 2009) ("An inference of nonobviousness is especially strong where the prior art's teachings undermine the very reason being proffered as to why a [POSIA] would have combined the known elements.").

Patent Owner also requests that the Board exclude, or give no weight to, the new arguments raised in Reply. Patent Owner has already objected to the new evidence supporting the Reply, and intends to file a motion to exclude.

For the foregoing reasons and those discussed in Patent Owner's Response, Patent Owner respectfully requests that the Board confirm the patentability of claims 1-13, 30 and 32 of the '019 Patent.

Dated: January 6, 2016 Respectfully submitted by:

/Michael P. Mazza/
Michael P. Mazza
Registration No. 34,092
Michael P. Mazza, LLC
686 Crescent Blvd.
Glen Ellyn, IL 60137-4281
Email: mazza@mazzallc.com

Arnold Turk
Registration No. 33,094
Greenblum & Bernstein, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
Email: aturk@gbpatent.com

Attorneys for Patent Owner,
Oil-Dri Corporation of America

CERTIFICATE OF SERVICE

The undersigned hereby certifies that a true copy of the foregoing:

PATENT OWNER'S SUR-REPLY TO PETITIONER'S REPLY BRIEF

was served upon the following parties by electronic mail on this 6th day of January, 2016, including Lead Counsel for Petitioner, as follows:

David Roodman, Esq. (daroodman@bryancave.com)
Robert G. Lancaster, Esq. (rglancaster@bryancave.com)
Emma Harty, Esq. (emma.harty@bryancave.com)
Nick Williamson, Esq. (nick.williamson@bryancave.com)

/ArnoldTurk/

_____

Arnold Turk
Registration No. 33,094

US005975019A

United States Patent [19]

Goss et al.

[11] Patent Number: 5,975,019

[45] Date of Patent: *Nov. 2, 1999

[54] **CLUMPING ANIMAL LITTER**

[75] Inventors: **G. Robert Goss**, Quincy; **D. Cristina Frugoli**, Mundelein, both of Ill.

[73] Assignee: **Oil-Dri Corporation of America**, Chicago, Ill.

[*] Notice: This patent is subject to a terminal disclaimer.

[21] Appl. No.: **08/914,406**

[22] Filed: **Aug. 19, 1997**

[51] **Int. Cl.**[6] **A01K 29/00**

[52] **U.S. Cl.** **119/173**

[58] **Field of Search** 119/171, 172, 119/173

[56] **References Cited**

U.S. PATENT DOCUMENTS

Re. 33,983	7/1992	Hughes	119/173
2,531,427	11/1950	Hauser	220/448
3,586,478	6/1971	Neumann	23/111
3,789,797	2/1974	Brewer	119/1
5,094,189	3/1992	Aylen et al.	119/173
5,129,365	7/1992	Hughes	119/173
5,176,107	1/1993	Buschur et al.	119/173
5,188,064	2/1993	House	119/172
5,317,990	6/1994	Hughes	119/173
5,359,961	11/1994	Goss et al.	119/173
5,386,803	2/1995	Hughes	119/173
5,503,111	4/1996	Hughes	119/173
5,836,236	11/1998	Goss et al.	119/173

FOREIGN PATENT DOCUMENTS

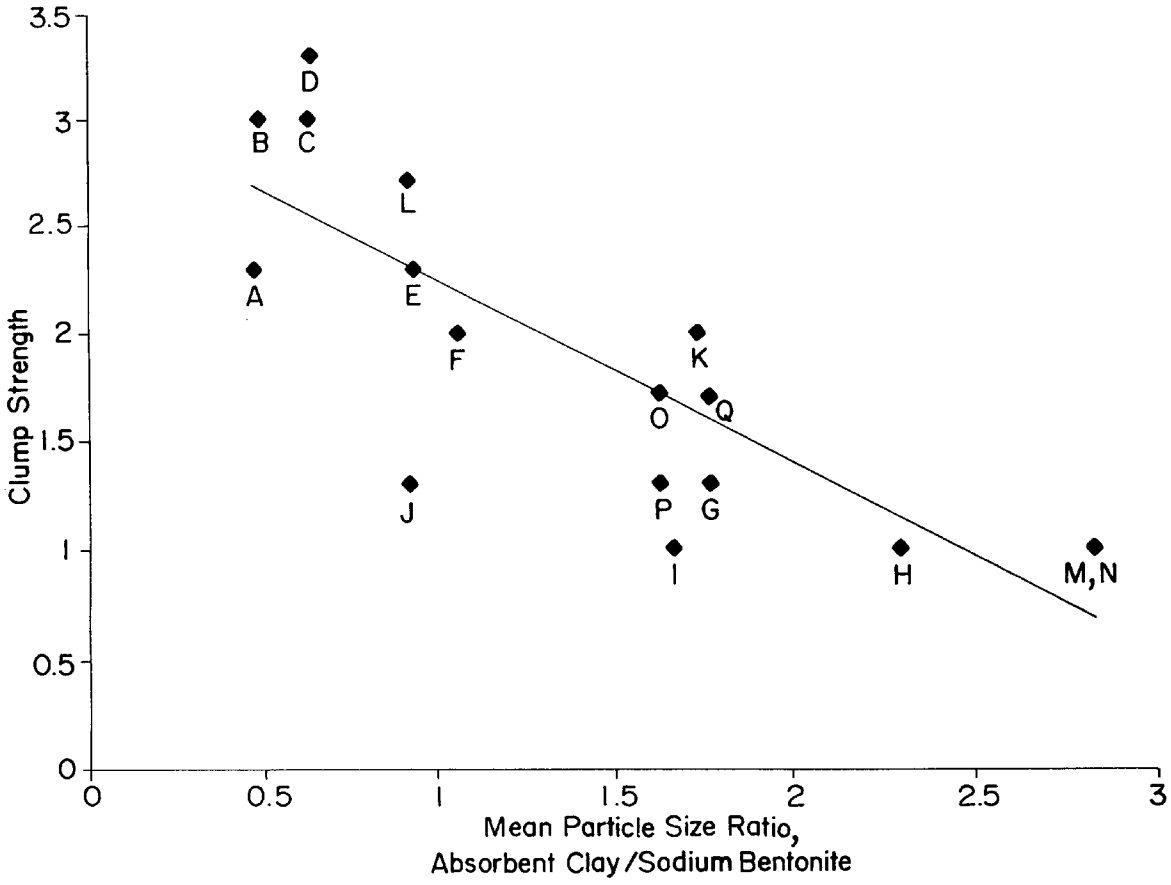
0378421	7/1990	European Pat. Off.	A01K 1/015

Primary Examiner—Thomas Price
Attorney, Agent, or Firm—Olson & Hierl, LTD.

[57] **ABSTRACT**

A clumping animal litter utilizing the interparticle interaction of a swelling clay, such as sodium bentonite, in combination with a non-swelling clay material. Preferably, sixty percent (60%) by weight, or less, composition of sodium bentonite is used after the judicious selection of particle size distribution such that the mean particle size of the non-swelling clay material is greater than the mean particle size of the sodium bentonite. In addition, an organic clumping agent, such as a pregelatinized corn starch can be combined with the sodium bentonite/clay mixture to enhance clumping properties.

35 Claims, 1 Drawing Sheet



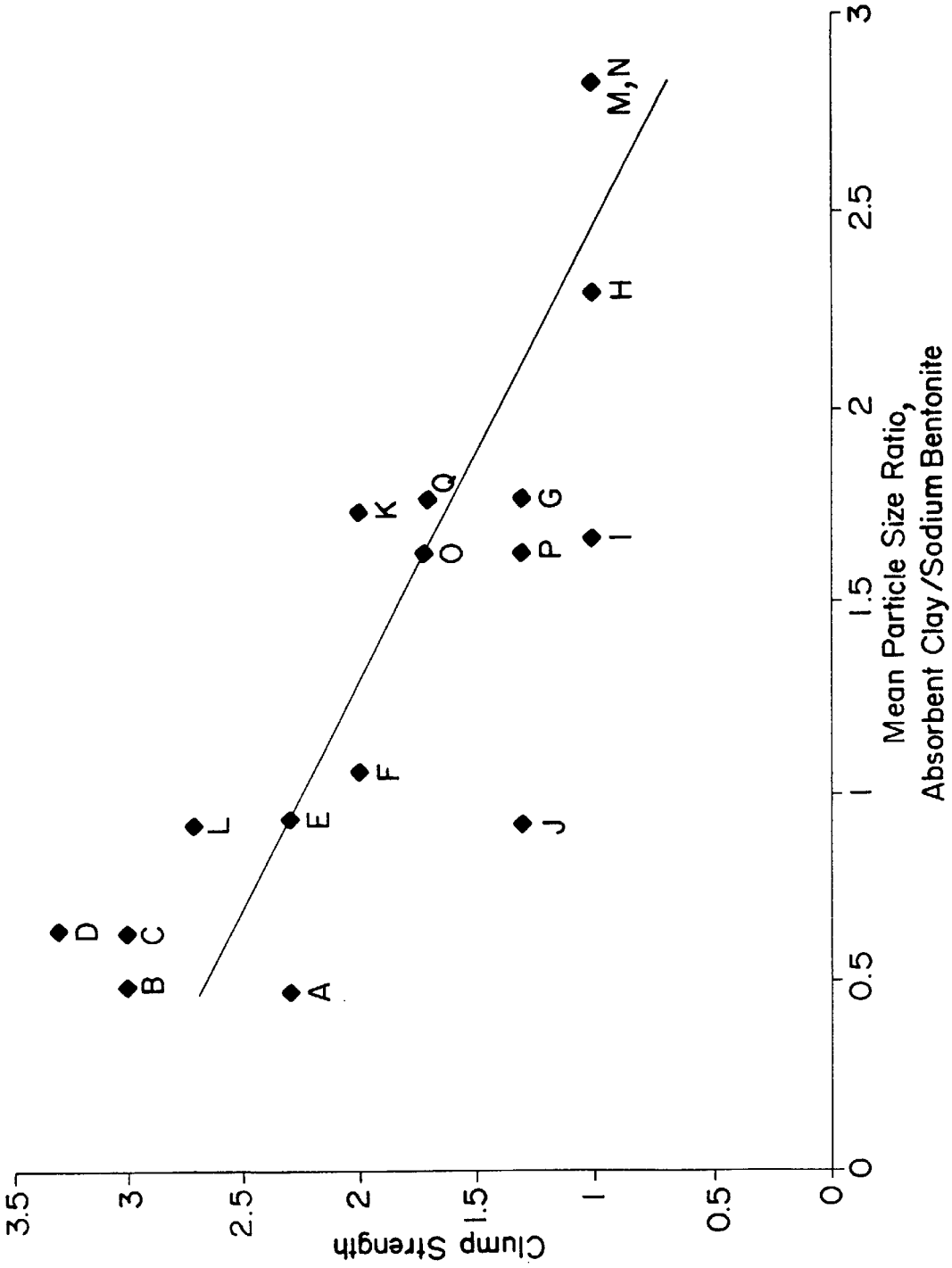

Clump Strength
3.5
3
2.5
2
1.5
1
0.5
0
0
0.5
1
1.5
2
2.5
3
Mean Particle Size Ratio,
Absorbent Clay/Sodium Bentonite
A
B
C
D
E
F
G
H
I
J
K
L
M,N
O
P
Q

FIG. 1

CLUMPING ANIMAL LITTER

TECHNICAL FIELD

This invention relates to clay-based compositions suitable for use as animal litter. In particular, the present invention is directed to a clump-forming, clay-based animal litter.

BACKGROUND OF THE INVENTION

In the past, much time, effort, and other valuable resources, have been expended in the development of animal litter, particularly for household pets, and especially cats. A material most widely utilized in animal litter is generally clay.

Clay particles provide small animals with dry, sanitary, dustless and relatively odorless litter. Clay materials are sorptive minerals characterized by low bulk density and layered lattice crystal structures. These minerals are derived from condensed forms of silicic acid, H_4SiO_4, where each silicon atom is surrounded by four oxygen atoms inducing a tetrahedral structure. Chains or two-dimensional sheets are formed when the tetrahedral structures are linked together by the sharing of common oxygen atoms. Clay materials are composed of such silica tetrahedral sheets with a central alumina octahedral sheet.

Through formational mismatching and distortion between the tetrahedral layers and impurities, diverse morphological and chemical properties are conferred to the clay. The absorption of water is one such phenomenon. Clumps of wetted litter permit easy and selective removal of odor-producing animal wastes for convenient disposal without having to replace the entire litter bed.

The irregular series of layers with corresponding interstitial space comprise pores. It is those spaces and pores which give clay its capacity to absorb and store water.

Another material that has found wide acceptance, particularly in clumping litter, is a swelling clay such as sodium (Na) bentonite. However, until the present invention, important nuances of sodium bentonite were either disregarded, unappreciated, or unforeseen by those skilled in the particular art.

Interparticle interaction enables sodium bentonite to clump. In order to clump properly the particles of sodium bentonite must be allowed to interact with one another. To insure such interaction is capable of taking place those skilled in the art have used weight percentages of sodium bentonite well in excess of 60 percent. This is, in part, because animal litter developers have in the past used blends of sodium bentonite and a non-clumping clay material in weight-to-weight ratios. However, a good clumping performance with a composition containing sixty-percent (60%) by weight or less of sodium bentonite heretofore was not readily attainable.

For example, U.S. Pat. No. Re. 33,983 and U.S. Pat. No. 5,503,111 to Hughes, each describe a method and composition for absorbing animal dross using at least about 65 percent by weight of water-swellable bentonite clay, based on the total amount of litter used.

Other clumping agents used in the prior art include polysaccharides, water-soluble gums, dry particulate cellulosic ethers and water-absorbent polymers. These additives require careful handling during manufacture, multiple processing steps and are costly. Further, in such animal litter, the dry particulate cellulosic ethers or the water-absorbent polymers tend to segregate from the particulate clay during handling and shipping because of differences in specific gravity.

Some prior attempts also have been made to overcome the shortcomings of swelling clays by utilizing non-swelling clay and starch as a binder, but such litters were slow clumping. For example, U.S. Pat. No. 5,094,189 to Aylen et al., describes a sorbent, non-swelling clay mixed with 0.2 to 2 percent pregelatinized, cationic starch binder but adhesion of the wetted agglomerates was fairly light and required a day or so to become fairly firm. Likewise, U.S. Pat. No. 5,176,107 to Buschur describes a sorbent, non-swelling clay litter composition utilizing 8 to 14 percent wheat starch paste as a liquid-activated adhesive binding agent which required several hours for the wetted clumps to harden fully. The inability to rapidly remove wetted clumps of animal waste to reduce or eliminate malodors associated therewith from the litter is undesirable.

The clumping effect of the present invention, as previously stated, is related to the interparticle interaction of the sodium bentonite material, particularly with the introduction of moisture.

Montmorillomite is the principal clay mineral of bentonite rock which originates from volcanic ash. Van Olphen, H., *An Introduction to Clay Colloid Chemistry*, 2nd ed., Wiley-Interscience Publication (1977); p.67. The ion rich composition of the wet material reduces the repulsion forces between the particles allowing the attractive forces—predominantly van der Waals forces, which are not affected by the ion concentration—to dominate. The result is, of course, clumping of the composition with the introduction of water. To increase the clumping effect, it was believed, would necessarily require an increase in the sodium bentonite amount which could interact. It has now been found that that is not necessarily the case.

SUMMARY OF THE INVENTION

Animal litter compositions having an effective clumping performance are constituted by a particulate absorbent non-swelling clay material and a particulate swelling clay such as sodium bentonite, wherein the mean particle size of the non-swelling clay material (no greater than 4 millimeters) is greater than the mean particle size of the swelling clay (no greater than 2 millimeters). A suitable match can be readily made where the combination of the selected materials provides a good clump at a less than sixty weight percent (60 wt-%) of sodium bentonite provided the particle size distribution requirements are satisfied.

The particle size of the two primary materials can be preselected such that the mean particle size ($\bar{u}$) of the clay material is greater than the mean particle size ($\bar{u}$) of the swelling clay. Preferably, the non-swelling clay material has a similar specific gravity to that of the swelling clay.

This judicious selection process provides a composition in which a substantially larger number of swelling clay particles is present while the total amount of swelling clay present in the litter composition is relatively low. The swelling clay particles are therefore able to interact efficiently with adjacent absorbent particles to form clumps when contacted by moisture.

BRIEF DESCRIPTION OF THE DRAWING

FIG. **1** is a line graph, plotting each of the samples of the present invention set out in Table III, which illustrates the relationship between the clump strength at approximately 30 seconds after wetting occurs and the mean particle size ratio in a 50/50 blend of clay and sodium bentonite.

DESCRIPTION OF THE PREFERRED EMBODIMENT

While the present invention is susceptible to embodiments in many different forms, the preferred embodiment of the

invention is described below. It should be understood, however, that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the specific embodiments illustrated.

The compositions of the present invention are designed to create a usable animal litter which has greater clumping strength and permits more scoops per pound of litter.

The animal litter of this invention is in the form of a free-flowing admixture of particulate non-swelling clay material and swelling clay, and can, in an alternate embodiment, contain an organic clumping agent such as gums, e.g., galactomannan gums, or starch, cellulose esters or ethers, and the like. The litter generally forms a clump of durable clump strength substantially immediately, i.e., within about 30 seconds to about one minute, of being wetted with an aqueous liquid, such as water or animal urine. The term "durable clump strength" as used herein means that such a so-formed wetted clump has a firmness of sufficient structural integrity and hardness to withstand mechanical separation from the unwetted litter for disposal substantially immediately, i.e., within about 30 seconds to about one minute of being wetted and retains such firmness for a period of at least 24 hours. Clump strength can be evaluated objectively or subjectively by any number of conventional methods known in the animal litter arts.

Each embodiment discussed is composed of a specific non-swelling clay material and a swelling clay such as sodium bentonite, and can additionally include an organic clumping agent (see Tables IV and V for composition percentages). These elements are discussed individually herein before the several examples illustrating the present invention. Compositions described herein are expressed as "weight percent" (or percent by weight), which unless otherwise noted is calculated based upon the total weight of the animal litter.

With respect to the non-swelling clay material, any of the commonly known clays will suffice. The animal litter composition should comprise at least about 40 percent by weight of the non-swelling clay material.

Non-swelling clay material, at least in part, contains an earthy material composed primarily of hydrous aluminum silicates and is different from the swelling clays that are capable of absorbing several times their weight of an aqueous liquid. Relatively small amounts of non-clay materials can also be present. The non-swelling clay material is usually derived from a naturally occurring raw material, but synthetic non-swelling clay materials are also suitable.

An absorbent clay material which is particularly useful in practicing the present invention is a non-swelling smectite, i.e., a clay composed of units constituted by two silica tetrahedral sheets with a central alumina octahedral sheet. See, for example, Grim, 2nd ed., McGraw-Hill, Inc., New York, N.Y. (1968). pp 77-78. Smectite-attapulgite mixtures can also be used for this purpose.

It is common for individual clay particles to change in volume to some extent when absorbing an aqueous liquid. Typically, the "non-swelling" clays only expand so that a fully hydrated clay particle occupies less than about 150 percent of the volume that the particle occupied in an anhydrous state.

The smectite family of clays includes the various mineral species montmorillonite, nontronite, hectorite and saponite, all of which can be present in the clay mineral in varying amounts. These clays can range in color from a cream or grey off-white to a dark reddish tan color. Such smectites are frequently referred to in the trade under designations as Mississippi Grey, Mississippi Tan, Blue Mountain, and Georgia White. These clays contain calcium and/or magnesium in the form of exchangeable cations.

The clay constituent of the present compositions is in the form of discrete particles. These particles preferably are rounded in shape to facilitate bagging and handling, and have surfaces that are reasonably smooth to the touch so that an animal feels comfortable standing upon them.

The smectite clays used in several embodiments of the present invention include Blue Mountain Clay and Georgia White Clay. The clays were run through a particle sizing table using screen sizes from 6 mesh to 100 mesh, United States Sieve Series. The results are reported in Table I below.

From the particle size analysis the mean particle size ($\bar{u}$) of each clay sample was determined using Promesh graph paper. See, Falivene, P. J. Graph Paper for Sieve Analysis, CHEMICAL ENGINEERING: 87-88 (Feb. 23, 1981). The mean particle size ($\bar{u}$) for the non-swelling clay materials are also reported in Table I below.

TABLE I

Sieve Analysis of Non-Swelling Clay Material[1]

Mesh	Blue Mtn. (1)	Georgia	Blue Mtn. (2)	Blue Mtn. 8/16	Blue Mtn. 16/30
6	—	—	—	99.7	—
12	—	—	—	62.2	—
16	—	—	99.9	6.0	—
18	99.0	99.1	79.4	—	97.4
20	92.4	87.8	45.4	—	44.4
30	76.1	53.0	9.0	—	9.7
40	47.0	18.8	1.3	—	—
50	22.5	2.0	—	—	—
60	5.4	0.4	—	—	—
80	—	—	—	—	—
100	1.3	—	—	—	—
$\bar{u}$	440	580	850	1600	850

[1]Numbers indicate the percentage of material passing through each screen.

In dramatic contrast to the non-swelling clay material, the swelling clays are typically capable of expanding more than 500 percent during hydration. Swelling clays not only expand in volume but they also become tacky when wetted, forming clumps of spent clay. A swelling clay is defined in the literature and in patents, such as in U.S. Pat. No. 3,586,478, as one which gives a Bingham Yield Value of at least 20 dynes/cm^2 as a 2 percent dispersion in water.

An example of a well known swelling clay is sodium bentonite, also called Wyoming bentonite. In a hydrated state, swelling clays often exhibit a tackiness which will cause adjacent particles of the swelling clay to agglomerate.

The tackiness of the swelling clay gives it a "glue-like" function in the clumping process. The cohesiveness of the clump is tied to the particle distribution of swelling clay within the clay blend that forms the clump. Naturally, the more "glue" the stronger the clump, but the present invention has found that a judicious distribution of a smaller amount of "glue" can also be effective. That is, the use of less swelling clay is possible because there is more effective distribution of the particles within the animal litter.

The sodium bentonite material used in the embodiments of the present invention was subjected to particle size analyses. The various samples shown below include WYO-Ben 20/40 ("20/40"), WYO-Ben 20/60 (2 samples: "20/60

(1)" and "20/60 (2)"), WYO-Ben 30/60 with fines ("30/60 w/fines") and without fines ("30/60 w/o"), WYO-Ben 40/80 ("40/80"), WYO-Ben FS-30 ("FS-30"), WYO-Ben FS-40 ("FS-40"), and American Colloid ("ACC"). Each test sample was run through a particle size separation table using 12 mesh to 325 mesh screen (U.S. Sieve Series).

The results of the sieve analysis are listed in Table II below. From the particle size distributions the mean particle size ($\bar{u}$) of each sample was determined using Promesh graph paper. See, Falivene, P. J. Graph Paper for Sieve Analysis, CHEMICAL ENGINEERING: 87-88 (Feb. 23, 1981).

TABLE II

Sieve Analysis of Sodium Bentonite[1]

Mesh	ACC	FS-30	FS-40	20/40	20/60 (1)	20/60 (2)	30/60 w/fines	30/60 w/o	40/80
12	100	100	—	—	—	—	—	—	—
16	88.6	86.5	—	—	—	—	—	—	—
18	68.3	64.3	—	99.8	—	—	—	—	—
20	37.6	34.7	—	57.8	99.5	99.1	99.9	99.9	—
30	11.0	8.2	90.0	13.1	61.2	66.8	67.5	61.8	99.9
40	3.3	1.4	80.4	—	24.8	34.6	36.1	24.9	60.8
50	1.8	—	—	—	6.9	9.0	24.3	7.4	32.7
60	—	—	25.8	—	—	3.2	20.4	—	21.6
80	—	—	—	—	—	—	16.0	—	7.3
100	—	—	—	—	—	—	13.9	—	—
200	—	—	2.9	—	—	—	8.0	—	—
325	—	—	—	—	—	—	5.2	—	—
$\bar{u}$	900	920	300	800	520	480	480	510	370

[1]Numbers reflect percentage of material passing through each screen.

Upon contact with an appropriate amount of an aqueous liquid, the innovative animal litter of this invention autogenously forms a clump of durable clump strength within a matter of seconds. The so-formed clump is sufficiently durable for mechanical separation and removal (e.g., by use of a spoon, scoop, or small hand shovel) from a bed of otherwise substantially dry animal litter. The formed clump also remains substantially intact and durable for at least a 24 hour period. Thus, the animal litter of this invention provides the animal's caretaker with an opportunity to conveniently remove and dispose of the clump either subtantially immediately or at a later time.

PREPARATION OF SAMPLES

Samples were prepared to test clumping strength. The following samples as listed in Table III, below, were prepared as follows:

- desired absorbent clay material based on mean particle size, as shown in Table I, was selected;
- sodium bentonite based on mean particle size, as shown in Table II, was selected;
- the amount of selected absorbent clay material was determined and recorded;
- an amount of sodium bentonite approximately equal to weighed out clay material was combined with the absorbent clay material;
- the ratio of mean particle size of the clay material to the mean particle size of sodium bentonite was calculated;
- the obtained clay/bentonite compositions were spread in a tray to a depth of approximately 3 inches (approx. 7.6 centimeters);
- about 20 ml of water was added to the composition in a small concentrated area to create clump;
- after 30 seconds the clump was removed from the tray; and
- quality of the removed clump was evaluated.

TESTING OF SAMPLES

Each sample was then dropped from a vertical height of one foot (approximately 30.5 cm) onto a substantially solid surface. A number in the range of 1 to 5 was subjectively allocated to each sample based on the observed structural integrity of the clump after dropping (1 being highest, 5 being lowest). The cohesiveness of the clump (e.g., wet, brittle, cracked, etc.) was also noted, where appropriate, when the clump was removed from the remaining unwetted (unclumped) portion of the litter. A clump was given a clump strength rating of 1 when it remained substantially intact on being dropped and given a clump strength rating of 5 when it completely fell apart on being dropped.

The ratio of mean particle size (e.g., the ratio of the mean particle size of clay to the mean particle size of sodium bentonite) and the clump strength of each sample set is recorded in Table III, below.

TABLE III

Mean Particle Size Ratio and Clump Strength

Sample Set	Clay	$\bar{u}$	Na Bentonite	$\bar{u}$	Ratio	Clump Strength[1]
A	BL	440	FS30	920	.48	2.3/1.7
B	BL	440	ACC	900	.49	3/3
C	GA	580	FS30	920	.63	3/3.7
D	GA	580	ACC	900	.64	3.3/2.7
E	BL(2	850	FS30	920	.92	2.3/—
F	BL(2	850	20/40	800	1.06	2/1.3
G	BL(2	850	30/60 w/fines	480	1.77	1.3/1
H	BL(2	850	40/80	370	2.3	1/1
I	BL(2	850	30/60	510	1.67	1/1
J	16/30	850	FS-30	920	.92	1.3/1.7
K	8/16	160	FS-30	920	1.74	2/1.3
L	16/30	850	FS-30	920	.92	2.7/2.7
M	16/30	850	FS-40	300	2.83	1/1
N	BL(2	850	FS-40	300	2.83	1/1
O	BL(2	850	20/60(1)	520	1.63	1.7/1.7
P	16/30	850	20/60(1)	520	1.63	1.3/1
Q	BL(2	850	20/60(2)	480	1.77	1.7/1.7

[1]Clump Strength is reported as an average for three tested clumps at two different times: 30 seconds/24 hours.

Referring now to FIG. **1**, the clump strength (y-axis) can be seen plotted against the mean particle size ratio (x-axis).

The results of the testing clearly show a correlation between the two parameters. Sample sets A, B, C, D, E, F, and L all had mean particle size ratios of less than 1 (except for F which had a mean particle size of 1.06) and appear on FIG. **1** at the high end (at or above 2) on the clump strength axis (indicating a poorer quality clump).

Sample sets G, O, P, and Q all had mean particle size ratios of greater than 1 but less than 2. These sample sets scored much better on the clump strength drop test—each coming in at under 2. Sample set K scored slightly high on the clump strength scale (2) for its relatively moderate particle size ratio of 1.74. Similarly, sample sets I and J scored better than theorized on the clump strength scale (I—1.0; J—1.3) for their particle size ratios of 1.67 and 0.92, respectively.

Finally, sample sets H, M, and N while recording the highest three mean particle size ratios of all tested samples (H—2.3; M and N—2.83), each performed well on the clump strength drop test, achieving average scores of about 1. The range of preferred ratios is about 1.1:1 to about 4:1 (non-swelling clay-to-swelling clay), and most preferably about 2:1 to about 3:1 (non-swelling clay-to-swelling clay).

Although there is some scatter in the accumulated data, as shown in FIG. **1**, the relationship between the mean particle size ratio and clump strength for the above data is linear (as represented by the line: $y=-0.842x+3.0772$) with a 99 percent probability of a correlation.

A third component, which can be included, in varying percentages, in any of the samples of Table III, is an organic clumping agent, such as, but not limited to, a pregelatinized starch. Processed cellulosic adhesives, polyelectrolytes, and cellulosic ethers such as Methocel™ and the like, can also be utilized as suitable clumping agents.

The starch can be obtained from any natural cereal, root or pitch source. Preferably, the starch is pregelatinized corn starch, which does not require the heating and swelling process that must be carried out on raw starches prior to bonding them to the litter material, however, it is not limited thereto. Wheat paste can also be a suitable pregelatinized starch. The starch, if used, can be admixed with the clay constituents of the animal litter as by dry blending to form an intimate, homogeneous free-flowing admixture utilizing conventional dry blender equipment.

Table IV below illustrates the advantages of using a starch, which can be in the range of about 0.25 percent by weight to about 6 percent by weight of the animal litter, with the 50/50 clay/sodium bentonite compositions.

TABLE IV

Effects of Starch on Clump Strength of 50/50 Compositions

50/50 Composition	weight % Starch[1]	Avg. Clump Strength[1]
FS-30/BL	0	2.3/—
	0.5	1.3/1
	0.75	1/1
	1	1/1
	1.25	1/1
FS-30/GA	0	3/3.7
	0.5	1.7/1.7
	0.75	2/1
	1	1.7/1
	1.25	1.3/1
ACC/BL	0	3/3
	0.5	—/—
	0.75	—/—

TABLE IV-continued

Effects of Starch on Clump Strength of 50/50 Compositions

50/50 Composition	weight % Starch[1]	Avg. Clump Strength[1]
	1	1.3/1
	1.25	1.3/1
ACC/GA	0	3.3/2.7
	0.5	1.7/1
	0.75	1.7/1
	1	1.7/1
	1.25	—/—

[1]Pregelatinized corn starch

[2]Average for three clumps using one foot vertical drop test (as described above) at times of 30 seconds/24 hours.

As the results of Table IV clearly indicate, the clump strength of 50/50 compositions is improved with the addition of the pregelatinized corn starch as an organic clumping agent. While the amount of the starch used in the above tests was up to about 1.25 percent by weight, up to about 6 percent by weight of pregelatinized starch, based on the weight of the animal litter, can be added to improve clumping in 50/50 compositions.

In accordance with a further goal of the present invention, compositions containing less than 60 percent by weight of sodium bentonite (and in fact, less than 50 percent by weight) and a relatively small amount of starch (about 0.2 to about 6.0 percent by weight) have yielded "good" clumping results. Following the sample preparation procedures set out above, and adding various amounts of pregelatinized corn starch as a binder to different litter compositions before the introduction of the liquid (as a simulation of animal waste), additional samples for drop testing were obtained. The results of these test are shown in Table V below.

TABLE V

Effects of Starch on Compositions of Less Than 50% by Weight Sodium Bentonite

Wt. Percent Starch	Wt. Percent Na Bentonite	Wt. % Clay	Clump Strength (30 sec.)[1]	Clump Strength (24 hrs.)[1]
	FS-30	BL Clay		
0.5	40	60	2.7	1
	30	70	2.7	2
0.75	40	60	1	1
	30	70	1.7	1
1	40	60	2	1
	30	70	2.3	1.3
1.25	40	60	1	1
	30	70	1.3	1
	20	80	1.3	1
	10	90	2	1
		GA Clay		
0.5	40	60	2	1.3
	30	70	2.3	2.7
	20	80	3.3	2.7
0.75	40	60	2.3	2
	30	70	2.3	2.3
1	40	60	2.7	2
	30	70	3.7	2.3
1.25	40	60	1.7	1.3
	30	70	2	1.3
	20	80	2.7	2
	ACC	BL Clay		
0.5	40	60	1.3	1
	20	80	3	2.7
0.75	40	60	1.3	1

TABLE V-continued

Effects of Starch on Compositions of Less Than 50% by Weight Sodium Bentonite				
Wt. Percent Starch	Wt. Percent Na Bentonite	Wt. % Clay	Clump Strength (30 sec.)[1]	Clump Strength (24 hrs.)[1]
	20	80	2.3	1
	10	90	2.7	1.7
1	40	60	1.3	1
	20	80	2.3	1
1.25	30	70	1.3	1
	20	80	2	1
		GA Clay		
0.5	40	60	1.7	1
	20	80	2.7	1.3
0.75	30	70	2	1
1	30	70	2	1
1.25	40	60	1.7	1
	20	80	2	1

[1]Average clump strength of three (3) samples.

With few exceptions, the sodium bentonite/absorbent clay compositions of less than 50/50 clumped well at 30 seconds and at 24 hours. Clumping was enhanced by the addition of starch, especially in compositions of less than 40 percent by weight of sodium bentonite. The Wyo-Ben FS-30 and the Blue Mountain Clay produced strong clumps, relative to the other samples, using at least 0.75 weight percent of starch.

The foregoing discussion and the accompanying examples are presented as illustrative, and are not to be taken as limiting. Still other variations within the spirit and scope of this invention are possible and will readily present themselves to those skilled in the art.

I claim:

1. A clumping animal litter comprising:

a. a particulate non-swelling clay material having a predetermined mean particle size no greater than about 4 millimeters; and

b. a particulate swelling clay having a predetermined mean particle size no greater than about 2 millimeters, wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay.

2. The animal litter of claim **1** wherein the swelling clay is sodium bentonite.

3. The animal litter of claim **1** wherein the non-swelling clay material is smectite.

4. The animal litter of claim **1** wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is within the range of about 1.1:1 to about 4:1.

5. The animal litter of claim **4** wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is preferably within the range of about 2:1 to about 3:1.

6. The animal litter of claim **1** wherein the non-swelling clay material is at least about 40 percent by weight of the animal litter.

7. The animal litter of claim **6** wherein the non-swelling clay material is preferably about 60 percent by weight of the animal litter.

8. The animal litter of claim **6** wherein the non-swelling clay material has a particle size in the range of about 6 mesh to about 100 mesh, U.S. Sieve Series.

9. The animal litter of claim **1** wherein the swelling clay is at most about 60 percent by weight of the animal litter.

10. The animal litter of claim **9** wherein the swelling clay is preferably about 40 percent by weight of the animal litter.

11. The animal litter of claim **9** wherein the swelling clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series.

12. The animal litter of claim **11** wherein the swelling clay has a particle size preferably in the range of about 16 mesh to about 80 mesh, U.S. Sieve Series.

13. The animal litter of claim **1** and further comprising an organic clumping agent.

14. The animal litter of claim **13** wherein the clumping agent is a cellulosic ether.

15. The animal litter of claim **13** wherein the clumping agent is a polyelectrolyte.

16. The animal litter of claim **13** wherein the organic clumping agent is in an amount in the range of about 0.25 percent by weight to about 6 percent by weight, based on the weight of the animal litter.

17. The animal litter of claim **13** wherein the clumping agent is a pregelatinized starch.

18. The animal litter of claim **17** wherein the pregelatinized starch is in an amount in the range of about 0.25 percent by weight to about 6 percent by weight, based on the weight of the animal litter.

19. The animal litter of claim **17** wherein the pregelatinized starch is corn starch.

20. The animal litter of claim **19** wherein the corn starch is in an amount in the range of about 0.5 percent by weight to about 6 percent by weight, based on the weight of the animal litter.

21. A clumping animal litter comprising:

a. a particulate non-swelling clay material in the amount of at most about 60 percent by weight of the animal litter, the material having a predetermined mean particle size;

b. a particulate swelling clay in the amount of at least about 40 percent by weight of the animal litter, the material having a predetermined mean particle size, and wherein the mean particle size of the non-swelling clay material is greater than the mean particle size of the swelling clay;

c. an organic clumping agent in an amount within the range of about 0.25 percent by weight to about 6 percent by weight of the animal litter; and

d. wherein the ratio of the mean particle size of the non-swelling clay material to the mean particle size of the swelling clay is within the range of more than about 1:1 to about 4:1.

22. The animal litter of claim **21** wherein the swelling clay is sodium bentonite.

23. The animal litter of claim **22** wherein the swelling clay is preferably about 40 percent by weight of the animal litter.

24. The animal litter of claim **22** wherein the swelling clay has a particle size in the range of about 12 mesh to about 325 mesh, U.S. Sieve Series.

25. The animal litter of claim **21** wherein the non-swelling clay material is smectite.

26. The animal litter of claim **25** wherein the non-swelling clay material is preferably about 60 percent by weight of the animal litter.

27. The animal litter of claim **21** wherein the clumping agent is a pregelatinized starch.

28. The animal litter of claim **27** wherein the pregelatinized starch is corn starch.

29. The animal litter of claim **21** wherein the ratio of the mean particle size of the non-swelling clay material to the

mean particle size of the swelling clay is preferably within the range of about 2:1 to about 3:1.

30. A method for making a clumping animal litter comprising the steps of:

a. combining a particulate non-swelling clay material with a suitable particulate swelling clay to form a composition wherein the mean particle size of the particulate non-swelling clay material is greater than the mean particle size of the particulate swelling clay;

b. mixing the composition to effect a substantially uniform distribution of the two materials;

c. packaging a quantity of the mixed composition.

31. The method of claim **30** and further comprising the step of adding an organic clumping agent after the step of combining.

32. The method of claim **30** wherein the step of combining comprises the step of utilizing at most about 60 percent by weight of the swelling clay, based on the weight of the animal litter.

33. The method of claim **31** wherein the step of adding an organic clumping agent comprises a pregelatinized corn starch.

34. The method of claim **31** wherein the step of adding an organic clumping agent comprises a polyelectrolyte.

35. The method of claim **34** wherein the step of combining comprises the step of utilizing at least about 40 percent by weight of the non-swelling clay material, based on the weight of the animal litter.

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