IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

THE DOW CHEMICAL COMPANY, Plaintiff, v. NOVA CHEMICALS CORPORATION (CANADA) and NOVA CHEMICALS INC. (DELAWARE), Defendants.	)	C.A. No. 05-737 (JJF) **JURY TRIAL DEMANDED**

ANSWER AND COUNTERCLAIMS OF DEFENDANTS
NOVA CHEMICALS CORPORATION AND
NOVA CHEMICALS INC.

Defendants NOVA Chemicals Corporation, and NOVA Chemicals Inc. (collectively "NOVA") file this Answer and Counterclaims in response to the Complaint dated October 21, 2005, filed by Plaintiff The Dow Chemical Company ("Dow").

ANSWER

PARTIES

1. Dow is a corporation organized under the laws of Delaware with a principal place of business at 2030 Dow Center, Midland, Michigan 48674.

Answer: Upon information and belief, NOVA admits the allegations of paragraph 1 of the Complaint.

2. On information and belief, NOVA Chemicals Corporation is a corporation organized under the laws of Canada with a principal place of business at 1000 Seventh Avenue S.W., Calgary, Alberta T2P SC6, Canada.

Answer: NOVA admits the allegations of paragraph 2 of the Complaint.

3. Shares of NOVA Chemicals Corporation are traded on the New York Stock Exchange under the stock ticker symbol NCX.

Answer: NOVA admits the allegations of paragraph 3 of the Complaint.

4. NOVA Chemicals Corporation manufactures chemicals, including polyethylene and other products.

Answer: NOVA admits the allegations of paragraph 4 of the Complaint.

5. On information and belief, NOVA Chemicals Corporation either directly or indirectly imports into, sells, and/or offers for sale its products in Delaware and elsewhere in the United States.

Answer: NOVA admits the allegations of paragraph 5 of the Complaint.

6. On information and belief, NOVA Chemicals Inc. is a corporation organized under the laws of Delaware with a principal place of business at Westpointe Center, 1550 Caraopolis Heights Road, Moon Township, Pennsylvania 15108.

Answer: NOVA admits the allegations of paragraph 6 of the Complaint.

7. On information and belief, NOVA Chemicals Inc. is a subsidiary of NOVA Chemicals Corporation.

Answer: NOVA admits the allegations of paragraph 7 of the Complaint.

8. On information and belief, NOVA Chemicals Inc. manufactures chemicals that are sold and offered for sale in Delaware and elsewhere in the United States.

Answer: NOVA admits the allegations of paragraph 8 of the Complaint.

9. Collectively, defendants have United States manufacturing sites in the following United States locations: Bayport, Texas; Monaca, Pennsylvania; Belpre, Ohio; Chesapeake, Virginia; Decatur, Alabama; Painesville, Ohio; Indian Orchard, Massachusetts; and Channelview, Texas.

Answer: NOVA admits the allegations of paragraph 9 of the Complaint.

10. NOVA Chemicals Inc. is authorized to do business, is doing business, and/or has a regular and established place of business in this judicial district, is incorporated in Delaware, and has committed acts of infringement in this District.

Answer: NOVA admits that NOVA Chemicals Inc. is authorized to do business, is doing business, or has a regular and established place of business in this judicial district, and is incorporated in the State of Delaware. NOVA otherwise denies the allegations of paragraph 10 of the Complaint and specifically denies that it has committed acts of infringement in this District or elsewhere.

JURISDICTION AND VENUE

11. This patent infringement action arises under the patent laws of the United States of America, 35 U.S.C. § 101 et seq. This Court has subject matter jurisdiction under 28 U.S.C. §§ 1331 and 1338(a).

Answer: NOVA admits that Dow alleges in paragraph 11 of the Complaint that this is an action for infringement arising under the patent laws of the United States, Title 35, United States Code. NOVA admits that the Court has subject matter jurisdiction over this action.

12. This Court has personal jurisdiction over defendants based on the above allegations.

Answer: NOVA admits that it is subject to personal jurisdiction in this District.

13. Venue is proper in this judicial district under 28 U.S.C. §§ 1391(b), (c), and (d) and 1400(b) based on the above allegations.

Answer: NOVA admits that venue is proper in this judicial district pursuant to 28 U.S.C. §§ 1391 and 1400(b).

THE PATENTS IN SUIT

14. On December 8, 1998, United States Patent No. 5,847,053 ("the '053 patent") was duly and legally issued to Dow for an invention entitled "Ethylene Polymer Film Made From Ethylene Polymer Blends"; and since that date Dow has been and still is the owner of the '053 patent. A copy of the '053 patent is attached hereto as Exhibit A.

Answer: NOVA admits that United States Patent No. 5,847,053 ("the '053 patent") is entitled "Ethylene Polymer Film Made From Ethylene Polymer Blends," has an issue date of December 8, 1998, was issued with Dow identified as the assignee, and, on information and belief, that Dow remains the owner of the '053 patent. NOVA admits that Exhibit A of the complaint contains a copy of the '053 patent. NOVA otherwise denies the allegations of paragraph 14 of the Complaint and specifically denies that the '053 patent was duly and legally issued.

15. On August 29, 2000, United States Patent No. 6,111,023 ("the '023 patent") was duly and legally issued to Dow for an invention entitled "Fabricated Articles Made From Ethylene Polymer Blends"; and since that date Dow has been and still is the owner of the '023 patent. A copy of the '023 patent is attached hereto as Exhibit B.

Answer: NOVA admits that United States Patent No. 6,111,023 ("the '023 patent") is entitled "Fabricated Articles Made From Ethylene Polymer Blends," has an issue date of August 29, 2000, was issued with Dow identified as the assignee, and, on information and belief, that Dow remains the owner of the '023 patent. NOVA admits that Exhibit B of the complaint contains a copy of the '023 patent. NOVA otherwise denies the allegations of paragraph 14 of the Complaint and specifically denies that the '023 patent was duly and legally issued.

ALLEGED INFRINGEMENT OF THE PATENTS IN SUIT

16. Since around the spring of 2003, defendants have been and still are infringing the '053 patent and the '023 patent directly, contributorily, and/or by inducing others to infringe by making, selling, offering for sale, using and/or importing into the United States ethylene polymer blend products, specifically defendants' SURPASS line of polyethylene products, that embody the patented inventions.

Answer: NOVA denies the allegations of paragraph 16 of the Complaint.

17. Defendants will continue to infringe the '053 patent and the '023 patent unless enjoined by this court.

Answer: NOVA denies the allegations of paragraph 17 of the Complaint.

18. On information and belief, defendants' infringement of the '053 patent and the '023 patent has been and is knowing and willful.

Answer: NOVA denies the allegations of paragraph 18 of the Complaint.

FIRST DEFENSE - NO INFRINGEMENT

NOVA has not made, used, sold and/or offered to sell in this country, and/or imported into this country any SURPASS® polyethylene products that are within the

claims of the '053 patent and thus has not infringed and is not infringing any claim of the '053 patent, either directly, contributorily, and/or by inducement.

NOVA has not made, used, sold and/or offered to sell in this country, and/or imported into this country any SURPASS® polyethylene products that are within the claims of the '023 patent and thus has not infringed and is not infringing any claim of the '023 patent, either directly, contributorily, and/or by inducement.

SECOND DEFENSE - INVALIDITY

The '053 patent is invalid for failure to comply with the conditions for patentability specified by 35 U.S.C. § 101 et seq., including sections 102, 103, 112, and/or 113.

The '023 patent is invalid for failure to comply with the conditions for patentability specified by 35 U.S.C. § 101 et seq., including sections 102, 103, 112, and/or 113.

THIRD DEFENSE - MARKING

Upon information and belief, Dow and/or its licensees failed to comply with 35 U.S.C. § 287 in connection with the making, offering for sale, and/or selling of products covered by the '053 patent by failing to mark those products with the number of the '053 patent.

Upon information and belief, Dow and/or their licensees failed to comply with 35 U.S.C. § 287 in connection with the making, offering for sale, and/or selling of products covered by the '023 patent by failing to mark those products with the number of the '023 patent.

RIGHT TO ASSERT ADDITIONAL DEFENSES

NOVA's investigations into the allegations set forth in Dow's Complaint are ongoing and discovery has not yet commenced. NOVA expressly reserves the right to assert and pursue additional defenses.

COUNTERCLAIMS

PARTIES AND JURISDICTION

1. NOVA Chemicals Corporation is a corporation organized under the laws of Canada with a principal place of business at 1000 Seventh Avenue S.W., Calgary, Alberta T2P SC6, Canada.

2. NOVA Chemicals Inc. is a corporation organized under the laws of Delaware with a principal place of business at Westpointe Center, 1550 Caraopolis Heights Road, Moon Township, Pennsylvania 15108.

3. On information and belief, Dow is a corporation organized under the laws of Delaware with a principal place of business at 2030 Dow Center, Midland, Michigan 48674.

4. This Court has jurisdiction over these Counterclaims pursuant to at least 28 U.S.C. §§ 1331, 1338, 1367, and 2201.

5. Dow is subject to personal jurisdiction in this judicial district for the present Counterclaims, at least because it commenced the present action and because, upon information and belief, it is a Delaware corporation.

6. These Counterclaims are for declaratory judgment relief arising under 28 U.S.C. §§ 2201 and 2202, and the patent law of the United States, 35 U.S.C. § 101 *et seq.*

COUNTERCLAIM I: DECLARATORY JUDGMENT OF NO INFRINGEMENT OF THE '053 PATENT

7. NOVA adopts and incorporates in this Counterclaim paragraphs 1 - 6 above, as if set forth herein.

8. Claim 1 of the '053 patent is addressed to a "film made from an ethylene polymer composition," the composition comprising, *inter alia*, "at least one heterogeneously branched linear ethylene polymer having a density from about 0.93 g/cm^3 to about $0.965g/cm^3$."

9 Claim 6 of the '053 patent is addressed to "An ethylene polymer composition comprising," *inter alia*, "at least one heterogeneously branched linear ethylene polymer having a density from about 0.93 g/cm^3 to about $0.965g/cm^3$."

10. Claims 1 and 6 of the '053 patent are the only independent claims of the '053 patent.

11. The '053 patent states, *inter alia,* at column 7, lines 28-30 that "The ethylene polymer to be combined with the homogenous ethylene/α-olefin interpolymer is a heterogeneously branched (e.g., Ziegler polymerized) interpolymer...."

12. On information and belief, prior to filing its Complaint in the present action, Dow did not have information showing that any accused NOVA SURPASS® product contains a heterogeneously branched polymer, as that term is used in the '053 patent.

13. On information and belief, prior to serving its Complaint in the present action, Dow had information that NOVA SURPASS® products do not contain a heterogeneously branched polymer, as that term is used in the '053 patent.

14. The '053 patent states, *inter alia,* in column 7, lines 33-36 that "Heterogenously branched ethylene/α-olefin interpolymers differ from the homogeneously branched ethylene/α-olefin interpolymers primarily in their branching distribution."

15. The '053 patent states, *inter alia,* in column 7, lines 36-41 that "heterogeneously branched LLDPE polymers have a distribution of branching, including a highly branched portion (similar to a very low density polyethylene), a medium branched portion (similar to a medium branched polyethylene) and an essentially linear portion (similar to linear homopolymer polyethylene)."

16. On information and belief, prior to filing its Complaint in the present action, Dow did not identify a polymer component in any accused NOVA SURPASS® product as having "a highly branched portion (similar to a very low density polyethylene), a medium branched portion (similar to a medium branched polyethylene) and an essentially linear portion (similar to linear homopolymer polyethylene)," as those terms are used in the '053 patent.

17. The '053 patent states, *inter alia,* at column 7, lines 57 - 66 that Dowlex® 2045 is "a heterogeneously branched ethylene/1-octene copolymer...."

18. The '053 patent states, *inter alia,* at column 8, lines 4-7 that "Dowlex® 2045 also has a distinct peak at an elution temperature of about 98°C., indicating the 'linear' fraction of the whole polymer."

19. On information and belief, prior to filing its Complaint in the present action, Dow did not measure "a distinct peak at an elution temperature of about 98°C," as those terms are used in the '053 patent, for any accused NOVA SURPASS® product.

20. The '053 patent states, *inter alia,* at column 8, lines 23-26 that "The heterogeneously branched ethylene/α-olefin interpolymers and/or copolymers also have at least two melting peaks as determined using Differential Scanning Calorimetry (DSC)."

21. On information and belief, prior to filing its Complaint in the present action, Dow did not identify in any accused NOVA SURPASS® product any interpolymers and/or copolymers that "have at least two melting peaks as determined using Differential Scanning Calorimetry (DSC)," as those terms are used in the '053 patent.

22. During the prosecution leading to the '053 patent, Dow distinguished its claimed products from blends of multiple homogeneous polymers.

23. On information and belief, prior to serving its Complaint in the present action, Dow had information that SURPASS® products contain only "homogenously branched" copolymers, as those terms are used in the '053 patent.

24. On information and belief, Dow served its complaint in this action knowing that NOVA did not infringe the '053 patent.

25. NOVA has not infringed and is not infringing the '053 patent with its SURPASS® polyethylene products, either directly, contributorily, and/or by inducement.

26. NOVA is entitled to a declaratory judgment that it has not infringed and is not infringing the '053 patent with its SURPASS® polyethylene products, either directly, contributorily, and/or by inducement.

COUNTERCLAIM II: DECLARATORY JUDGMENT OF INVALIDITY OF THE '053 PATENT

27. NOVA adopts and incorporates in this Counterclaim paragraphs 1 - 6 above, as if set forth herein.

28. "Example 4" of the '053 patent is directed, *inter alia*, to an "in-situ blend... wherein the homogenously branched substantially linear polymer is made in a first reactor.... [And a] heterogeneously branched ethylene/1-octene copolymer is made in a second reactor operated sequentially with the first reactor...."

29. The '053 patent does not report a slope of strain hardening coefficient (SHC) value for the blend of "Example 4."

30. The '053 patent does not report an SHC value for any component identified as a component of the blend of "Example 4."

31. The '053 patent does not report an SHC value for any component identified as a component of an in-situ blend.

32. The '053 patent does not provide conditions to separate an in-situ blend of polymers into components.

33. The '053 patent does not provide conditions to separate an in-situ blend of polymers into separate components where the polymer components have overlapping temperature rising elution fractionation (TREF) elution temperatures.

34. The '053 patent states, *inter alia*, at column 6, lines 40-42 that "FIG. 1 shows the various stages of the stress/strain curve used to calculate the slope of strain hardening."

35. The '053 patent states, *inter alia*, at column 6, lines 61-62 that "FIG. 1 graphically depicts the relationship between the density of the homogeneously branched

substantially linear ethylene polymers and ethylene/α-olefin polymers as a function of their slope of strain hardening coefficient."

36. The '053 patent describes "FIG. 1" differently at column 6, lines 40-42 than at column 6, lines 61-62.

37. The "FIG. 1" described in the '053 patent at column 6, lines 40-42 is not contained in the '053 patent.

38. On information and belief, prior to April 28, 1993, at least one of the named inventors of the '053 patent was aware of a figure as described at column 6, lines 40-42 of the '053 patent.

39. On information and belief, prior to April 28, 1993, at least one member of Dow's Patent Department who participated in the prosecution leading to the '053 patent was aware of a figure as described at Column 6, lines 40-42 of the '053 patent.

40. The figure labeled "Figure 1" appearing on the fourth page of the issued '053 patent does not depict "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '053 patent at column 6, lines 40-42.

41. The figure labeled "Figure 2" appearing on the fifth page of the issued '053 patent does not depict "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '053 patent at column 6, lines 40-42.

42. The '053 patent does not contain a figure showing "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '053 patent at column 6, lines 40-42.

43. A figure showing "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '053 patent at column 6, lines 40-42, is necessary for the understanding of the subject matter claimed in the '053 patent.

44. The '053 patent states, *inter alia,* at column 6, line 67 that "Table 1 displays the data of FIG. 1 in tabular form:"

45. The data contained in Table 1 of the '053 patent corresponds to the data of the "FIG. 1" described in the '053 patent at column 6, lines 61-67 and depicted on the fourth page of the '053 patent.

46. The data contained in Table 1 of the '053 patent is not data showing "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '053 patent at column 6, lines 40-42.

47. Independent Claims 1 and 6 of the '053 patent contain a limitation requiring that component "A" have "a slope of strain hardening coefficient greater than or equal to 1.3"

48. All claims of the '053 patent contain a limitation that component "A" have a "slope of strain hardening coefficient" at least greater than or equal to 1.3.

49. The '053 patent states, *inter alia*, at column 6, lines 45-50 that:

> The slope of strain hardening coefficient (SHC) is calculated according to the following equation:
>
> $$SHC = (\text{slope of strain hardening}) * (I_2)^{0.25}$$
>
> where I_2 =melt index in grams/10 minutes.

50. The "slope of strain hardening" parameter appearing in the SHC equation defined in the '053 patent at column 6, lines 45-50 is disclosed to be determined using "FIG. 1," wherein "FIG. 1 shows the various stages of the stress/strain curve used to

calculate the slope of strain hardening. The slope of the parallel line in the strain hardening region is then determined."

51. A figure showing a "strain hardening region" is not present in the '053 patent.

52. The determination of a "parallel line in the strain hardening region" is not disclosed in the '053 patent.

53. In the prosecution leading to the '053 patent, Dow did not cite any printed publication or public use, as those terms are used in 35 U.S.C. § 102, from prior to April 28, 1993 that contains the SHC definition at column 6, lines 45-50 of the '053 patent.

54. In the prosecution leading to the '053 patent, the Examiner did not cite any printed publication or public use, as those terms are used in 35 U.S.C. § 102, from prior to April 28, 1993 that contains the SHC definition at column 6, lines 45-50 of the '053 patent.

55. On information and belief, Dow is not aware of any publication or public use, as those terms are used in 35 U.S.C. § 102, from prior to April 28, 1993, that contains the SHC definition at column 6, lines 45-50 of the '053 patent.

56. The '053 patent indicates that the I_2 parameter in the equation at column 6, lines 45-50 has the units of "grams/10 minutes."

57. The '053 patent does not provide any units for the "slope of strain hardening" parameter in the equation at column 6, lines 45-50.

58. On information and belief, prior to April 28, 1993, at least one of the named inventors of the '053 patent was aware of units for the "slope of strain hardening" parameter, as that parameter is used in the '053 patent at column 6, lines 45-50.

59. The '053 patent does not provide any units for the "SHC" parameter in the equation at column 6, lines 45-50.

60. In the section of the '053 patent entitled "Determination of the Slope of Strain Hardening Coefficient" beginning at column 6, line 6, the '053 patent refers to both English units (*e.g.*, psi at column 6, line 12) and metric units (*e.g.*, grams/cm^3 at column 6, lines 57-58).

61. The '053 patent does not state whether English or metric units should be used for the "slope of strain hardening" parameter in the equation at column 6, lines 45-50.

62. The '053 patent does not state what units should be used for the "slope of strain hardening" parameter in the equation at column 6, lines 45-50.

63. The '053 patent incorporates by reference patents that collectively use multiple different units for the slope of a stress/strain curve, including "lbs./in/ /oz./yd.^{2}" in United States Patent No. 3,458,706, "MPa" in United States Patent No. 4,597,920, "KPa" in United States Patent No. 5,059,481, "GPa" and "gm/denier" in United States Patent No. 4,413,110, "psi" in United States Patent No. 4,663,220, and "Kpsi" in United States Patent No. 4,865,902,

64. At column 27, lines 26-29 of U. S Patent No. 4,413,110, the numerical value reported in units of "GPa" is different from the numerical value reported in "g/d."

65. The numerical value for the SHC parameter in the equation at column 6, lines 45-50 of the '053 patent depends on, *inter alia*, the units used for the "slope of strain hardening" parameter.

66. The '053 patent does not specify units for the "slope of strain hardening" parameter.

67. On November 1, 1999, the patent application leading to Dow's United States Patent No. 6,723,398 B1 ("the '398 patent") was filed in the United States Patent Office.

68. A true and correct copy of the '398 patent is attached hereto as Exhibit A.

69. The '398 patent states, *inter alia*, at column 2, lines 45-49 that "FIG. 2 shows the various regions of a typical tensile curve (as load in pounds versus extension in inches) and the particular region used to determine the slope of strain hardening."

70. The '398 patent includes on page 4 "FIG. 2," which corresponds to the description in the '398 patent at column 2, lines 45-49.

71. "FIG. 2" of the '398 patent shows "various stages of the stress/strain curve used to calculate the slope of strain hardening."

72. As depicted in "FIG. 2" of the '398 patent, the "Strain Hardening Region" begins before the "point of 10% extension before failure."

73. The '398 patent discloses that a subsection of the "strain hardening region" is used to determine the "slope of strain hardening."

74. The '398 patent states, *inter alia*, at column 11, lines 6-11 that:

> The slope of strain hardening is conveniently taken as a line representing a 10 percent secant tangent which is calculated from the failure point to the point where 10 percent extension before the failure point (where 10 percent extension before is equal to 90 percent of the total extension or strain).

75. The '053 patent does not disclose that the slope of strain hardening is conveniently taken as a line representing a 10 percent secant tangent which is calculated

from the failure point to the point where 10 percent extension before the failure point (where 10 percent extension before is equal to 90 percent of the total extension or strain).

76. The '398 patent states, *inter alia*, at column 11, lines 12-15 that:

> A more precise methodology for calculating the slope of strain hardening is performing linear regression analysis using the tensile curve datapoints that represent the last 10 percent extension before the failure point.

77. The '053 patent does not disclose that a more precise methodology for calculating the slope of strain hardening is performing linear regression analysis using the tensile curve datapoints that represent the last 10 percent extension before the failure point.

78. The '398 patent, at column 10, lines 61-64, identifies the "line parallel to the strain hardening region" as a "10 percent secant line."

79. The '053 patent does not identify the "line parallel to the strain hardening region" as a "10 percent secant line."

80. The '053 patent does not identify any subsection of the "strain hardening region" from which the "slope of strain hardening," as those terms are used in the '053 patent, is or should be determined.

81. No drawing containing the information in "FIG. 2" of the '398 patent related to the region used to determine the "slope of strain hardening" or the units for "slope of strain hardening" is contained in the '053 patent.

82. ASTM dimensions for stress/strain curves in accordance with ASTM D-882 are pressure vs. % extension.

83. The slope of the strain hardening, as depicted in "FIG. 2" in the '398 patent, has units of "pounds/inch."

84. The '053 patent does not disclose that "slope of strain hardening" should be in units of "pounds/inch."

85. The units "pounds/inch" do not correspond to the dimensions of pressure vs. % extension.

86. On information and belief, one or more of the named inventors of the '053 patent was aware of the preferred subsection of the "strain hardening region" used to determine the "slope of strain hardening" and/or the units to be used in determining that parameter prior to April 28, 1993.

87. On information and belief, one or more attorneys in Dow's Patent Department who participated in the prosecution leading to the '053 patent was aware of the preferred subsection of the "strain hardening region" used to determine the "slope of strain hardening" and/or units to be used in determining that parameter prior to April 28, 1993.

88. On information and belief, at the time Dow served its complaint in this action, Dow knew that "FIG. 1" referred to at Column 6, lines 40-42 was not present in the '053 patent.

89. On information and belief, at the time Dow served its complaint in this action, Dow knew that the '053 patent failed to disclose units for the "slope of strain hardening" parameter that appears in the SHC equation described at Column 6, lines 45-50.

90. On information and belief, at the time Dow served its Complaint in this action, Dow knew that the use of different units for the "slope of strain hardening" parameter in the equation

$$SHC = (\text{slope of hardening}) * (I_2)^{0.25}$$

would result in different SHC values when calculated using this equation.

91. On information and belief, at the time Dow served its complaint in this action, Dow knew that its '053 patent failed to adequately disclose the SHC parameter recited in each claim of the '053 patent and/or failed to disclose the best mode for determining SHC because of the omission from the '053 patent specification of the "FIG. 1" referred to at column 6, lines 40-42.

92. On information and belief, at the time Dow served its complaint in this action, Dow knew that its '053 patent failed to furnish a drawing necessary for the understanding of the subject matter sought to be patented.

93. On information and belief, at the time Dow served its complaint in this action, Dow knew that its '053 patent failed to furnish any units for the "slope of strain hardening" parameter that appears in the SHC equation described at Column 6, lines 45-50, which units are necessary for calculation of SHC.

94. The claims of the '053 patent are invalid for failure to comply with the conditions for patentability specified by 35 U.S.C. § 101, *et seq.*, including sections 102, 103, 112, and/or 113.

COUNTERCLAIM III: DECLARATORY JUDGMENT OF NO INFRINGEMENT OF THE '023 PATENT

95. NOVA adopts and incorporates in this Counterclaim paragraphs 1 - 6 above, as if set forth herein.

96. Claim 1 of the '023 patent is addressed to "An ethylene polymer composition comprising," *inter alia*, "at least one ethylene polymer characterized as having a density from about 0.93 g/cm^3 to about 0.965g/cm^3 and comprising a linear polymer fraction, as determined using a temperature rising elution fractionation (TREF) technique."

97. Claim 9 of the '023 patent is addressed to "A film made from an ethylene polymer composition, wherein the composition comprises," *inter alia*, "at least one ethylene polymer characterized as having a density from about 0.93 g/cm^3 to about 0.965g/cm^3 and comprising a linear polymer fraction, as determined using a temperature rising elution fractionation (TREF) technique."

98. Claims 1 and 9 of the '023 patent are the only independent claims of the '023 patent.

99. During the prosecution leading to the '023 patent, Dow stated, *inter alia,* that "the term 'linear fraction' or 'linear polymer fraction' (at least as used in the present application) refers to heterogeneously branched ethylene polymers."

100. The '023 patent states, *inter alia,* at column 8, lines 13-16 that "The ethylene polymer to be combined with the homogenous ethylene/α-olefin interpolymer is a heterogeneously branched (e.g., Ziegler polymerized) interpolymer...."

101. On information and belief, prior to filing its Complaint in the present action, Dow did not have information showing that any accused NOVA SURPASS® product contains a heterogeneously branched polymer, as that term is used in the '023 patent.

102. On information and belief, prior to serving its Complaint in the present action, Dow had information that NOVA SURPASS® products do not contain a heterogeneously branched polymer, as that term is used in the '023 patent.

103. The '023 patent states, *inter alia,* in column 8, lines 19-22 that "Heterogeneously branched ethylene/α-olefin interpolymers differ from the homogeneously branched ethylene/α-olefin interpolymers primarily in their branching distribution."

104. The '023 patent states, *inter alia,* in column 8, lines 22 - 27 that "heterogeneously branched LLDPE polymers have a distribution of branching, including a highly branched portion (similar to a very low density polyethylene), a medium branched portion (similar to a medium branched polyethylene) and an essentially linear portion (similar to linear homopolymer polyethylene)."

105. On information and belief, prior to filing its Complaint in the present action, Dow did not identify a polymer component in any accused NOVA SURPASS® product as having "a highly branched portion (similar to a very low density polyethylene), a medium branched portion (similar to a medium branched polyethylene) and an essentially linear portion (similar to linear homopolymer polyethylene)," as those terms are used in the '023 patent.

106. The '023 patent states, *inter alia,* at column 8, lines 43-45 that Dowlex® 2045 is "a heterogeneously branched ethylene/1-octene copolymer...."

107. The '023 patent states, *inter alia,* at column 8, lines 57-60 that "Dowlex® 2045 also has a distinct peak at an elution temperature of about 98°C., indicating the 'linear' fraction of the whole polymer."

108. On information and belief, prior to filing its Complaint in the present action, Dow did not measure "a distinct peak at an elution temperature of about 98°C," as those terms are used in the '023 patent, for any accused NOVA SURPASS® product.

109. The '023 patent states, *inter alia,* at column 9, lines 9-12 that "The heterogeneously branched ethylene/α-olefin interpolymers and/or copolymers also have at least two melting peaks as determined using Differential Scanning Calorimetry (DSC)."

110. On information and belief, prior to filing its Complaint in the present action, Dow did not identify in any accused NOVA SURPASS® product any interpolymers and/or copolymers that "have at least two melting peaks as determined using Differential Scanning Calorimetry (DSC)," as those terms are used in the '023 patent.

111. During the prosecution leading to the '023 patent, Dow distinguished its claimed products from blends of multiple homogeneous polymers.

112. On information and belief, prior to serving its Complaint in the present action, Dow had information that SURPASS® products contain only "homogenously branched" copolymers, as those terms are used in the '023 patent.

113. On information and belief, Dow served its complaint in this action knowing that NOVA did not infringe the '023 patent.

114. NOVA has not infringed and is not infringing the '023 patent with its SURPASS® polyethylene products, either directly, contributorily, and/or by inducement.

115. NOVA is entitled to a declaratory judgment that it has not infringed and is not infringing the '023 patent with its SURPASS® polyethylene products, either directly, contributorily, and/or by inducement.

COUNTERCLAIM IV: DECLARATORY JUDGMENT OF INVALIDITY OF THE '023 PATENT

116. NOVA adopts and incorporates in this Counterclaim paragraphs 1 - 6 above, as if set forth herein.

117. "Example 4" of the '023 patent is directed, *inter alia*, to an "in-situ blend ... wherein the homogenously branched substantially linear polymer is made in a first reactor.... [And a] heterogeneously branched ethylene/1-octene copolymer is made in a second reactor operated sequentially with the first reactor...."

118. The '023 patent does not report a strain hardening coefficient (SHC) value for the blend of "Example 4."

119. The '023 patent does not report an SHC value for any component identified as a component of the blend of "Example 4."

120. The '023 patent does not report an SHC value for any component identified as a component of an in-situ blend.

121. The '023 patent does not provide conditions to separate an in-situ blend of polymers into components.

122. The '023 patent does not provide conditions to separate an in-situ blend of polymers into separate components where the polymer components have overlapping temperature rising elution fractionation (TREF) elution temperatures.

123. The '023 patent states, *inter alia*, at column 7, lines 18-19 that "FIG. 1 shows the various stages of the stress/strain curve used to calculate the slope of strain hardening."

124. The '023 patent states, *inter alia,* at column 7, lines 38-41 that "FIG. 1 graphically depicts the relationship between the density of the homogeneously branched substantially linear ethylene polymers and ethylene/α-olefin polymers as a function of their slope of strain hardening coefficient."

125. The '023 patent describes "FIG. 1" differently at column 7, lines 18-19 than at column 7, lines 38-41.

126. The "FIG. 1" described in the '023 patent at column 7, lines 18-19 is not contained in the '023 patent.

127. On information and belief, prior to April 28, 1993, at least one of the named inventors of the '023 patent was aware of a figure as described at column 7, lines 18-19 of the '023 patent.

128. On information and belief, prior to April 28, 1993, at least one member of Dow's Patent Department who participated in the prosecution leading to the '023 patent was aware of a figure as described at Column 7, lines 18 - 19 of the '023 patent.

129. The figure labeled "FIG. 1" appearing on the fourth page of the issued '023 patent does not depict "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '023 patent at column 7, lines 18-19.

130. The figure labeled "FIG. 2" appearing on the fifth page of the issued '023 patent does not depict "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '023 patent at column 7, lines 18-19.

131. The '023 patent does not contain a figure showing "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '023 patent at column 7, lines 18-19.

132. A figure showing "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '023 patent at column 7, lines 18-19, is necessary for the understanding of the subject matter claimed in the '023 patent.

133. The '023 patent states, *inter alia,* at column 7, line 44 that "Table 1 displays the data of FIG. 1 in tabular form:"

134. The data contained in Table 1 of the '023 patent corresponds to the data of the "FIG. 1" described in the '023 patent at column 7, lines 38-44 and depicted on the fourth page of the '023 patent.

135. The data contained in Table 1 of the '023 patent is not data showing "the various stages of the stress/strain curve used to calculate the slope of strain hardening," as described in the '023 patent at column 7, lines 18-19.

136. Independent Claims 1 and 9 of the '023 patent contain a limitation requiring that component "A" have "a slope of strain hardening coefficient greater than or equal to 1.3"

137. All claims of the '023 patent contain a limitation that component "A" have a "slope of strain hardening coefficient" at least greater than or equal to 1.3.

138. The '023 patent states, *inter alia*, at column 7, lines 22-28 that:

> The slope of strain hardening coefficient (SHC) is calculated according to the following equation:
>
> $$SHC = (\text{slope of strain hardening}) * (I_2)^{0.25}$$
>
> where I_2 =melt index in grams/10 minutes.

139. The "slope of strain hardening" parameter appearing in the SHC equation defined in the '023 patent at column 7, lines 22-28 is disclosed to be determined using "FIG. 1," wherein "FIG. 1 shows the various stages of the stress/strain curve used to calculate the slope of strain hardening. The slope of the parallel line in the strain hardening region is then determined."

140. A figure showing a "strain hardening region" is not present in the '023 patent.

141. The determination of a "parallel line in the strain hardening region" is not disclosed in the '023 patent.

142. In the prosecution leading to the '023 patent, Dow did not cite any printed publication or public use, as those terms are used in 35 U.S.C. § 102, from prior to April 28, 1993 that contains the SHC definition at column 7, lines 22-28 of the '023 patent.

143. In the prosecution leading to the '023 patent, the Examiners did not cite any printed publication or public use, as those terms are used in 35 U.S.C. § 102, from prior to April 28, 1993, that contains the SHC definition at column 7, lines 22-28 of the '023 patent.

144. On information and belief, Dow is not aware of any publication or public use, as those terms are used in 35 U.S.C. § 102, from prior to April 28, 1993, that contains the SHC definition at column 7, lines 22-28 of the '023 patent.

145. The '023 patent indicates that the I_2 parameter in the equation at column 7, lines 22-28 has the units of "grams/10 minutes."

146. On information and belief, prior to April 28, 1993, at least one of the named inventors of the '023 patent was aware of units for the "slope of strain hardening" parameter, as that parameter is used in the '023 patent at column 7, lines 22-28.

147. The '023 patent does not provide any units for the "slope of strain hardening" parameter in the equation at column 7, lines 22-28.

148. The '023 patent does not provide any units for the "SHC" parameter in the equation at column 7, lines 22-28.

149. In the section of the '023 patent entitled "Determination of the Slope of Strain Hardening Coefficient" beginning at column 6, line 52, the '023 patent refers to both English units (*e.g.*, psi at column 6, line 59) and metric units (*e.g.*, grams/cm^3 at column 7, lines 35-36).

150. The '023 patent does not state whether English or metric units should be used for the "slope of strain hardening" parameter in the equation at column 7, lines 22-28.

151. The '023 patent does not state what units should be used for the "slope of strain hardening" parameter in the equation at column 7, lines 22-28.

152. The '023 patent incorporates by reference patents that collectively use multiple different units for the slope of a stress/strain curve, including "lbs./in/ /oz./yd.^{2}" in United States Patent No. 3,458,706, "MPa" in United States Patent No. 4,597,920, "KPa" in United States Patent No. 5,059,481, "GPa" and gm/denier" in United States Patent No. 4,413,110, "psi" in United States Patent No. 4,663,220, and "Kpsi" in United States Patent No. 4,865,902.

153. At column 27, lines 26-29 of U. S Patent No. 4,413,110, the numerical value reported in units of "GPa" is different from the numerical value reported in "g/d."

154. The numerical value for the SHC parameter in the equation at column 7, lines 22-28 of the '023 patent depends on, *inter alia*, the units used for the "slope of strain hardening" parameter.

155. The '023 patent does not specify units for the "slope of strain hardening" parameter.

156. On November 1, 1999, the patent application leading to Dow's United States Patent No. 6,723,398 B1 ("the '398 patent") was filed in the United States Patent Office.

157. A true and correct copy of the '398 patent is attached hereto as Exhibit A.

158. Pack-Wing S. Chum is a named inventor on both the '398 patent and the '023 patent.

159. On information and belief, Pack-Wing S. Chum was and/or is an employee of Dow.

160. On information and belief, Pack-Wing S. Chum was aware of the contents of the specification of the application leading to the '398 patent at least by January 10, 2000.

161. Osborne K. McKinney prosecuted both the application leading to the '398 patent and the application leading to the '023 patent.

162. On information and belief, Osborne K. McKinney was and/or is an employee of Dow.

163. The "Utility Patent Application Transmittal" dated November 1, 1999, for the application leading to the '398 patent was signed by Osborne K. McKinney.

164. The "Utility Patent Application Transmittal" dated November 1, 1999, for the application leading to the '398 patent was submitted while the application leading to the '023 patent was pending at the United States Patent and Trademark Office.

165. The application leading to the '398 patent was not disclosed by or on behalf Dow in the application leading to the '023 patent.

166. The application leading to the '398 patent was not cited by the Examiner in the application leading to the '023 patent.

167. The '398 patent states, *inter alia*, at column 2, lines 45-49 that "FIG. 2 shows the various regions of a typical tensile curve (as load in pounds versus extension in inches) and the particular region used to determine the slope of strain hardening."

168. The '398 patent includes on page 4 "FIG. 2," which corresponds to the description in the '398 patent at column 2, lines 45-49.

169. "FIG. 2" of the '398 patent shows "various stages of the stress/strain curve used to calculate the slope of strain hardening."

170. As depicted in "FIG. 2" of the '398 patent, the "Strain Hardening Region" begins before the "point of 10% extension before failure."

171. The '398 patent discloses that a subsection of the "strain hardening region" is used to determine the "slope of strain hardening."

172. The '398 patent states, *inter alia*, at column 11, lines 6-11 that:

> The slope of strain hardening is conveniently taken as a line representing a 10 percent secant tangent which is calculated from the failure point to the point where 10 percent extension before the failure point (where 10 percent

> extension before is equal to 90 percent of the total extension or strain).

173. The '023 patent does not disclose that the slope of strain hardening is conveniently taken as a line representing a 10 percent secant tangent which is calculated from the failure point to the point where 10 percent extension before the failure point (where 10 percent extension before is equal to 90 percent of the total extension or strain).

174. The '398 patent states, *inter alia*, at column 11, lines 12-15 that:

> A more precise methodology for calculating the slope of strain hardening is performing linear regression analysis using the tensile curve datapoints that represent the last 10 percent extension before the failure point.

175. The '023 patent does not disclose that a more precise methodology for calculating the slope of strain hardening is performing linear regression analysis using the tensile curve datapoints that represent the last 10 percent extension before the failure point.

176. The '398 patent identifies the "line parallel to the strain hardening region" as a "10 percent secant line."

177. The '023 patent does not identify the "line parallel to the strain hardening region" as a "10 percent secant line."

178. The '023 patent does not identify any subsection of the "strain hardening region" from which the "slope of strain hardening," as those terms are used in the '023 patent, is or should be determined.

179. No drawing containing the information in "FIG. 2" of the '398 patent related to the region used to determine the "slope of strain hardening" or the units for "slope of strain hardening" is contained in the '023 patent.

180. ASTM dimensions for stress/strain curves in accordance with ASTM D-882 are pressure vs. % extension.

181. The slope of the strain hardening, as depicted in "FIG. 2" in the '398 patent has units of "pounds/inch."

182. The '023 patent does not disclose that "slope of strain hardening" should be in units of "pounds/inch."

183. The units "pounds/inch" do not correspond to the dimensions of pressure vs. % extension.

184. Subsequent to the November 1, 1999, filing of the application leading to the '398 patent, Osborne K. McKinney presented arguments on behalf of Dow in the application leading to the '023 patent based on, *inter alia*, values of the "slope of the strain hardening coefficient."

185. On information and belief, one or more of the named inventors of the '023 patent was aware of the preferred subsection of the "strain hardening region" used to determine the "slope of strain hardening" and/or the units to be used in determining that parameter prior to April 28, 1993.

186. On information and belief, one or more attorneys in Dow's Patent Department who participated in the prosecution leading to the '023 patent was aware of the preferred subsection of the "strain hardening region" used to determine the "slope of strain hardening" and/or units to be used in determining that parameter prior to April 28, 1993.

187. On information and belief, at the time Dow served its complaint in this action, Dow knew that its '023 failed to furnish a drawing necessary for the understanding of the subject matter sought to be patented.

188. On information and belief, at the time Dow served its complaint in this action, Dow knew that its '023 patent failed to adequately disclose the SHC parameter recited in each claim of the '023 patent and/or for failed to disclose the best mode for determining SHC because of the omission from the '023 specification of the "FIG 1" referred to at column 7, lines 22- 28.

189. On information and belief, at the time Dow served its complaint in this action, Dow knew that the '023 patent failed to disclose units for the "slope of strain hardening" parameter that appears in the SHC equation described at column 7, lines 22-28.

190. On information and belief, at the time Dow served its Complaint in this action, Dow knew that the use of different units for the "slope of strain hardening" parameter in the equation

$$SHC = (\text{slope of strain hardening}) * (I_2)^{0.25}$$

would result in different SHC values when calculated using this equation.

191. On information and belief, at the time Dow served its complaint in this action, Dow knew that its '023 patent failed to furnish any units for the "slope of strain hardening" parameter that appears in the SHC equation described at column 7, lines 22-28, which units are necessary for calculation of SHC.

192. The claims of the '023 patent are invalid for failure to comply with the conditions for patentability specified by 35 U.S.C. § 101, *et seq.*, including sections 102, 103, 112, and/or 113.

RIGHT TO ASSERT ADDITIONAL COUNTERCLAIMS

193. NOVA's investigations into the allegations set forth by in Dow's Complaint are ongoing and discovery has not yet commenced. NOVA expressly reserves the right to assert and pursue additional counterclaims.

PRAYER FOR RELIEF

For the reasons set forth above, NOVA prays for the Court's entry of judgment for it and against Dow as follows:

A. Declaring the '053 patent to be invalid;

B. Declaring that NOVA has not infringed, induced infringement of, or contributorily infringed the '053 patent with its SURPASS® polyethylene products;

C. Declaring the '023 patent to be invalid;

D. Declaring that NOVA has not infringed, induced infringement of, or contributorily infringed the '023 patent with its SURPASS® polyethylene products;

E. Dismissing Dow's Complaint with prejudice;

F. Declaring that this case is exceptional pursuant to 35 U.S.C. § 285;

G. Awarding to NOVA its costs, expenses, and reasonable attorney's fees incurred in defending against Dow's claims in this action; and

H. Awarding to NOVA such other and further relief as this Court deems just and proper.

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Dated: August 10, 2006
745598 / 29645

LIST OF EXHIBITS

A	United States Patent No. 6,723,398 B1

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

CERTIFICATE OF SERVICE

I, Kenneth L. Dorsney, hereby certify that on August 10, 2006, the foregoing document was hand delivered to the following persons and was electronically filed with the Clerk of the Court using CM/ECF, which will send notification to the registered attorney(s) of record that the document has been filed and is available for viewing and downloading:

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