EXHIBIT G

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**

DECLARATION OF DR. CHARLES STANLEY SPEED IN SUPPORT OF NOVA'S OPENING CLAIM CONSTRUCTION BRIEF

Dr. Charles Stanley Speed, being first duly sworn upon oath, states as follows:

1. I have over 30 years of experience in the field of polymer technology as an employee of the Exxon Chemical Company, including experience in polymer physics, application development and technical service, and product, catalyst, and process development. I am currently a consultant in the field of polyolefin technology.

2. Prior to my employment at Exxon, I received a BS in Chemistry and a Ph.D in Chemical Physics from the University of Texas-Austin in 1963 and 1967, respectively. After receiving my Ph.D, I was a Post Doctoral Fellow at the University of Illinois from 1967-1969.

3. I have published several articles in the field of polyolefin technology, including numerous articles on the structure and properties of polyethylene compositions and films, and single site catalysts. I am also a named inventor on several patents related to ethylene polymers, polymer blends, and the polymerization process.

4. I have reviewed the patents-in-suit, U.S. Patent Nos. 5,847,053 ("the '053 patent") and 6,111,023 ("the '023 patent"), and note that each claim of the patents-in-suit requires a component having a "slope of strain hardening coefficient of greater than or equal to 1.3."

5. The patents-in-suit provide a formula for calculating the slope of strain hardening coefficient ("SHC") as follows:

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

According to this formula, the SHC of a polymer is determined based on two measured properties, the slope of strain hardening and I_2 (also known as the melt index).

6. According to the patents-in-suit, I_2 is measured according to ASTM D-1238, Condition 190°C/2.16 kg and is reported in the units of g/10 min. ('023, col. 4, l. 64 - col. 5, l. 12; col. 7, l. 28.) The ASTM D-1238 method is an industry standard test method promulgated by the American Society for Test and Measurement.

7. To my knowledge and based on my review of the patents-in-suit and Dow documents, there is no industry standard for determining the slope of strain hardening. No units for the slope of strain hardening are specified in the '053 and '023 Dow patents.

8. Slope of strain hardening of a polymer is reported in the patents-in-suit as being measured by (1) compression molding a plaque from the polymer, (2) performing a tensile test on a specimen taken from the plaque using an instrument called an Instron Tensile Tester, and (3) measuring a slope from a region in the graphical results of the tensile test.

9. A tensile test measures how a material reacts to a force being applied to it. According to the patents-in-suit, the data obtained from the tensile test is plotted as a "stress/strain curve" and contains a "strain hardening region."

10. Stress may be formally defined as force exerted per unit area. Stress can be reported in many different unit systems, for example pounds per square inch (psi), kilopounds per square inch (kpsi), megapascals (MPa), gigapascals (GPa), and kg/cm^2. The patents-in-suit do not specify which units should be used to measure stress for determining the slope of strain hardening, but do cite to other references using units of stress for a tensile measurement that include psi, kpsi, MPa, and GPa, among others.

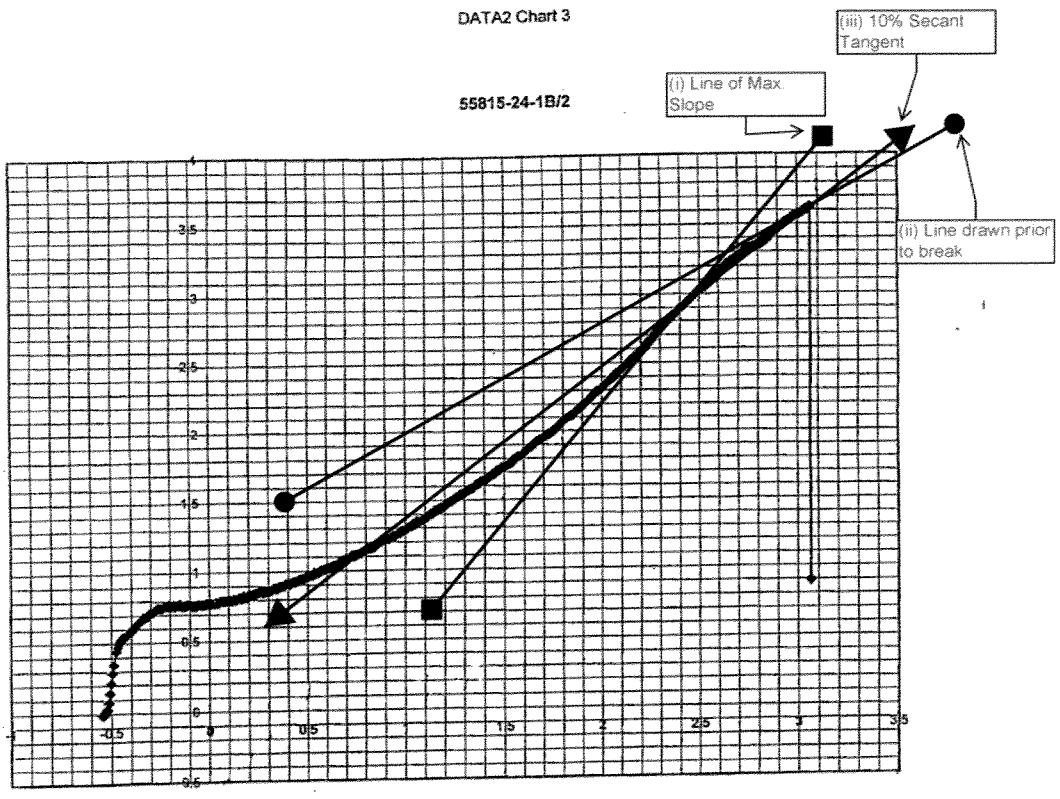
11. Strain may be formally defined as the deformation of a material caused by the action of a force upon it, and can be measured by calculating the change in length of the sample relative to its original length. Strain is a dimensionless quantity (*i.e.,* unitless) because the units of the initial and final lengths cancel each other out in the formula. Strain, however, is often expressed in dimensions of meters/meter, inches/inch, mm/mm, or percent.

12. The patents refer to a FIG. 1, reportedly showing the various stages of the stress/strain curve used to calculate the slope of strain hardening. The FIG. 1 referred to, however, is missing from the patents-in-suit.

13. To obtain the slope of strain hardening for the SHC equation, the patents-in-suit instruct the reader to draw a line parallel to the strain hardening region of the stress/strain curve

14. When a stress/strain plot is curved, as is typically found with this type of data, the slopes of parallel lines at different points on the curve differ from each other. Because of its curvature, there are a number of different ways to draw a line parallel to the strain hardening region of a stress/strain curve and each such method will result in a different value for the slope. Based on my review of Dow documents and deposition transcripts, it is also evident that Dow itself has used several different methods to draw a line parallel to the strain hardening region of the stress/strain curve. The methods I have identified in Dow's documents include drawing (i) the line having the greatest slope in the strain hardening region, (ii) the line just prior to break, and (iii) a "10% secant line," which is a line between the failure or break point and the point at 10 percent extension back from the break point.

15. Below, I show lines corresponding to each of Dow's methods (i), (ii), and (iii) described above, drawn on a tensile curve taken from Dow's documents. Line (i), marked with squares, corresponds to the maximum slope in the strain hardening region, line (ii), marked with circles, is drawn just prior to the sample break, and line (iii), marked with triangles, is the 10% secant tangent line. As shown, the three lines are not parallel, meaning that each has a different slope.



16. I have also reviewed Dow documents showing additional methods for drawing a line parallel to the strain hardening region as part of the calculation of SHC. Pages from the lab notebook of Ken Reichek, a Dow scientist, illustrate that samples were analyzed for slope of strain hardening in order to determine SHC values. (Exh. 1 at DN0091553.) Exhibit 1, pages DN00091554-DN00091556, shows three separate measurements of the slope of the strain hardening region, those being the "last 10%," "last 2%" and "max of 2%." For each of the twenty samples listed, the three different methods yield three different average slope values. Dow's U.S. Patent No. 6,723,398 provides a still further method, based on a mathematical analysis of the stress/strain curve.

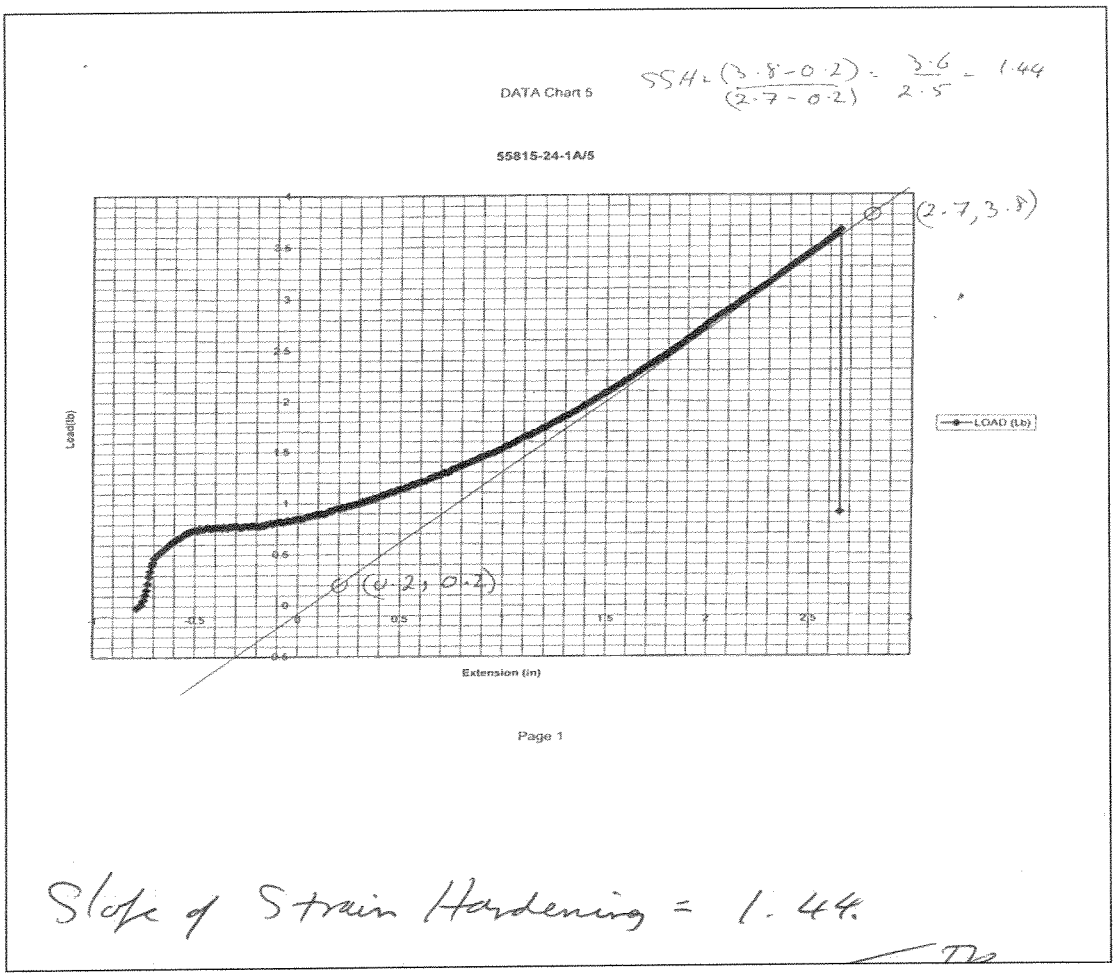
17. Using the equation provided in the patents-in-suit, I calculated the SHC value for Sample 16 on page DN0091556 of Exh. 1 using the average values of slope (SSH) reported for each of the three methods for determining slope and the melt index of the sample, reported as 0.076 g/10 min on page DN0091553. The results are listed below:

Method for Determining Slope	**SSH**	**SHC**
last 10 %	2.56	1.34
last 2 %	2.31	1.21
max of 2 %	3.36	1.76

This further demonstrates how the slope of strain hardening (SSH) value for a sample varies depending on the which line-drawing method is used. In addition, this example shows that the SHC value for a polymer sample can be both above and below the 1.3 value in the claims depending on which line-drawing method is used to determine the slope of strain hardening.

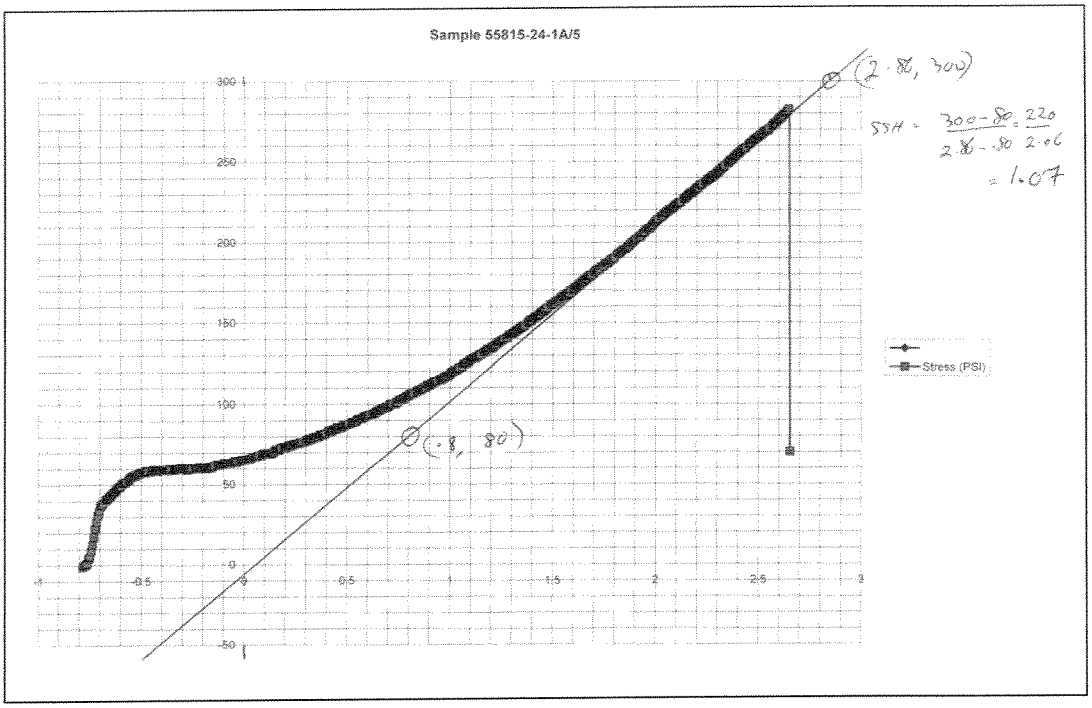
18. Additionally, as discussed above, many different units of stress and strain can be used to plot a tensile curve. The slope of strain hardening will vary greatly depending on which units are used. For example, if stress were measured in MPa, the calculated SHC would be approximately 145 times less than if stress were measured in psi, based on the conversion factor between the two different units. Although not properly defined as a "stress/strain" curve, I note that Dow, in internal documents as well as in the later filed U.S. Patent No. 6,723,398, also measured SHC using "load vs. extension" curves. Load vs. elongation is a different type of tensile curve, measuring the deformation of the sample based on its extension (*e.g.* in, cm, ft, mm, etc.) in response to the applied load (*e.g.* lbs, kg, kgf, etc.).

19. Below I have included a page (DN00103320) from the laboratory databook of another Dow scientist, Dr. Thomas Oswald, who did work in Dow's laboratory relating to determining slope of strain hardening, showing a plot of tensile data along with some hand-written calculations. The sample tested in this experiment is designated as "55815-24-1A/5." As is shown on the graph, the units of measurement are pounds for the load and inches for the extension.



20. Dr. Oswald's notebook page also shows a line drawn parallel to the strain hardening region and the calculation of the slope of strain hardening. For this particular plot, Dr. Oswald calculated the SSH to be 1.44 in units of lbs/in. Applying the formula in the patents-in-suit and the reported I_2 value of 0.97 (DN00103324), this corresponds to an SHC of 1.43.

21. Dow document number DN00106966, shown below, is a stress/strain plot for the same 55815-24-1A/5 sample, also taken from Dr. Oswald's materials.



22. As with the previous graph, Dr. Oswald drew a line parallel to the strain hardening region and calculated the slope of strain hardening (SSH). Dr. Oswald testified at his deposition that the units of slope for this measurement were psi/in/100. (Oswald Dep. Tr. at 74:1-10.) This time, Dr. Oswald calculated the SSH to be 1.07 psi/in/100. Applying the formula in the patents-in-suit and the reported I_2 value, this corresponds to an SHC of 1.06.

23. This further illustrates how the value determined for the slope of strain hardening can vary, even for a single sample, depending on the units used to measure the tensile data. In addition, this example shows that the SHC value for a polymer sample can be both above and below the 1.3 value in the claims depending on which units are used to calculate the slope of strain hardening.

24. Based on my personal knowledge, from my education, experience in the field, and the information I have reviewed in connection with this litigation, including the particular documents cited herein, I conclude that the slope of strain hardening, and therefore a SHC according to the patents-in-suit, cannot be determined without knowing in what units the SSH value is measured or without knowing where to draw the line parallel to the strain hardening region.

Further Affiant Sayeth Not.

Charles Stanley Speed

SUBSCRIBED AND SWORN TO before me this 8th day of August, 2008.

Notary Public

DOROTHY M. WEAVER
Notary Public, State of Texas
My Commission Expires
February 16, 2010

EXHIBIT H

THIS EXHIBIT HAS BEEN REDACTED IN ITS ENTIRETY