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)

DECLARATION OF JOAO B. P. SOARES, Ph.D.

I, Joao B. P. Soares, do declare and state as follows:

1. I am currently a Professor in the Department of Chemical Engineering at the University of Waterloo (Waterloo, Ontario, Canada). I am also an Adjunct Professor in the Department of Chemical Engineering at the King Fahd University of Petroleum and Minerals (Dhahran, Saudi Arabia). I have a BASc in chemical engineering from Federal University of Bahia in Salvador, Brazil (1983). I have a MASc in chemical engineering from the State University of Campinas in Campinas, Brazil (1985). I also have a PhD in chemical engineering from McMaster University in Hamilton, Canada (1994). I am also a consultant for ExxonMobil, LyondellBasell and BASF.

2. I have authored more than 120 articles in referreed scientific journals, 11 book chapters, and have given more than 130 oral presentations at international scientific conferences on topics concerning olefin polymerization kinetics, mathematical modeling, and polyolefin characterization. I am a member of the Executive Advisory Board of the Wiley-VCH Macromolecular journals and responsible for the coordination of the scientific journal *Polymer*

Reaction Engineering. I am also the co-organizer of two major polyolefin conferences: the International Conference on Polyolefin Characterization (ICPC) and the International Conference on Polyolefin Reaction Engineering (INCOREP). I am also the organizer for the Polymer Characterization Symposium in the upcoming 8th World Congress of Chemical Engineering (Montreal, Quebec, Canada, August 23-27, 2009). I have given 15 in-house industrial short courses and 23 open industrial short courses, all in the areas of olefin polymerization kinetics, mathematical modeling and polyolefin characterization. I am also a Fellow of the Chemical Institute of Canada, a member of the American Chemical Society and the Institute for Polymer Research at the University of Waterloo, and a Professional Engineer in Ontario.

3. I have been retained by counsel for plaintiff the Dow Chemical Company ("Dow") for purposes of offering my expert opinions in support of Dow's Opening *Markman* Brief.

4. I have reviewed U.S. Patent Nos. 5,847,053 ("the '053 patent") and 6,111,023 ("the '023 patent").

5. I understand that both parties dispute the meaning in the term "homogeneously branched" as it is recited in the '053 patent claims and referred to the patent's specification. The '053 patent specification explains that "homogeneously branched" means:

> The homogeneously branched ethylene/α-olefin interpolymers useful for forming the compositions described herein are those in which the comonomer is randomly distributed within a given interpolymer molecule and wherein substantially all of the interpolymer molecules have the same ethylene/comonomer ratio within that interpolymer.

(col. 3, ll. 29-35). It is my opinion that, persons with ordinary skill in the art understand that certain polymers, especially polymers made with a single-site catalyst in a well-mixed reactor, will have a branching distribution of the type quoted above. These polymers are often called

"homogeneously branched polymers" because they are produced with a single-site catalyst and have more uniform properties than polymers made with multiple-site catalysts. The average molar fraction of comonomer, i.e., the branching, of these polymers is also homogeneous and does not depend on molecular weight. Consequently, a person of ordinary skill in the art would understand the phrase "homogeneously branched" used in reference to a polymer to have the meaning quoted above.

6. I also understand that both parties dispute the meaning of "ethylene interpolymer" recited in claims 1 and 9 of the '023 patent. According to the '023 patent specification, the term interpolymer is defined as follows:

> The term "interpolymer" is used herein to indicate a copolymer, or a terpolymer, or the like. That is, at least one other comonomer is polymerized with ethylene to make the interpolymer.

(col. 4, ll. 1-4). As such, an ethylene interpolymer is a polymer made from ethylene and at least one comonomer. In my opinion, this definition reflects the well known, ordinary and customary meaning of the term in the art. A copolymer is a polymer with two monomers. A terpolymer is a polymer with three monomers. And an interpolymer includes both of these types of polymer as well as any other polymer with more than one monomer. Consequently, an ethylene interpolymer would be one with ethylene and at least one other comonomer.

7. It is also my understanding that both parties dispute the meaning of the claim term "linear polymer fraction, as determined using a temperature rising elution fractionation (TREF) technique" recited in claims 1 and 9 of the '023 patent. I have reviewed the reference in the '023 patent to the phrase "linear fraction." (col. 8, l. 59). That portion of the specification states that Dowlex 2045, a heterogeneously branched polymer, "has a distinct peak at an elution temperature of about 98° C., indicating the 'linear' fraction of the whole polymer." (col. 8, ll. 58-60). It is my understanding that the reference to "elution temperature" refers to the "TREF

technique" as recited in the claims 1 and 9. It is well known that the "98° C" peak in Dowlex contains molecules that are predominantly, but not entirely made of ethylene. They nevertheless contain a few short chain branches from octene that is incorporated into these molecules. Accordingly, the '023 patent uses the term "linear fraction" to refer to a fraction of the Dowlex polymer that in fact contains lightly branched molecules and possibly some homopolymer molecules.

I declare under penalty of perjury that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true.

Date: August 13, 2008

Joao Soares

Joao B. P. Soares, Ph.D.

CERTIFICATE OF SERVICE

I, Rodger D. Smith II, hereby certify that on August 13, 2008, I electronically filed the foregoing with the Clerk of the Court using CM/ECF, which will send notification of such filing(s) to the following:

Richard L. Horwitz
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I also certify that copies were caused to be served on August 13, 2008, upon the following in the manner indicated:

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