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It is a real honor to be included as part of the Plastindia inaugural session and to participate with so many distinguished guests. On behalf of the Dow Chemical Company, I would like to thank you for this opportunity.

Plastics are a critical part of not only our company, but also our individual lives. To a large extent, plastics define our standard of living. It touches every aspect of society. Our transportation is lighter, safer, and more durable and fuel efficient due to plastic. Plastic preserves our food, insulates our homes, encloses the electronics we rely on, and enables an unprecedented standard of care in medicine.

Given the tremendous growth and innovation over the last few decades, one has to wonder -- is this a mature industry? **Can we continue to invent and grow beyond GDP?** A review of recent plastic inventions casts doubt on our ability to sustain previous levels of success. Polyketones, our Sydiotactic polystyrene, and poly lactic acid have failed to produce profitable growth platforms. In part, this is due to the exceptional robustness of the previous innovations. These new materials simply do not offer enough unique properties or cost advantages to displace incumbent materials or enable new applications. In short, they do not have a compelling value proposition. The plastics industry provides value when we bring our customers productivity or dramatically new functionality. Eliminating secondary operations, part consolidation and increased performance are the hallmarks of our success.

So back to our initial questions**- is there any innovation left in plastics?** A corollary question I am often asked is – **will we invent a new polymer**? My opinion is **no, if** you define a polymer in terms of practical fundamental linkages connecting the monomers. I believe the organic chemists have done a pretty thorough job of mapping out all the various ways to link carbon, oxygen, hydrogen, nitrogen and sulfur atoms. That is the reason our undergraduate organic chemistry text books are so thick. They did a nice job mapping the basic chemistry. Polycarbonate, polyesters, polyamide, polyimides,

polyethers, polyolefine, etc. are all well known. So I don't believe there will be any fundamental new polymers, **based on linkages**.

However, I would contend that it does not mean innovation is dead in plastics.

First, we continue to find new monomers. While the linkages might not change, the molecules we put between the linkages can give us new families of products with higher heat, improved ductility, strength, optical properties, etc. One only has to look at the number of new patents granted to see the richness of work going on in this area.

Secondly, filler and compounding technology continue to advance. We change the modulus ductility balance, add conductivity, and create startling new visual effects through the use of fillers and additives.

Third, we can change the molecular architecture. Think of monomers as bricks. Any mason knows **how** to put the bricks together which defines the structure more than the individual bricks. For example take Dow's VERSIFY™ Plastomers and Elastomers.

This is a range of specialty propylene ethylene semicrystalline copolymers. Propylene and ethylene are very old. Polyolefins based on these materials were among the first plastics. After decades of development, what is left? Plenty. By changing the way these old molecules are put together, we can create new materials. The unique molecular architecture of VERSIFY provides films, fibers and molded parts with excellent clarity and gloss, superb elasticity, flexibility, softness and compatibility. These innovation were made possible not by new building blocks or linkages, but by a new catalyst allowing precise control of how we assemble our monomers. These improved properties resulted in commercial sales of 20 million pounds in two years following introduction. For comparison it took six years for acetyl to reach this level. Polycarbonate, polyamide, and PBT took 10 years. All from some very old molecules.

Finally our industry continues to develop new ways to form our existing materials. Plastics are versatile and readily processed. Direct compounding and other new forming technology allows us to expand the array of processing options.

I am very optimistic that there is much room for continued innovation. We will certainly faces challenges, not the least of which is unprecedented increases in raw materials. My Dow colleague Charlie Kresge says, “we compete in a world where most people call our feedstocks fuel. To continue to prosper we must continue to innovate”.

It seems every week I get another email or solicitation to participate in an innovation seminar. Everyone is frustrated with the pace of innovation and there are hoards of consultants trying to help us improve. We are obsessed with benchmarking and looking for the magic process. There are week long conferences on measuring R&D. I would like to close with my thoughts on what it takes to be an innovator. It is simple. **Great People**. Nothing else matters if you don’t have a talented, well-trained work force. No process can make up for a lack of creativity. It is in this area I believe India has a huge advantage. The technical talent pool and entrepreneurial spirit in India is second to none. I believe plastics innovation will continue and India will play a critical role in advancing the value our industry provides to society.