I would like to thank the panel members of the EPA and NHTSA for holding this hearing today and allowing me to address this public forum. I am pleased to offer comments to this committee on the relevant work to reduce vehicle emissions being carried out by United Stated Steel Corporation, in cooperation with our automotive customers, the North American steel industry and the global steel industry.

I am Jody Shaw, Manager of Technical Marketing and Product Research for U. S. Steel, the largest U. S. based integrated steel maker and a significant supplier to the major North American vehicle makers. Our objective is to preserve and grow this vital market and maintain steel’s participation in the vehicle. I want to make the case for why this objective is also good for the goals of the EPA and NHTSA, that is, how steel technology can help to reduce emissions associated with vehicles.

The core of my message today, is that steel can play an important role in reducing the energy consumption and CO₂ emissions in all phases of a vehicle’s life; the manufacturing phase, driving phase and end-of-life.
Over the past few decades in working with our automotive customers, I have seen a remarkable evolution of both the material we supply and the their application that have positively impacted the vehicle in meeting the NHTSA and EPA regulations.

Historically, the focus of CAFE regulations has been the use or driving phase of the automobile. Steel has been and will remain important to automakers’ efforts to improve fuel economy. Steel’s role is to enable mass reduction while maintaining safety and affordability. Today, steel is the dominant material in modern vehicles in the United States and around the world representing 60% of the vehicle material content. Steel has maintained that dominance for the 100 year history of the vehicle.

However, it has not been the same steel. In the 60s and 70s, we replaced the cold roll steels that rust with zinc coated steel. In the 80s and 90s, we replaced mild steel with high strength steel. This decade, we are replacing the high strength steels with lightweighting advanced high strength steel. And a decade from now, we will be replacing those steels with new advanced lightweighting products.

Today, the advanced high strength steels are the fastest growing material in vehicle designs. Whereas in 1999, there were nearly no applications of advanced high strength steels, today they represent 15% of the vehicle steel content. Each and every new vehicle launch increases the content of these grades with the vehicle makers expecting
to reach 50% within the next decade. Our customers demand for these products is a result of their lightweighting capability that enables affordable designs within their existing manufacturing facilities.

The need for these new materials have come as a result of the increasing crash requirements which have changed the vehicle structure from a stiffness dominated design to a strength dominated design. And strength is where steel performs better than any other automotive material. The advanced high strength steels are 4, 5, and 6 times stronger than the steels they are replacing.

But what has this meant to lightweighting of the vehicle? Material lightweighting is a function of design flexibility, strength and density. What steel lacks in low density relative to competing materials, it more than compensates for with strength and design flexibility. To demonstrate that capability, the steel industry has invested in many projects demonstrating 25 to 30% mass reduction.

We have worked with our customers to incorporate that technology into each and every new vehicle being launched today. These new vehicle structures are twice as strong as previous designs with mass reductions in excess of 20%, while meeting the increased crash requirements and maintaining affordability. And remember, this technology is not yet fully integrated. Advanced high strength steel content will increase from 15% today to 50% in the next decade, enabling additional mass saving on future vehicles.
Clearly steel is and will continue to play a role in reducing the energy use and CO₂ emissions of the vehicle in its driving phase. However, as I mentioned at the outset, steel also can play an important role in reducing the energy use and CO₂ emissions in the other phases of a vehicle’s life; in particular, the manufacturing phase and end-of-life recovery. EPA and NHTSA have an important opportunity to use this rulemaking to formulate policy guidance that best encompasses the entire environmental impact associated with a vehicle and consequently encourages vehicle manufacturers to choose the materials that results in the lowest environmental impact over the entire vehicle life.

The advanced high strength steels’ energy and CO₂ intensity is the same as conventional steels. So in the manufacturing phase, a 25 to 30% mass reduction enabled by these materials means we produce 25 to 30% less steel for each vehicle with the accompanying reduction in raw material use, energy use and CO₂ emissions. This mass reduction then improves fuel economy, reducing energy use and CO₂ emissions in the driving phase. Then at the end of the vehicle’s life, 100% of the steel in vehicles is recycled back into the very same steel products or future steel products for the next generation of vehicles.

In contrast, the low density competing metals, such as aluminum or magnesium, have a much different story. On a per pound basis, the energy and CO₂ intensity of these materials are 7 to 18 times more than steel, resulting in a corresponding increase in the vehicles
manufacturing energy and CO₂ intensity. These materials may provide a mass advantage. Unfortunately, what is gained in fuel economy in the driving phase through weight reduction can be easily overcome by the selection of high-energy, CO₂-intensive, low-density materials.

This concept goes beyond material selection and applies to many technology options that may perform well within the envelop of the regulated tailpipe emissions but perform poorly when that boundary is expanded to address the total life cycle. To address these unintended consequences, a life cycle assessment approach is needed that considers all the phases of a vehicle’s life. The methodology for a life cycle approach is well established in ISO Standard 14040 with many vehicle manufactures already implementing this methodology in vehicle designs. The concern is vehicle makers may select technologies that increase the full life cycle energy and CO₂ footprint of the vehicle in order to comply with the tailpipe only regulations.

We will continue to invest in steel technologies that reduce the full life cycle energy and CO₂ footprint of the vehicle. Since 1990, the North American steel industry has reduce the energy and carbon intensity of steel by 33%, more than doubling the targets set by the Kyoto Protocol. Looking to the future, the steel industry is exploring over 100 independent CO₂ technologies to reduce or eliminate the carbon emissions associated with steel making. We continue to develop new grades of steel, both independently and in partnership with the National Science Foundation and universities, that will enable
additional lightweighting. And at the end-of-life, steel will continue to be the most recycled material on the planet, more than all other materials combined. The combination of these investments will reduce the energy and CO₂ intensity of the steel supplied, reduce the amount of steel needed per vehicle, reduce the tailpipe emissions though weight reduction and reduce emissions at end-of-life though recycling.

However, without the appropriate regulations, these opportunities to reduce the energy use and CO₂ emissions associated with vehicles may not be realized. The current fuel economy and tailpipe emission regulations may result in the unintended consequences of increasing the full life cycle energy use and CO₂ emissions of the vehicle. It is my recommendation and request, on behalf of U. S. Steel, that the EPA and NHTSA develop policies that comprehend the full life cycle environmental impact associated with a vehicle and encourages vehicle manufacturers to chose technologies that results in the lowest environmental impact over the entire vehicle life.

Thank you for your time today and I would be happy to answer any questions.