August 22, 2003

Dr. Jeffrey Runge, Administrator
National Highway Traffic Safety Administration
U.S. Department of Transportation
400 7th Street, S.W.
Washington, D.C. 20590

Dear Dr. Runge:

We applaud the National Highway Traffic Safety Administration's (NHTSA's) recent efforts to address the dangers of light truck incompatibility. The growing number of light trucks on the highway is increasing the damage inflicted by these larger vehicles in crashes with passenger cars, and vehicle incompatibility and aggressivity is a serious problem that is rightly identified as an agency priority. The launching in September 2002 of an integrated project team to conduct in-depth review of vehicle compatibility and the June report on vehicle compatibility are both commendable steps towards mitigating the risks that oversized light trucks pose to other vehicles.

However, the agency's proposed initiatives all mimic, to a disturbing degree, industry suggestions that overwhelmingly focus on occupant protection, support only voluntary measures, and distance themselves from design changes. The February 13, 2003, letter from the Alliance of Automobile Manufacturers and the Institute for Highway Safety states

> *…a high priority should be further enhancing the protection for occupants. Possible changes to front and side structures to improve compatibility in front-to-side crashes also need to be explored. However, any specific recommendations on how to implement structural changes are likely to occur in the longer term.*[1]

The statement tidily sums up the recommendations contained in the agency's report. Yet NHTSA should not let the industry set the agenda. While safety has never been a priority for auto manufacturers, it is your agency's raison d'être.

While improving occupant protection is very important and we support such measures as requiring side curtain air bags in all passenger vehicles, the total crash dynamic must be considered. We must alter the existing, myopic focus on occupant protection, and adopt a more ethical approach that comprehends the total picture of vehicle safety and compatibility.

The design of light trucks — and large pickup trucks in particular — with their steel bars and frame-on-rail construction, act like battering rams in a crash. Moreover, the auto industry has a very poor record of self-regulation in terms of consumer safety, particularly in areas requiring a more comprehensive approach to vehicle safety design. Until NHTSA ceases rubber-stamping industry's suggestions for voluntary measures and expeditiously establishes policies to effectively address the incompatibility crisis, the carnage on the roads will only continue.

The Aggressivity Crisis Requires Immediate and Decision Action by NHTSA

Automakers have long advertised SUVs and pickup trucks as safe vehicles for families. Yet these vehicles are unsafe for their occupants, as rollover death rates continue to climb, and are devastating for other vehicles on the highway, making them a poor bargain for society. Manufacturers have known for years about the damage light trucks incur on when they crash into passenger cars. They've unblinkly faced the carnage inflicted on other motorists from light trucks' high bumpers and menacing front grilles, building ever-more heavy and terrible SUVs over time and continuing to market them militaristically, such as with ads calling the Lincoln Navigator an "urban assault vehicle." In fact General Motors' new Hummer is a direct adaptation of a military vehicle.

SUVs and pickups were never designed to be safely used as passenger vehicles. Unit body cars are designed as one frame, in a kind of steel lattice, that is lightweight yet safe for occupants and others on the road because it crushes inward in a predictable manner, absorbing energy so that occupants and others are saved. In contrast, the body-on-frame construction used for most SUVs and all pickup trucks is formed with long, stiff, steel rails which act as battering rams in a crash and do not absorb energy well.

The high bumper, stiff frame and steel-panel construction of light trucks override crash protections of other vehicles, and the steel-beam truck chassis can puncture struck passenger cars like fork tines. A small car like the Honda Civic receives safety ratings better than many much larger vehicles — design is what matters for occupant safety, rather than size or weight alone.

One former NHTSA Administrator estimated in 1997 that the aggressive design of light trucks has killed 2,000 additional people needlessly each year.[2] A more specific analysis found that 1,434 passenger car drivers who were killed in collisions with light trucks would have lived if they had been hit instead by a passenger car of the same weight as the light truck, even under the same crash conditions.[3] Yet another study has shown that for every Ford Explorer driver saved in a two-vehicle crash because that driver chose an Explorer over a large car, five drivers are killed in vehicles hit by Explorers.[4]

Pickup trucks are riskier than any other vehicle on the road. There are twice as many deaths in car-to-pickup crashes as in car-to-car crashes.[5] An analysis of the 40 most popular cars and light trucks shows that pickups rank worst as a class in combined driver risk – above SUVs, minivans, large cars, compact cars, and subcompact cars.

The combined risk posed by pickup trucks to all drivers is between 175 and 238 driver deaths per year, per million vehicles sold. This compares with a range for large cars of between 63 and 113, for subcompact cars between 72 and 114, and for SUVs of between 111 and 174. And the heavier the pickup truck, the riskier the vehicle. Pickups are also the most aggressive class of vehicles. Five of the six pickups ranked as the most risky to other drivers, killing on average between 99 and 136 per million vehicles.[6]

One-ton pickups like the largest Dodge Rams and the Ford F-350 are tremendously dangerous vehicles, both because of their propensity to rollover and their aggressivity when in crashes with other vehicles. Contrary to industry myth, the larger, heavier vehicles are not inherently safer for occupants, and may pose a far greater risk than other vehicles to other people on the road.

NHTSA's Proposed New Standards Are a Positive Step, But Address Only Half the Solution

Many Key Upgrades Planned by NHTSA Are Sorely Needed and Long-Overdue

We welcome many of the proposed the initiatives in your report on vehicle compatibility. The glare from high-mounted headlamps on light trucks can be a dangerous distraction for passenger car drivers, particularly at nighttime, and we are pleased with the proposed amendments to Federal Motor Vehicle Safety Standard (FMVSS) No. 108, Lamps, Reflective Devices, and Associated Equipment. In addition, we fully support efforts to improve roadway hardware, such as guard rails and barriers, and to keep consumers informed about new safety metrics and standards.

Improvement of FMVSS No. 208, Side Impact Protection, is welcome and long-overdue. As your report states, the standard has not been substantially upgraded in over a decade and the most recent crash data demonstrate the extreme risk that passenger car occupants face when their vehicle is struck in the side by a light truck — over *28 times* the risk of death faced by truck occupants. Mandating the installation of side curtain impact air bags would improve a vehicle's self protection by absorbing crash energy and providing head and chest protection.

Side Impact Upgrades Are Needed

Enhancement of the FMVSS No. 214 static side door crush resistance test procedure, as suggested in the report, could also be highly significant in addressing vehicle incompatibility. In 2001, over 28 percent of vehicle occupant fatalities, or 9,251 deaths, were due to ejection.[7] Every year 1,660 fatalities and 1,970 seriously injured occupants are ejected through a door. Roughly two-thirds of door openings in these

crashes are the result of structural damage to the latch or the metal plate attached to the door pillar that secures the door.[8] Improved side door crush resistance, along with mandated side curtain air bags, would be effective steps towards increasing the self-protection of occupants involved in crashes with light trucks.

Voluntary "Standards" for Side Impact Improvements or Partner Protection Are No Solution

Improvements in self-protection must be accompanied by improved partner protection, however, because improvements to the vehicle structure that enhance self-protection result in a stiffer vehicle that is therefore more violent in a multiple-vehicle crash. Self-protection augmentation, while vital, should not be NHTSA's only definitive response. The February 13, 2002 letter from the Alliance quoted above demonstrates that the industry is aware of the agency's interest in addressing problems related to vehicle compatibility and aggressivity. However, this long-overdue industry reaction seems mainly calculated to convince federal regulators, legislators and the media that a voluntary effort to improve vehicles could, and should, replace the development of new safety standards for light trucks.

Yet the Alliance makes no specific commitments to redesign vehicles to protect consumers, despite the fact that it has known for decades that pickup trucks act as battering rams in crashes, and that that the height and stiffness of SUVs makes them major killers on the highway. As this suggests, voluntary safety "standards" do not work. In fact, Congress rejected them almost three decades ago when it passed the National Traffic and Motor Vehicle Safety Act in 1966. As the Senate Committee Report stated:

> *The promotion of motor vehicle safety through voluntary standards has largely failed. The unconditional imposition of mandatory standards at the earliest practicable date is the only course commensurate with the highway death and injury toll.*[9]

The 1966 Congressional legislators were right. The historical path of automakers' voluntary efforts is paved with broken promises. From General Motors' promises in 1970 to voluntarily put air bags in all its vehicles by the mid-1970s (GM installed just 10,000 in model year 1974 and 1975 vehicles, and then discontinued the program), to Ford, DaimlerChrysler and GM's recent recanting of their widely publicized 2001 promises to voluntarily improve the fuel economy of their light trucks by 25 percent (withdrawn after the threat of Congressional action on fuel economy receded), "voluntary" is often just another name for the manufacturers' tactical maneuvers and delay.

In addition, voluntary "standards" violate core principles of democratic accountability and transparency, as they:

- **Involve closed, secret processes and meetings**: The public, which is at risk, is shut out of the development of the proposal, which instead is designed in secret by industry working groups;

- **Involve no mechanisms for accountability**: The public has no means to secure an independent evaluation of the quality of the industry's voluntary tests or standards;
- **Lack procedural and judicial oversight**: Industry group decision makers are not subject to oversight, compliance with statutory requirements, responsibility for explaining the basis for their decisions, or judicial review of decisions;
- **Lack transparency**: The public receives no verification that a particular vehicle actually complies with the industry's voluntary tests, as they do with government standards that are subject to public compliance testing and enforcement, and there is no vehicle sticker at the point-of-sale to indicate that a standard is met;
- **Lack a baseline for safety**: High-income purchasers, who can afford safety extras may be protected, but low-income purchasers remain vulnerable to cost-based decisions by manufacturers;
- **Produce weak and non-binding results**: Proposals are invariably weak because they represent the lowest common denominator among companies looking out for their own costs and product plans, and there is no obligation to install technology in compliance with the group standard, meaning that companies can change their minds at will and decide to withdraw any protection offered by the voluntary "standard."

A voluntary "standards" program is a particularly inapt solution where, as here, thousands of lives are at stake, the manufacturers have long been on notice of the serious safety hazards in these vehicles, and the externalities of their marketing-driven decisions to produce ever-more aggressive and deadly vehicles are imposing needless suffering and costs on all of us. Federal safety standards are the only way to mitigate the dangers of incompatibility and aggressivity, and save countless lives.

Harmonization Efforts Raise Serious Concerns and May Threaten NHTSA's Progress

We are also skeptical of NHTSA's work in collaboration with the International Harmonization Research Activities (IHRA) working group for compatibility. International collaboration is excellent for sharing ideas, and many important auto safety developments have come to the United States through international forums, such as the Enhanced Safety of Vehicles Conference. However, allowing shared research efforts to form the basis for the international harmonization of safety standards presents substantial and insurmountable risks, given the current structure of international trade agreements and enforcement mechanisms:

- The process tends to produce a "race to the bottom," as countries wishing to improve upon a basic international minimum standard may be brought before the World Trade Organization (WTO) and the standard eliminated as a violation of rules requiring adoption of the "least trade-restrictive" standard.
- Due to the multiplicity of actors and their different agendas, once adopted, it would be much more difficult to improve upon an international, "harmonized" standard over time or in keeping with technological developments than to enhance a standard set on the national level.

Given the agency's assertion in its recently published priority plan that it plans to reevaluate safety standards on a seven-year cycle, the need to bring international bodies along on such a timetable appears to render either this goal or the agency's harmonization objectives untenable. Yet the reevaluation and updating of standards is a core, and long-neglected responsibility to the agency's safety mission, and should not be at all compromised by NHTSA's international participation.

A Minimum Aggressivity Standard Is Well-Supported by Existing Research and Should Be Issued by NHTSA to Enhance Partner Protection and Save Lives

We are encouraged by NHTSA's efforts to develop an aggressivity metric in vehicle-to-vehicle crashes. The Average Height of Force (AHOF) is a single height measurement that represents that average height at which a vehicle transfers force to a rigid barrier. The report's proposal, however, describes only a "long-range" effort to develop vehicle-and-barrier and vehicle-and-vehicle crash tests to fully describe AHOF and identify other vehicle characteristics that influence occupant injury in the struck vehicle. While crash tests are clearly essential tools in developing vehicle safety regulation, a protracted testing program could stall the development of a compatibility standard for years.

Moreover, crash test data is never as valuable as real-world crash data. NHTSA, through the National Center for Statistics & Analysis (NCSA), has long been an excellent source of reliable crash data, and the Fatality Analysis Reporting System (FARS) and the National Automotive Sampling System General Estimates System (NASS GES) are both outstanding databases. Computer modeling developed from the real-world crash data is also a far more expeditious method of developing AHOF.

In order to facilitate computer modeling and other crash evaluation methods, NHTSA should develop an index of vehicle characteristics that influence occupant injury in the struck vehicle. In addition, the agency should expand the number of crash cases it investigates in order to enhance the statistical validity of research conclusions derived from the data.

NCSA, through its Special Crash Investigations (SCI) division, does not currently adequately document a number of the most critical aspects of multiple vehicle crashes. Refined measurements of multiple heights for each involved vehicle structure will help researchers to understand the nature of the interaction and the ratio of the energy absorbed by each crash vehicle. Enhanced photographic documentation of both crash vehicles would also help retrospective evaluations of vehicle-to-vehicle compatibility. In addition, documenting the vehicles' deformation as to a greater number of the vehicles' energy-absorbing structures — including frame rails, engine components, firewall, and pillars — would help researchers better evaluate compatibility and mismatch.

The agency should also use its 400 existing fixed rigid barrier crash tests to identify pairs of vehicles that are comparable in classification, such as large and small SUVs, but different in measured characteristics, such as high and low AHOF.

Preliminary research by researchers Marc Ross and Tom Wenzel has shown that unibody/crossover SUV models tend to have lower risks than conventional SUV models.[10] This kind of research, using existing testing data, can be used to isolate best and worst practices in vehicle compatibility and form the basis for future regulation and for crucial consumer education programs to inform the public about the ethics and real-world consequences of their vehicle purchase decisions.

Research Already Amply Supports Rulemaking To Increase Vehicle Compatibility

Despite the need for improved data collection, NHTSA demonstrates in its report that there already is sufficient statistical evidence of light truck incompatibility to begin a rulemaking. According to agency data, the two most frequent fatal non-rollover crash scenarios are the front of a light truck striking the side of a car, and a frontal collision between a light truck and a car. In frontal crashes involving a car and light truck, there are almost 1,000 more fatalities in the cars than in the light trucks. In side impact crashes involving two cars, there are almost 1,000 more fatalities in the struck vehicle than the striking vehicle. However, when the striking vehicle is a light truck, there are almost 2,000 more fatalities in the struck vehicle.[11]

Controlling for potentially confounding factors, such as vehicle and driver's age, NHTSA computed fatality ratios based on seven years of FARS data, using only two-vehicle frontal collisions where both the vehicles were model year 1990 or newer and drivers were ages 26 to 55. The agency found that even with the controls, passenger car occupants died almost five times more often in collisions with SUVs, and about *eight* times as often in collisions with full-size pickups.[12]

In terms of specific investigations of vehicle frontal geometry and stiffness, NHTSA has already collected impact force data from over 400 New Car Assessment Program (NCAP) tests when developing the AHOF metric. Analyzing these tests, researcher Charles Kahane found that the difference in the AHOF between the struck and the striking vehicles has a statistically significant correlation with the fatality risk of a car driver struck on the driver's side by the front of a light truck.[13] Moreover, the agency has already computed the initial stiffness of vehicles for NCAP crash tests and has demonstrated that the initial stiffness of a light truck has a statistically significant correlation with the fatality risk to a passenger car driver involved in a frontal collision with the truck.[14]

Hans Joksh came to similar conclusions in 2000, demonstrating that weight, height of center of force, static stiffness, and dynamic stiffness are all correlated with aggressivity when testing vehicles of all types, and that vehicle stiffness was particularly well correlated with aggressivity for pickup trucks.[15]

Kennerly Digges showed that both stiffness and center of force vary with vehicle weight, which proves that the vehicle weight may not adequately account for variations in the stiffness and geometry of the vehicles in the fleet, particularly for trucks and multi-passenger vehicles. In all cases, impact above the vehicle sill is more likely to cause

serious injuries and death than impact below the sill.[16] Side impact protection is reduced when the intrusion at the chest level precedes the intrusion at the pelvic level, meaning that a lower load path is safer. In addition, a lower load path also is more likely to engage the sill, therefore transferring less force to the door, upper pillars, the seat, and the passenger.[17] The high frontal design of pickups and SUVs is a crucial aggressivity factor.

Other research has found that light truck bumpers — either alone or in combination with the front grille or front hood — were the component most often associated with passenger car damage.[18] Another study for NHTSA revealed that hood profile — the height of the hood of the light truck — was the most important factor in the aggressiveness of a light truck. In the study of 12 collisions, the researchers found that a lowered profile (a tapered hood) for the light truck reduced the probability of serious injury to occupants of the struck car from 97 percent to 11 percent.[19]

With all the valuable research already available and, in NHTSA's own admission, correlated to real-world crash events and effects, it is inexplicable that NHTSA claims it "has yet to demonstrate that any of these characteristics can prospectively measured in a vehicle crash test, and the level of compatibility quantified." The record is in fact replete with detailed findings that could form the basis for a standard, and any small holes in the agency's understanding may most efficiently be filled through the open notice-and-comment process attendant to a rulemaking.

In short, the agency should craft a life-saving minimum standard and consumer information program and thereby continue to develop its knowledge concerning vehicle compatibility. As NHTSA states in its conclusion to the report, "[v]ehicle compatibility has been a concern for NHTSA since the 1970s." The time for action is now.

Any Reform of CAFE Must Rely on Real-World Historical Analysis, Not Hypothetical Formulas

Public Citizen is outraged by the agency's overly simplistic and unscientific evaluations and statements concerning the relationship between historical fuel economy standards and safety in its report. Given the extraordinarily high stakes regarding the "right answer" in this area, it is an abomination that NHTSA's public statements do not reflect a more thoughtful treatment of the interactions between fuel economy standards and vehicle safety. The fate of efforts to address global warming and climate change, pollution, cancer and asthma, oil dependence and national security all hang in the balance, and the agency's blithe, over-broad and inaccurate characterizations of this complex area do serious and lasting harm to public health as well as the agency's authority.

Indeed, the agency has a moral and legal obligation to publicly and seriously evaluate the many, disparate criticisms of its own studies and statements in this area. Yet NHTSA has never, in any rulemaking document or public statement, even addressed, much less answered, any of our or other commenter's numerous, direct submissions

questioning the validity and adequacy of the report undertaken by NHTSA researcher Charles Kahane and highlighting the many problems in the agency's analytical approach.

NHTSA specifically raised the issue of the relationship between safety and vehicle fuel economy in its notices regarding model year 2004 and model year 2005-07 light truck average fuel economy. In response, Public Citizen, as well as numerous other groups, conducted a detailed survey of the studies in this area, including the articulate dissent written by David Greene of the National Academy of Sciences pointing out several fatal flaws in the Kahane study and the re-do of the Kahane study by Dynamic Resources, Inc., and diligently submitted these comments to the agency's dockets.

Regardless of the need for the agency to directly address those comments, the agency's final rules contained virtually no substantive discussion of the safety issue — just noting that targets for the standards were set at levels not requiring any downweighting *See* 68 FR 16868, 16875-76 [summarizing comments regarding safety without any agency analysis or discussion]; *id.* at 16871, 16898 [summarily stating that the final rule will not "necessitate nor result in reductions in vehicle weight" without responding to comments that safety and weight are not correlates].

This is patently insufficient, yet in its latest stab at the issue in this report, the agency has the unimaginable chutzpah to blankly state that "the current structure of the CAFE system can provide an incentive to manufacturers to downweight vehicles," and that "[r]egardless of the root causes, it is clear that the downsizing of vehicles that occurred during the first decade of the CAFE program had serious safety consequences."[20]

The agency cites no research or support for these statements. In view of all our unanswered comments and analysis questioning the relationship between vehicle weight and safety, it in fact is far from "clear" what impact, if any, CAFE had upon safety. More to the point, it is also highly unclear whether those impacts are the *necessary and inevitable* outcome of improvements in fuel economy standards, or whether past experience is, in this case, a poor predictor of future outcomes. To treat wholly contested, and utterly contestable, statements as obvious truths is irresponsible public policy and an egregious misuse of the agency's reports on aggressivity and rollover.

Although uncited, we surmise that these problematic assertions arise from the agency's dependence on a hypothetical analysis performed by Charles Kahane, which the National Academy of Sciences (NAS) relied upon in its 2002 CAFE Report. If so, the reference is misplaced: Kahane's own study showed that a reduction in the weight of light trucks yielded safety benefits,[21] and light truck CAFE is surely the crucial area for improvements in aggressivity. In NHTSA's effort to "arm" itself with closely examined "safety consequences arising from the present composition of the light vehicle fleet,"[22] the agency should not rely on this fundamentally unsound, over-broad analysis.

The Kahane Study Does Not Establish Any Link Between a 100-lb. Weight Reduction in Light Trucks and Cars and CAFE Standards

In his 1997 study, Kahane went through three steps to reach his conclusion. Using regression analysis to measure the relationship between curb weight (including a reduction in wheelbase and track width) and fatality rates, the study:

1) Held light truck weights constant and reduced cars by 100 lbs. (with accompanying reductions in wheelbase and track width);
2) Held car weight constant and reduced light trucks by 100 lbs. (with accompanying reductions in wheelbase and track width);
3) Added the results.

While slimming down cars by 100 lbs. showed a considerable increase in fatalities (302 overall, mainly from increased rollover and impacts between cars and light trucks), the second step went a small way in the other direction, showing a small savings of life from reducing light trucks by 100 lbs. (40, the majority of the lives were saved in impacts with passenger cars).

There are problems with each of these steps. The overarching problem is that a 100-lbs. reduction is totally arbitrary and without any basis in the historical effects of CAFE, as explored more fully below. Indeed, the only thing that is adequately demonstrated is that a 100-lb. reduction in cars is more harmful than a 100-lbs. reduction in light trucks is lifesaving. Put another way, the study shows that taking 100 lbs. out of a car has a larger negative impact than the slightly positive impact of taking the same 100 lbs. out of a much larger and heavier light truck. This is a bit of a no-brainer: Positing a 100-lbs. reduction instead of, for example, a proportional reduction of weight, trackwidth, etc., merely builds into the study a systematic "bias" against cars.

It is also not clear that the results of these two steps are indeed additive. As David Greene and Maryanne Keller demonstrated in the NAS panel dissent, a 100-lbs. reduction across the entire vehicle fleet has no net effect on fatalities (though we suggest that it may increase rollover in both the car and light truck fleets).[23] This is a serious objection to Kahane's conclusion: Insofar as he is measuring increased fatalities in step one in crashes between smaller, lighter cars and light trucks that have not been slimmed down, removing 100 lbs. from those trucks at the same time would change the results. For this reason, the addition of the separate results in steps one and two appears spurious.

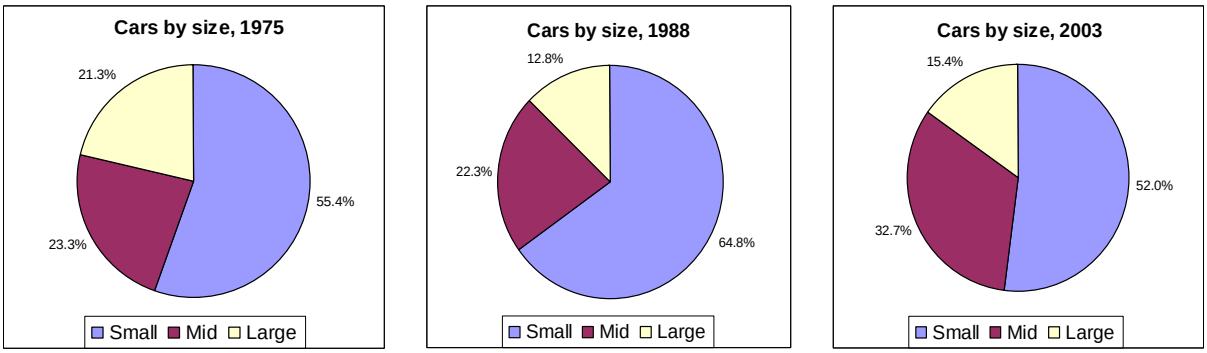
To restate this as a policy matter: If the safety impact Kahane finds could be solved or partially addressed by simultaneously raising both car and light truck fuel economy, then this particular choice in the study actually poses a crucial question unanswered by subsequent work or throughout its amplification and use by the NAS.

To add insult to methodological injury, Kahane's assumptions have no relationship whatsoever to the historical record. The vehicle fleet did not uniformly shift downward; instead, only the largest cars changed in proportion to the total car fleet. And,

as technology has caught up, there has not been a steady loss of weight or size in the fleet. Instead, the proportional distribution of cars by size category today looks very similar to the pre-CAFE picture, as the graphs below illustrate.

While the Kahane study has been treated as an accounting of the cumulative lives lost on an annual basis from CAFE, this difference between the actual historical picture and the purely theoretical one in Kahane shows how off the mark the study is. The effect, if any, is not, in fact, cumulative from year to year, but shifts along a technology horizon that controls the cost-effectiveness of technological versus weight-related solutions to CAFE.

MINIMAL INCREASE IN NUMBER OF SMALL CARS IN 1988, BUT SIZE DISTRIBUTION WITHIN CAR VEHICLE FLEET NEARLY IDENTICAL IN 1975 AND 2003



Because the label "scientific" is normally reserved for explorations involving empirical fact, the Kahane study is not scientific. As a matter of the historical record:

- Manufacturers reduced weight in the heaviest vehicles, not across-the-board.
- A 2002 study by Dynamic Research, Inc. (DRI), applying Kahane's methods to more recent crash and vehicle data, found that fuel economy standards did not harm safety.
- A more recent, 2003 study by DRI concluded that weight reductions improve safety, while wheelbase reductions harm safety. Kahane's assumption conflates and confuses these factors: Size and design, not weight, matters most for safety.

The Weight-Safety Relationship Is Complex – Vehicle Design Must Be the Focus of Efforts to Improve Safety

Auto industry defenders often argue that fuel economy standards' impact on safety is a matter of "simple physics."[24] The myth, consistent with the fallacies of the Kahane report, is that increased CAFE standards would directly result in weight loss across vehicle sectors, resulting in additional deaths on U.S. highways.

Yet even the NAS report found, as to future fuel economy improvements, that if fuel economy increases do cause the downweighting of vehicles that weigh more than 4,000 lbs. (a category which includes most light trucks), any negative safety impacts would be minimized or even reversed, resulting in safety benefits:

> *If an increase in fuel economy is effected by a system that encourages either downweighting or the production and sale of more small cars, some additional traffic fatalities would be expected.* However, the actual effects would be uncertain, and any adverse safety impact could be minimized, or even reversed, if weight and size reductions were limited to heavier vehicles (particularly those over 4,000 lbs.). Larger vehicles would then be less damaging (aggressive) in crashes with all other vehicles and thus pose less risk to other drivers on the road.[25]

Although many light trucks are over 4,000 pounds, this conclusion by the NAS is not mentioned in either NHTSA's recent rulemaking or the agency's reports on vehicle compatibility or rollover.

Indeed, researchers looking into aggressivity and compatibility have discovered that the physics of safety are anything but simple. Driver death rates in some passenger cars are far lower than driver death rates in SUVs and other light trucks.[26] This fact alone should suggest to the agency the need for a far more specific assessment of vehicle risk factors than has been done to date. As Mark Greene and Maryanne Keller, two members of the NAS panel, pointed out, the factors that confound efforts to isolate the effect of vehicle weight are highly complex and a comprehensive analysis, using historical data, of CAFE's effects on safety, has yet to be done.[27]

Make-model specific studies of vehicle fatality trends have shown that, historically, similarly weighted vehicles have had highly disparate safety effects for both their own occupants and other drivers on the road.[28] Marc Ross, of the University of Michigan, and Tom Wenzel, of Lawrence Berkeley National Laboratory, recently completed a study for the Department of Energy of driver death rates grouped by both vehicle type and model. They found that while the safest mid-size cars were as safe as the safest SUVs, that "SUVs impose a greater risk on drivers of other vehicles than do all types of cars." Pickup trucks, a vehicle category that is on average larger, heavier and stiffer than passenger cars, have a *combined* risk to their drivers and the occupants of other vehicles that "is much higher than that for other vehicle types." Appendix A lists their make-model findings both for risk to drivers of each type of vehicles and for risk to others on the road.

While Ross and Wenzel conclude that some vehicle types are overall more risky than others, they also point out that vehicle quality and safety design, which vary throughout each vehicle class, play a large role in overall risk. The range of risk within each vehicle type proves that a vehicle's overall safety is not dictated by mere weight or requirements and that manufacturers can determine safety through sound engineering choices.

Ross and Wenzel also conclude that, in terms of CAFE-related weight decreases, the "argument that the low weight of cars with high fuel economy has resulted in many excess deaths is unfounded."[29] Public Citizen encourages NHTSA to look into make/model specific vehicle quality and safety design when it analyzes the historical and likely future impact of CAFE standards.

CAFE and Safety Are Connected in Ways that Should Be Addressed by NHTSA to Decrease Harm from An Increasingly Divergent and Rollover -Prone Vehicle Fleet

While Public Citizen strongly disagrees with the statements from NHTSA's report that downweighting has been the result of CAFE and has compromised safety, we agree with the report that CAFE "increase[d] production of vehicle classes that are more susceptible to rollover crashes, and produce[d] a less homogenous vehicle fleet mix." There is a strong connection between both lax fuel economy standards for light trucks, the bifurcation of the CAFE program between cars and light trucks, and the present mushrooming of extremely aggressive light trucks on our roads.

Although the myth that a heavy vehicle offers better occupant protection is often bandied about, vehicle weight is actually a poor predictor of occupant safety. Weight does nothing to help, and may do serious harm, in a single-vehicle crash into an object and can raise the level of violence in crashes between two large, heavy vehicles. Because heaviness is often correlated positively with stiffness and negatively with rollover propensity, the overall effect is that large, heavy vehicles offer little or no advantage to occupants. As light trucks continue to flood the highways, their ethically dubious advantage over smaller vehicles in multiple-vehicle crashes is also dissipating.

Yet heavier vehicles do inevitably pose a higher risk to other occupants and pedestrians. And in calculations of partner protection, both weight and the aggressivity of design have been shown to play a major role.

Public Citizen strongly suggests that the agency allocate resources to research the real historical effects of the divergence of the vehicle fleet and the explosion of light truck sales. The real story, essentially abandoned by the agency in its light truck rulemaking, is that the last decade's lax CAFE standards for light trucks has provided an incentive to create an ever-more-divergent vehicle fleet, allowing manufacturers to ramp up sales of their most rollover prone and aggressive vehicles, and gravely degrading the safety of the American highway.

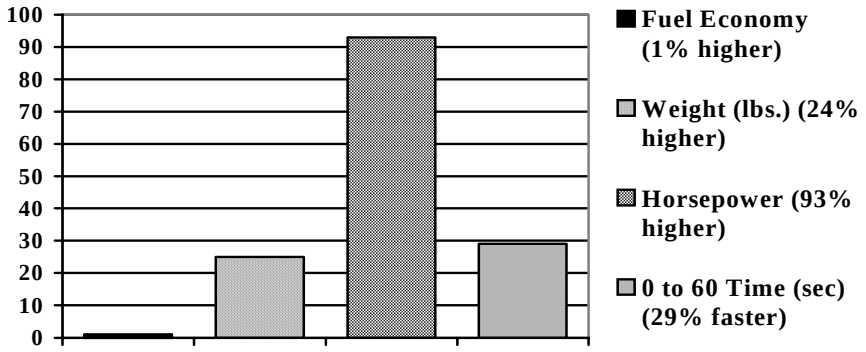
Lax Fuel Economy Standards for Light Trucks Cost Lives

Fuel economy standards for light trucks have not been significantly increased in over a decade and the average miles per gallon (mpg) of the light truck fleet has stagnated since the early 1980's. Without increases in fuel economy standards, EPA data show that automakers used predictable advances in technology and engine efficiency (totaling 1.9

mpg average yearly) to bulk up the weight and acceleration of vehicles, allowing vehicle gas mileage to stagnate (*see* Figure 1).[30]

If yearly fuel efficiency gains since 1981 had been translated into higher mpg rather than up-weighting and acceleration gains, cars would now achieve on average, almost 40 mpg, and light trucks would achieve nearly 28 mpg.[31] These engineering tradeoffs resulted in widening the divergence of vehicle weights on the highway, making two-vehicle crashes far more deadly.

Figure 1: Percent Change from 1981 to 2003 in Average Vehicle Characteristics

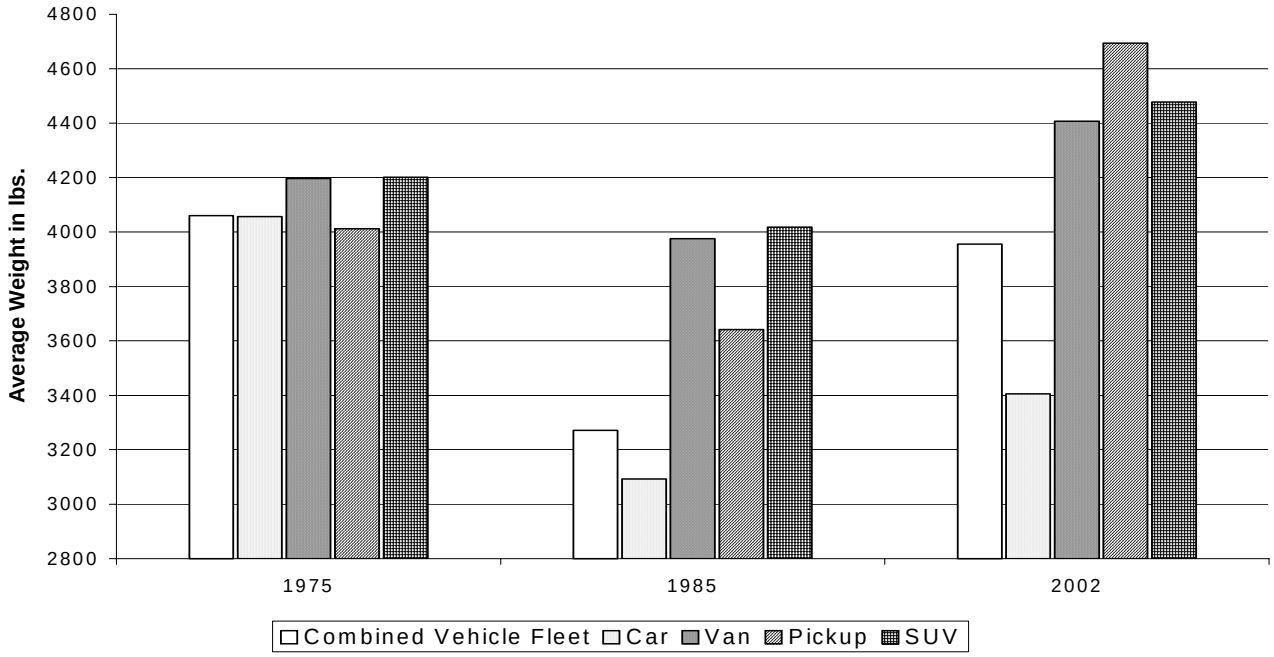


Although all vehicles got heavier between 1985 and 2003, the bulk of the recent gains in weight was concentrated in the light truck fleet. In 1975, the difference in average weight between cars and light trucks was 3 lbs. In 2003, it was 1,185 lbs.[32] The key factor for incompatibility – the weight gap between vehicles in the fleet – is steadily growing (*see* figures 2 and 3).

Figure 2: Vehicle Fleet Divergence 1975, 1988, 1990, 2001, 2003

Year	Light Truck Inertial Weight Average (lbs.)	Car Inertial Weight Average (lbs.)	Difference in Average Weight of Cars and Light Trucks (lbs.)
1975	4072	4075	3
1988	3841	3092	749
1990	4005	3175	830
2001	4462	3379	1083
2003	4595	3410	1185

Figure 3: Average weight of vehicle types 1975, 1985, 2002



Manufacturers Manipulated Lax Standards and Safety Loopholes to Produce Increasingly Inefficient and Dangerous Vehicles

The increasing weight of the light truck fleet would not be as dangerous as it is had the size of the light truck fleet stayed proportionately small. When the first fuel economy standards were set in 1975, light trucks made up 18 percent of the vehicle fleet.[33] Now, trucks, SUVs and minivans are more than half of all new vehicles sold and SUVs sales, in particular, have exploded with devastating consequences.

SUVs, which more than tripled their presence on the American highway between 1992 and 2001, were the primary fuel for this new light truck market. Unfortunately for American motorists, SUVs have not been held to the same safety and fuel economy standards as cars. Early SUVs were exempt from headrest, breaking distance and steel-beam side-impact collision protection standards. Until very recently, light trucks, including SUVs, have had less stringent tire durability requirements than do cars, and they still do not have to meet bumper height requirements.[34] And, since classified as "light trucks" in the 1970s, SUVs have been held to lower fuel economy and emissions standards than cars.

The largest SUVs continue to be regulatory renegades – slipping through the cracks of many federal standards. Large SUVs, those over 6,000 pounds, are held to a less protective side impact standard than applies to cars and they are not required to meet any roof strength standard. SUVs over 8,400 lbs. are not required to install anchorage systems to accommodate child restraints.

After years of losing out in the passenger car market to foreign manufacturers, the domestics' decision to produce and market vehicles in the far less regulated, tariff-protected[35] SUV category was like hitting the lottery. As Gerald Meyers, former vice president of vehicle development for American Motors (then owner of Jeep), told Keith Bradsher concerning the SUV:

> *It escaped regulation – we didn't have to worry about the fuel economy much at all, we didn't have to worry about bumper height standards, we didn't' have to worry about side impact standards, we didn't have to worry about emissions standards. So you see, it was a dream for us – we didn't have the money to do anything…. I was keeping a dying company alive.*[36]

Because of this, U.S. automakers found and developed,[37] in the SUV, a broad market that allowed it to rake in cash, while taking every step to avoid spending money to fix the unstable and threatening vehicle that resulted. Now, SUV and pickup truck sales account for nearly all of the profits of the Big Three auto companies.[38] While manufacturers make only a 3 percent profit on cars, they make 15 to 20 percent profit on SUVs.[39] General Motors, for example, generated 90 percent of its profits from SUVs and pickups.[40]

NHTSA has explained that, in proposing new CAFE initiatives, it will recognize the "substantial effects on vehicle safety [and] the composition of the light vehicle fleet" and act "without compromising vehicle safety."[41] In so doing, it is crucial that the agency consider the disastrous effects of not setting meaningful fuel economy standards for SUVs and other light trucks.

The agency's minimal light truck fuel economy standards have distorted good public policy and market preferences by giving manufacturers a strong incentive to market light trucks and particularly, SUVs. In addition, the current upper limit regarding the applicability of standards (6,000 lbs.) exempts the heaviest "light" trucks from even these minimal standards, creating a perverse incentive for manufacturers to "super-size" their vehicle fleet even further. These trends must end. Furthermore, the mere presence of stringent fuel economy standards will check the up-weighting allowable under the current system from the yearly yield of engine and technology improvements.

Any Restructuring of CAFE Should Result In a "Win-Win" That Increases Both Fuel Economy and Safety

NHTSA's report indicates that:

> *Consistent with its statutory authority, the agency plans to address issues relating to the structure, operation, and effects of potential changes to the CAFE system and CAFE standards.*

Public Citizen is very doubtful that any changes to the system that would be consistent with current statutory authority could be more effective than simply using the current system as it was intended. Public Citizen believes that the dismal recent history of CAFE is not a reflection of a broken system, but instead is the fruit of a severe deficit in the regulatory and political will to raise standards. The benchmark for comparison by the agency of proposed changes to the system therefore should not be the *status quo*, but should instead include an examination of the likely consequences of a substantial increase to the standard for both cars[42] and light trucks under the current system.

Moreover, we take a dim view of the agency's assertion that "NHTSA's goal" is to "identify and implement reforms" to CAFE that do not compromise "safety or American jobs." Safety design flaws are the direct and often unpredictable result of decisions by manufacturers and should be answered by safety standards which limit these choices to those optimal for crash survival. Furthermore, as we have demonstrated, substantially raising standards would yield equally substantial safety benefits by curtailing the manufacturers' ability to continue increasing the weight of vehicles as engine technology improves. A hike in standards for vehicles up to 10,000 lbs., a move within NHTSA's statutory authority, would provide incentives for manufacturers to concentrate any down-weighting in the heaviest vehicles, and thereby save lives.

If NHTSA is truly concerned about the safety impacts of CAFE, future analysis of CAFE's impact must include a much fuller consideration of the availability of counter-measures to alleviate any possible harm. As the Kahane study found that the largest increases in death occurred in rollovers and incompatibility-related crashes in cars, additional standards in those areas could reduce any impact, real or imagined, resulting from fuel economy increases.

Public Citizen suggests that NHTSA issue meaningful new CAFE standards at the same times that it implements new and substantial rollover crashworthiness and propensity and aggressivity reduction standards. This would give manufacturers the opportunity to increase both the safety and fuel economy of their vehicles, and to maximize the cost efficiencies of the vehicle design cycle.

Weight-Based Standards are Likely to Produce a Lose-Lose Proposition

Although not mentioned specifically in the report, we are aware that an option under consideration is a system of weight-based standards. Although the "devil is in the details," we wish to comment very generally on the problems inherent to such an approach:

1) Because weight-based fuel economy standards would likely establish lower requirements for heavier vehicles, automakers would retain a strong incentive to add weight to their vehicles. At the same time, weight-based standards would eliminate or reduce manufacturers' incentives to reduce the weight of the heaviest vehicles.

2) Increases in vehicle weight can exacerbate rollover fatalities and create more dangerous crashes. And technologies – such as high strength steel – that can both reduce vehicle weight while improving vehicle safety and improving fuel economy, will likely never be employed.
3) It is more cost-effective to reduce the weight of the heaviest vehicles rather than slimming down the lightest vehicles. And the result of this cost-effective approach would be an overall improvement in safety.
4) Weight-based standards would structure an entire system around a fallacy: that reductions in vehicle weight inherently increase fatalities.
5) Simply increasing the standard for light trucks and including all light trucks (those above 8,500 lbs.) would incur safety benefits that are likely better than those that could result from a weight-based system. Under a substantial increase, the historical record shows that the heaviest vehicles are likely to get lighter and the lightest vehicles will stay the same, or even increase in weight and size as it becomes easier for the fleet as a whole to reach the fuel economy target.

Recommendations for Agency Action

NHTSA must reduce the net harm done by vehicles in crashes with other vehicles. The crucial steps towards addressing incompatibility and reducing the damage inflicted by aggressively designed vehicles are as follows. NHTSA should:

- **Self-Protection Improvements In Vehicles Must Be Accompanied By Improvements in Partner Protection.** Some much-needed improvements in occupant protection measures, such as stronger A and B pillars, may produce stiffer vehicles that are more violent in crashes. Additionally, without partner protection measures to complement such actions, self protection standards will perpetually be up against with ever-more aggressive vehicle designs.

- **Make Good on the Already-Abundant Research Regarding The Nature Of Light Truck Incompatibility And Aggressivity By Conducting a Rulemaking.** Despite the need for more and improved data collection, studies on vehicle compatibility issues by both NHTSA and independent researchers are numerous and they form an unambiguous case for rulemaking addressing light truck redesign.

- **Improve The Agency's Crash Tests For Compatibility Research.** As NHTSA proposes, the agency should increase the number of load cells on the agency's crash test barriers to improve the quality of research using crash tests from the New Car Assessment Program (NCAP). This would enable researchers to use far more finely calibrated data to analyze the likely consequences of factors such as bumper height and center-of-force in crashes. Crash test data should not take the place of real-world crash data, nor should test development be used as a stalling mechanism for developing rulemaking that is already well supported by real-world crash data.

- **Improve NHTSA's Data Collection Efforts To Include An Index Of Specific Vehicle Factors That Demonstrate Incompatibilities.** NHTSA should improve the quality and quantity of data available to characterize vehicle-to-vehicle incompatibilities. The National Center for Statistics and Analysis (NCSA) currently collects detailed crash information for a sample of moderate to high severity crash events. However, the data do not adequately document a number of the most critical aspects of multiple vehicle crashes. The number of crash cases investigated should also be significantly increased as well, in order to enhance the statistical validity of research conclusions.

    a. Geometric mismatch may compromise a vehicle's ability to safely manage crash energy. Refined measurements at multiple heights for each vehicle structure will help researchers to understand the nature of the interaction and the ratio of energy absorbed by each vehicle.

    b. Crashes showing severe override or under-ride may indicate that a vehicle's crash structures have not properly engaged. Enhanced documentation of *both* crash-involved vehicles is necessary through photography. Retrospective evaluations of vehicle-to-vehicle compatibility would be possible with this information.

    c. Documenting the vehicles' deformation as to a greater number of the vehicles' energy-absorbing structures — including frame rails, engine components, firewall, and pillars — will help researchers to better evaluate compatibility and mismatch.

- **Use Computer Modeling To Predict Vehicle-To-Vehicle Crash Interactions.** As was done in the 1970s, NHTSA should develop computer models, based on real-world crash data, which predict vehicle performance in a variety of crashes. This kind of modeling can be used to identify design characteristics that enhance or detract from safety, showing vehicle compatibility, as well as vehicle crashworthiness in different types of crashes.

- **Research And Isolate Best And Worst Practices In Vehicle Compatibility As The Basis For Future Regulation.** NHTSA should use real-world fatality data as the basis for the agency's future research priorities, and to investigate and promote vehicle designs. For example, crossover SUVs are good performers for occupant protection and also inflict less damage upon other vehicles than conventionally designed SUVs built on a truck chassis. In contrast, full-size pickups impose dramatically high risk on drivers of other vehicles, without reducing the risk to their drivers.

- **Improve Consumer Information On Safety And Aggressivity To Enable Ethical Decision-Making By Consumers.** NHTSA should publish risks to drivers, risks to other drivers, and the combined risks of individual car, SUV and pickup models, based on an analysis of real-world fatality data, so that consumers may be informed about the full consequences of purchase decisions.

Sincerely,

Laura MacCleery
Counsel for Auto Safety and Regulatory Affairs
Public Citizen

Appendix A

Ross and Wenzel Make Model Risk Calculations – 1995-2000

Vehicle type	Make and Model	Risk Ranking	Combined risk	Risk to Drivers	Risk to others
Pickup Truck	Chevrolet S-10	1	238±18	172±16	65±10
	Dodge Ram[43]	2	220±14	85±8	136±11
	Chevrolet C/K series	3	219±11	115±8	104±8
	Ford F-Series[44]	4	208±9	93±6	115±7
	GMC C/K- series[45]	6	189±18	90±12	99±13
	Ford Ranger	8	175±13	105±10	70±8
SUV	Chevrolet Blazer[46]	9	174±15	109±12	65±9
	Toyota 4Runner	11	157±21	109±18	47±12
	Chevrolet Tahoe	16	131±18	62±13	69±13
	Ford Explorer[47]	17	124±9	76±7	49±6
	Jeep Cherokee/ Grand Cherokee[48]	23	114±9	60±7	54±6
	Chevrolet Suburban[49]	26	111±18	55±13	56±13
Minivan	Chevrolet Astro Van	30	98±16	51±11	47±11
	Dodge Caravan	35	81±9	40±6	41±6
	Ford Windstar	37	80±10	41±7	40±7
	Plymouth Voyager	38	75±11	36±8	39±8
Large Car	Mercury Marquis	24	113±18	77±15	36±10
	Dodge Intrepid	27	105±15	72±12	34±8
	Buick LeSabre	29	103±14	78±13	25±7
	Pontiac Bonneville	34	87±18	57±15	30±11
	Toyota Avalon	40	63±16	52±14	10±6
Midsize Car	Chevrolet Lumina	14	114±14	97±11	47±8
	Dodge Stratus	18	120±19	88±17	32±10
	Ford Taurus/ Mercury Sable	22	115±8	76±7	39±5
	Nissan Maxima	33	90±14	64±12	27±8
	Honda Accord	37	79±8	54±6	25±4
	Toyota Camry[50]	39	72±7	47±6	24±4
Compact Car	Pontiac Grand Am	12	155±14	120±12	36±7
	Ford Contour/ Mercury Mystique	15	138±13	104±12	33±7
	Nissan Altima	21	116±15	73±12	43±9
	Mazda 626	28	103±19	70±15	33±10
Subcompact Car	Dodge/Plymouth Neon	5	204±16	162±14	42±17
	Ford Escort[51]/ Mercury Tracer	7	179±12	148±11	31±5

	Chevrolet Cavalier/ Pontiac Sunfire	10	171±12	135±11	35±5
	Chevrolet (Geo) Prizm	13	146±24	120±22	25±10
	Saturn SC/SL/SW	19	119±11	89±10	30±6
	Nissan Sentra	20	119±17	95±15	24±8
	Toyota Corolla	25	113±12	88±11	25±6
	Honda Civic/ del Sol	31	95±9	73±8	23±5
	VW Jetta	32	92±18	60±14	32±10

“Risk “represents driver deaths per year, per million vehicles sold.
(Most Risky Ranked #1, Least Risky Ranked #40) 95 percent confidence level shown.

Endnotes

[1] O'Neill, Brian; Josephine S. Cooper. Letter to Dr. Jeffrey W. Runge. 13 Feb. 2003. *See* NHTSA-2003-14623. http://dmses.dot.gov/docimages/pdf86/245986_web.pdf.
[2] Bradsher, Keith. *High and Mighty: SUVs-The World's Most Dangerous Vehicles and How They Got That Way.* New York: PublicAffairs 2002, at 193 (Referring to Hans C. Joksch, "Vehicle Design versus Aggressivity," (April 2000), DOT HS 809 194. p. 40-42).
[3] Joksch, Hans C. "Vehicle Design versus Aggressivity," at 41. Further calculations contained in an electronic mail communication between Public Citizen and safety researcher Hans Joksch stated: "In 1996, 890 car occupants died in collisions with SUVs. If the risk in collisions with cars of the same weight had been half as high, as estimated at that time, 445 deaths would not have occurred if SUVs had been replaced by cars of the same weight." Email from Hans Joksch to Laura MacCleery of Public Citizen, on Feb. 24, 2003 (on file with Public Citizen).
[4] Bradsher. at 449, fn. 13 (Leaving aside SUVs and considering just the number of drivers killed per 5,000 crashes, in which a large car hits another car of any size, an average of 2.2 drivers die in large cars and 5.5 drivers die in the other cars that were truck. Together these numbers render a total of 7.7 deaths per 5,000 crashes. Because the large cars are heavier than most of the cars they hit, the drivers of the large cars tend to fare better. When looking at the crashes involving Explorers, on average only 1.2 Explorer drivers die when involved in the same number of collisions with cars. Compared to the 2.2 drivers who died in the large cars, the Explorers actually save a life. However, this is misleading because, doubling to 11 deaths. Therefore, on average 5.5 extra driver deaths occur in the struck cars. The combined death rate for drivers on both sides of the collision has now risen to 12.2 for collisions involving Explorers, compared with 7.7 when there were just large cars hitting the other cars.).
[5] Ross, Marc and Tom Wenzel, "An Analysis of Vehicle Risk by Type and Model." *A Briefing to the U.S. Department of Energy, Washington, DC, March 2002.* American Council for an Energy Efficient Economy, at 4.
[6] Ross, Marc and Tom Wenzel, "An Analysis of Vehicle Risk by Type and Model." *A Briefing to the U.S. Department of Energy, Washington, DC, March 2002.* American Council for an Energy Efficient Economy, at 6.
[7] NHTSA. *Traffic Safety Facts 2001*, Washington: NHTSA, 2002. 107.
[8] NHTSA. *Initiatives to Address the Mitigation of Vehicle Rollovers.* Washington: NHTSA, 2003. 12.
[9] Committee Report on S. 3005, The Traffic Safety Act of 1966, June 23, 1966, at 271, 273, 274.
[10] Ross, Marc and Tom Wenzel, "An Analysis of Vehicle Risk by Type and Model." *A Briefing to NHTSA Staff, Washington, DC, July 23, 2003*, at 11.
[11] NHTSA. Initiatives to Address Vehicle Compatibility. (NHTSA-2003-14623), 2003 at 14.
[12] NHTSA. Initiatives to Address Vehicle Compatibility. (NHTSA-2003-14623), 2003, at 15.
[13] NHTSA. Initiatives to Address Vehicle Compatibility. (NHTSA-2003-14623), 2003 at 17.
[14] *Id.*
[15] Hans, Joksh. *Vehicle Design Versus Aggressivity.* (DOT HS 809 194) 2000.
[16] Digges, Kennerly H., Ana Maria Eigen, "Analysis of Load Cell Barrier Data to Assess Vehicle Compatibility." (SAE Paper 2000-01-0051), Mar. 2000.
[17] Digges, Kennerly H.; Ana Maria Eigen, "Application of Load Cell Barrier Data to Assess Vehicle Crash Performance and Compatibility." (SAE Paper 1999-01-0720), Mar. 1999.
[18] Terhune, K.W., Ranney, T.A., *et al.* "Study of Light Truck Aggressivity." Buffalo: Calspan Field Services, Inc., 1984.
[19] Monk, M.W., *et al.* "Striking Vehicle Aggressiveness Factors for Side Impacts." (NHTSA NAD-52) 1986.
[20] *See* "Initiatives to Address Vehicle Compatibility" NHTSA, June 2003 at 21.
[21] *See* Charles J. Kahane, "Relationships Between Vehicle Size and Fatality Risk in Model Year 1985-93 Passenger Cars and Light Trucks," NHTSA Report No. DOT HS 808 507, Jan. 1997.
[22] *Id.*
[23] *See* "Effectiveness and Impact of Corporate Average Fuel Economy Standards" National Research Council, National Academy of Sciences 2002, at 117-124.
[24] *See* Comments from the Alliance of Automobile Manufacturers, Docket Number, NHTSA-2002-11419.

[25] *See* "Effectiveness and Impact of Corporate Average Fuel Economy Standards," National Research Council, National Academy of Sciences 2002, at 113.
[26] *See* Insurance Institute for Highway Safety *Status Report*, Vol. 35, No. 7, Oct 19, 2000.
[27] *See* "Effectiveness and Impact of Corporate Average Fuel Economy Standards" National Research Council, National Academy of Sciences 2002, at 117-124.
[28] *See* Marc Ross and Tom Wenzel, "An Analysis of Traffic Deaths by Vehicle Type and Model," U.S. Department of Energy LBNL-49675, Washington, DC, Mar. 2002.
[29] *See* Marc Ross and Tom Wenzel, "An Analysis of Traffic Deaths by Vehicle Type and Model," U.S. Department of Energy LBNL-49675, Washington, DC Mar. 2002, at 5-6.
[30] *See* U.S. Environmental Protection Agency, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 Through 2003," EPA420-R03-006, April 2003.
[31] *Id*
[32] *Id.*
[33] *See* Shelton, Terry S.T. NHTSA Research Note: "Revised Vehicle Miles of Travel for Passenger Cars and Light Trucks, 1975 to 1993; "Registration Data for 1975-2001: Data Source FHWA and Polk" (provided by a National Center for Statistics Analysis researcher to Public Citizen on Feb. 6, 2003).
[34] *See* Bradsher, Keith, *High and Mighty: SUVs- The World's Most Dangerous Vehicles and How They Got That Way*, 2002, at 31
[35] Domestic manufacturers were protected until the mid-1990s by a tariff which imposed costs on foreign manufacturers, discouraging the importation of SUVs and helping to create crucial leverage for Detroit in that market sector. *See* Bradsher, Keith, *High and Mighty: SUVs- The World's Most Dangerous Vehicles and How They Got That Way*, 2002, at 32.
[36] *See* Bradsher, Keith, *High and Mighty: SUVs- The World's Most Dangerous Vehicles and How They Got That Way*, 2002, at 34
[37] SUV advertising rose nearly nine-fold from $172.5 million in 1990 to $1.5 billion in 2000 and automakers and their dealers spent $9 billion advertising the SUV from 1990 through September 30, 2001. *See* Bradsher, Keith, *High and Mighty: SUVs- The World's Most Dangerous Vehicles and How They Got That Way*, 2002, at 112.
[38] *See* Hakim, Danny, "Ford Will Phase Out the Taurus and Replace It With 3 Vehicles," *The New York Times*, April 16, 2003.
[39] *See* Hakim, Danny "Whether a Hummer or a Hybrid, the Big Complaint Is Fuel Use," *The New York Times*, May 7, 2003. Citation attributed to Michael Flynn, director of the University of Michigan Office for the Study of Automotive Transportation.
[40] *See* Welch, David, "The Sun is Setting on 'Truckish' Sport-Utes," *BusinessWeek*, Monday, May 5, 2003.
[41] *See* "Initiatives to Address Vehicle Compatibility" NHTSA, June 2003 at 21.
[42] Constitutional experts at Public Citizen have indicated that, should the agency wish to exercise the full reach of its authority under the statute regarding standards for cars, the Congressional veto provision would provide no bar. The failure to set car standards is therefore the result of a lack of will.
[43] Driver death rates used for the Dodge Ram 1500 Two-Wheel-Drive Midsize Pickup.
[44] Driver death rates used for the Ford F-150.
[45] Driver death rates used for the GMC 1500.
[46] Driver death rates used for the Chevrolet S10 Blazer 4dr, Two-Wheel Drive.
[47] Driver death rates used for the Ford Explorer 2dr, Two-Wheel-Drive Utility.
[48] Driver death rates used for the Jeep Grand Cherokee 4dr Two-Wheel-Drive.
[49] Driver death rates used for the Chevrolet Suburban 1500 4dr Two-Wheel-Drive.
[50] Driver death rates used for the 1997 Toyota Camry.
[51] Driver death rates used for the 1997 Ford Escort.