BRIEFLY NOTED

The CPSC's Off-Road Adventure

BY JOSEPH CORDES AND BLAKE TAYLOR

In 2009, the Consumer Product Safety Commission (CPSC) announced its intention to regulate a class of recreational off-highway vehicles commonly referred to as "side by sides." These vehicles are different from their off-road ATV cousins in that side by sides have bench or bucket seats instead of straddle seating, floor pedals instead of hand levers for throttle and braking, and a steering wheel instead of handlebars for steering.

The CPSC released its proposed rule last November. We have been analyzing the rule and filed a public interest comment in which we raise serious issues with the commission's regulatory analysis.

Most consumer products—be they chemicals, chainsaws, or cribs—pose some amount of risk to users. The CPSC estimates that those risks cost American consumers at least $1 trillion a year from injury, death, and property damage. (When a product causes harm, the consumer may seek recompense from the manufacturer through the courts. Whether the tort process would be likely to reduce the kinds of risks that are the object of this proposed regulation is a complex issue, however. In this short piece we focus on the remedies that are proposed by the CPSC.)

Because people live in a world of tradeoffs, they exchange some amount of risk for some amount of gain, convenience, or pleasure. When risk becomes excessive—or, in CPSC statutory language, "unreasonable"—Congress has directed the commission to issue rules intended to curb that risk and protect consumers.

The two key questions are thus (1) "When does a *reasonable* risk become *unreasonable*?" and (2) "Will the proposed regulations reduce the risk?" The statute does not define "unreasonable risk," but the legislative history and subsequent case law indicate that a determination of unreasonableness should involve a weighing of a product's value against frequency and severity of injury. The vagueness of that standard and the lack of CPSC guidelines on the subject mean that, in practice, a product meets the unreasonable risk standard when at least three of the five CPSC commissioners say it does.

Our comment on the proposed regulation considers both whether the current analysis of the regulation satisfies this balancing test and whether the CPSC provides sufficient evidence that changes proposed by the regulation will have the intended effect.

Measuring risks and benefits / To determine whether side by sides pose unreasonable risk, we consider how many accidents involving the vehicles have occurred, how severe those accidents are, and whether there are trends suggesting that the risk is increasing. The CPSC Regulatory Impact Analysis (RIA) for the proposed rule offers some data on the number and severity of accidents, but those data are only for the year 2010 and cannot indicate any trend. Thus, even though side by sides have been on the market since 1998, the CPSC provides no information about whether the vehicles are becoming more or less safe over time.

The CPSC uses the 2010 accident data to estimate the costs and benefits of the proposed regulation. In undertaking such an analysis, one issue is how to frame the cost-benefit comparison. Implicitly, the CPSC analysis treats the economic cost of death and injury as a cost to society that should be reduced if the regulatory cost of doing so is less than the benefit from cost avoided. An alternative perspective suggested by one-time Obama administration chief regulatory analyst Cass Sunstein argues that in the case of risk regulation where presumed beneficiaries bear the cost (in this case, the side by side users), it is reasonable to ask whether the beneficiaries' willingness to

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pay for a reduction in risk exceeds the cost of achieving the reduction.

Those two differing perspectives imply different measures of risk. The RIA uses deaths or injuries per 10,000 side by side vehicles as the measure of risk. However, this measure does not capture the exposure to risk of injury or death from *using* a side by side, which is the measure that would seem more relevant for the kind of cost-benefit tradeoff that users face. A better measure would be the risk of injury or death *per vehicle mile traveled*. Unfortunately, data for annual vehicle miles traveled are not available. The distinction between the two measures is important, however, because the risk rate measured as incidents per mile traveled will tend to be lower than the risk rate per 10,000 vehicles that is used in the RIA. Applying a lower risk rate to the same economic cost of death and injuries used in the RIA could lower the expected benefits of the proposed regulations by enough that quantified expected benefits fall short of the quantified costs.

The CPSC analysis treats the economic cost of death and injury as a cost to society that should be reduced if it passes a cost-benefit test.

Appreciating the risk? / Further, the expected regulatory costs per vehicle, which are ultimately passed on to consumers, are not the only costs to be considered. Users of side by sides manufactured to meet the mandated changes in vehicle characteristics may also experience a decrease in utility, with an accompanying loss in consumer surplus, because of changes in the performance of side by sides. Will, as experts suggest, the proposed mandatory stability controls and understeering standards make the vehicles less fun to drive?

The CPSC discounts this question on the grounds that users may not be making the "right" tradeoff between performance and risk. Commissioner Robert Adler said in a January statement, "I doubt that most consumers truly understand the risk." Thus, one element of the proposal is a requirement for manufacturers to hang an informational tag on vehicles for sale about the particular model's stability standards.

The CPSC bases its case for mandatory stability standards and understeer performance on tests performed in controlled settings—and on pavement—while typical use of side by sides occurs in unpredictable, unpaved environments. The regulatory proposal also relies on studies conducted to analyze automobiles, which are definitively different from recreational off-highway vehicles. Lastly, the CPSC uses the case of the Yamaha Rhino—an early side by side model that underwent voluntary recall and repair beginning in 2009—as anecdotal evidence that similar repairs will reduce risk. One of several issues that the CPSC fails to address regarding this anecdote is the fact that Yamaha began taking the Rhino off the market shortly after the repair program commenced. Thus, there really is no way of knowing whether the safety-based modifications to the Rhino really did reduce the incidence of accidents, injuries, and deaths.

We thus return to our original issues. Do the risks of using side by sides in their current state pose an unreasonable risk? Does the CPSC provide sufficient evidence that its proposed regulatory remedies would lower risk at reasonable cost in relation to benefits received? As in most regulatory policy undertakings, questions like these must often be addressed with incomplete and imperfect data, and judgment calls. But in the case of side by side regulation, there are still enough open questions so that the case for regulation is best considered—to use the phrase from Scottish jurisprudence—unproven. R

EPA's Analytical Jujitsu

BY SAM BATKINS AND IKE BRANNON

In these pages four years ago ("Obfuscation at the EPA," Summer 2011) we announced our discovery of the U.S. Environmental Protection Agency's new methodology for ascribing job gains to costly new regulations: a sleight-of-hand whereby it attributes the workers hired to ensure compliance with new regulations as a benefit rather than an economic cost. It is execrable logic, compounded by the agency's failure to acknowledge the much larger long-term job losses from rendering entire industries less competitive from higher costs resulting from the regulation. Other economists joined us in deriding the fatuousness of such claims and the EPA refrained from such inanity—for a while.

Now, the agency has returned to this duplicitous Keynesian logic, this time in defense of its greenhouse gas standards for power plants, the "Clean Power Plan" (CPP). According to the EPA, the plan would create nearly 80,000 energy efficiency jobs by 2020. That is a breathtaking claim even by the agency's standards: the EPA offers no peer-reviewed data that come close to supporting that extravagant employment figure and it avoids acknowledging that compliance costs for the CPP, when fairly measured, would exceed $30 billion in 2020. What's more, the rule would shutter approximately 100 power plants across the nation and increase energy costs for all consumers and businesses. To pretend that the CPP would merely transfer tens of thousands of coal jobs into renewable energy and efficiency jobs, with more people employed as a

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result of the rule, is a truly breathtaking distortion of reality.

Uncharted territory / The notion that imposing higher compliance costs on a company somehow results in more jobs is not just the blithe justification of some EPA mandarin. In her speech announcing the new greenhouse gas standards, EPA Administrator Gina McCarthy declared that "utilities like Exelon and Entergy are weaving climate considerations into business plans. All this means more jobs, not less." It's a claim that sits on a house of shaky inferences, improper extrapolations, and shoddy math.

The EPA acknowledges it is, in effect, inventing an entirely new cost-benefit methodology, conceding in the Regulatory Impact Analysis (RIA) for the CPP that "employment impacts of demand-side energy efficiency programs have not been extensively studied in the peer-reviewed, published economic literature." But just because the entire economics profession has not figured out how to do something is no reason for EPA officials to not do it themselves.

One problem—but far from the only one—with the EPA's job creation methodology is that the agency uses data from the Annual Survey of Manufacturers, which is a broad but far from in-depth data set, to derive a multiplier of energy efficiency spending to jobs. However, only half of the data it takes from the survey relate to the energy efficiency sector. With half a sample, the agency then assumes the multiplier in the construction industry is the same as the manufacturing sector.

After using data only tangentially related to energy efficiency to infer that construction and manufacturing support the same employment levels, the EPA posits a jobs multiplier whereby $1 million in demand-side energy efficiency creates 2.56 new jobs. That number is at odds with other studies used more often by the EPA; for instance, Richard Morgenstern, an economist at Resources for the Future, estimates that $1 million in environmental spending supports only about 1.5 new jobs, well less than the EPA's new claim. However, Morgenstern's own estimates have a standard error of 2.2 jobs, which suggests that the true effect of such measures on jobs is likely to be "insignificant." Despite the EPA's previous reliance on Morgenstern, the agency is now happy to jettison his research and instead embrace claims that energy efficiency spending will reap greater employment benefits.

The very notion of a spending multiplier for some government action is controversial and one that various government entities have spent significant time studying. For example, the Congressional Budget Office analyzed the effects of the 2009 economic stimulus and quantified various output multipliers ranging from 0.4 for deferral of income to 2.5 for the "purchases of goods and services by the federal government." Each multiplier represents the direct and indirect effects on the nation's output of a dollar's worth of given policy. However, the EPA posits a higher multiplier than any of the CBO's estimates, even though the EPA's actions take place in a robust economy when any multiplier effect would be muted relative to a period like the Great Recession of 2008–2009.

Perhaps the most glaring fault in the EPA's calculus is the disconnect between its estimated 78,800 jobs created by the CPP and the economy-wide compliance costs of the regulations. While the agency claims demand-side spending would range from $8 billion to $12.3 billion by 2020, the EPA's multiplier of $1 million in demand-side efficiency spending creating 2.56 new jobs implies compliance costs exceeding $30 billion.

If the EPA's math is wrong about the short-term effect of the CPP rule when it is phased in beginning in 2020, what implications does that have for the agency's economic analysis regarding CPP's ultimate effect in 2030, when the agency predicts anywhere from $42 billion to $51 billion in energy efficiency spending? If the EPA is off by a factor of three in 2030, as it seems to be for 2020, it would imply that the total implementation costs imposed by the CPP are somewhere north of $150 billion.

Real employment implications / The EPA has been regulating power plants for some time. Its Maximum Achievable Control Technology standards for power plants was the costliest rule issued under President Obama when it was introduced, imposing $10 billion in compliance costs, while its Cross-State Air Pollution rule added another $1 billion in regulatory compliance costs. Last year the EPA finalized rules controlling cooling water intakes at power plants, creating another $300 million in compliance costs per annum.

The result of those regulations has been a gradual diminution of employment in power plants since 2008, which is the opposite of what the Obama administration would have us believe. Now, it is true that job creation should never be the sine qua non of government activity, and in this economy there has been undue weight placed on the employment gains—both real and imagined—from government activity. As Milton Friedman loved to point out, we could get to full employment in a jiffy if we mandated that people build roads with shovels instead of bulldozers. But to pretend that a rule that would close 100 power plants and boost energy costs throughout the economy would be a job-creator is a distortion of epic proportion.

Setting aside the half-baked Keynesian stimulus nonsense, here is what we know, using the EPA's own numbers: Even with $8.8 billion in estimated compliance costs, the EPA admits that the CPP will result in the premature retirement of 50 gigawatts (GW) of coal-fired power, which represents one-fifth of current capacity. The agency's previous forays into power plant regulation already managed to retire approximately 51 GW. The EPA projects that retiring 50 GW would destroy 15,600 jobs by 2020 along with an additional 14,100 employees laid off by 2025, with a total of 42,000 fewer employees in the power plant sector by 2030.

The EPA does not model exactly which power plants and which states would be most affected, but some sorting using the

agency's data allows us to infer how this might happen. Under the CPP, the EPA would calculate most states' ratio of carbon dioxide output to megawatt hours of energy production (CO_2/MWh). Plants with high ratios would drag up state averages and make it more difficult to comply with the new standards. Shuttering inefficient plants is one compliance path to lower a state's CO_2/MWh rate.

Using the EPA's e-Grid data, we sorted the power plants with the highest CO_2/MWh and nominal heat rates that might be candidates for retirement. We found 93 plants in 31 states with an average CO_2/MWh rate of 2,626, or roughly 20 percent less efficient than the average coal plant. Those facilities produce about 50 GW of power, or what the EPA forecasts for early retirements under the proposal. Based on those data, Pennsylvania is the most affected state, with 13 plants in danger of retirement. Michigan is next with seven possible retirements and Illinois has six that would presumably close because of the new rules.

The final flaw in the EPA's RIA is that it does not appear to monetize the 42,000 lost power plant jobs. For a baseline, the University of Chicago's Jonathan Masur and Eric Posner estimated $100,000 per displaced worker, which would add another $4.2 billion to the cost of the CPP, or almost half of the EPA's cost estimate.

Worthwhile analysis? / The EPA analysis of the CPP illustrates the sad fact that the agency often uses RIAs more as a way to sell its preferred regulatory intervention than a dispassionate attempt to measure the costs and benefits and explore real alternatives to what it's proposing.

Sorting through the rigmarole offered in the CPP RIA nicely illustrates the need for an independent agency to do the cost-benefit analysis of regulatory agencies' proposals so that the White House can be sure that the agencies aren't stacking the deck. It's a solution we've offered in these pages before, and it remains as timely and as far from actually happening as when we first made that suggestion. *R*

Complexity, Regulation and Nanotechnology

BY PYTHAGORAS PETRATOS

Nanotechnology has been characterized as the next industrial revolution. It has a plethora of applications in every industry. From nanomedicines—representing a whole new class of pharmaceuticals—to the shrinking of semiconductors down to the nanoscale, nanotechnology is destined to have a massive effect on everyday life. Two examples are the diminishing size and improving functionality of smartphones and the promise of nanorobots that will exclusively target cancer cells for the treatment of cancer.

Despite the promises of nanotechnology, only a few companies have received approval from the U.S. Food and Drug Administration to commercialize nanoscale materials and devices. Many nanosystems are under clinical trial, but only a small portion of them have been successfully commercialized. Innovation, value creation, and other benefits from the commercialization of nanotechnologies can be accelerated by a functional regulatory framework.

In this article I examine the current regulatory regime and propose a number of policies that could facilitate commercialization of nanotechnology products.

Nanotechnology / What is nanotechnology? It is the systematic application of scientific research at the nano level. A nanometer (nm) is the unit of length in the metric system equal to one billionth of a meter. As a sense of scale, consider that the width of a human hair is around 80,000nm.

At the nanometer level, chemical reactivity as well as magnetic and electrical properties change. A more formal definition offered by the federal government's National Nanotechnology Initiative website describes it as "the understanding and control of matter at the nanoscale, at dimensions between approximately 1 and 100 nanometers, where unique phenomena enable novel applications." For example, nanostructures can pass through biological barriers without triggering the immune system. While this generates incredible opportunities for health care, it also raises concerns about safety.

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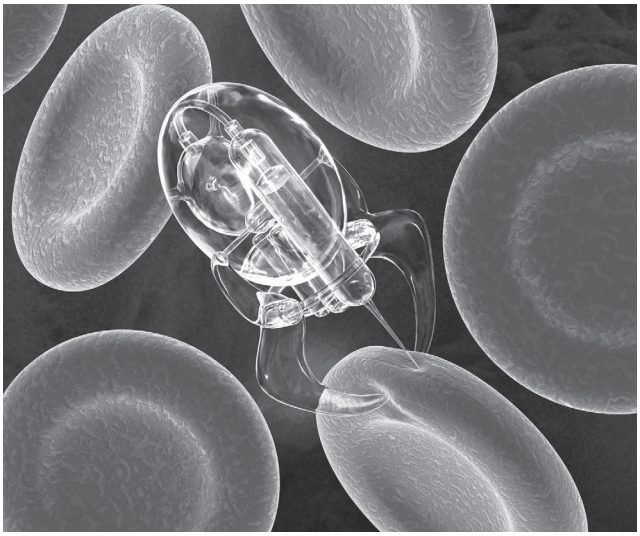
FDA regulation / The FDA is a key regulator of nanotechnology. And yet the agency has acknowledged that it cannot adequately regulate (medical) products of "new sciences" such as nanotechnology. "This compromises not only the public health mission since the Agency cannot effectively regulate products built on emerging science, but it also hamstrings the Agency's ability to support innovation in the industries and markets that it regulates," noted a 2007 report by an FDA Science Board subcommittee

The FDA has two main problems dealing with the regulatory complexity of nanotechnology. The first is a lack of scientific expertise. The agency recognizes that it has a weak scientific base and organizational structure, which is supported by an inadequate information technology infrastructure.

The second problem is a mismatch between the existing organizational culture of the FDA and the realities of nanotechnology. The FDA and similar organizations usually have complex structures and contain diverse subdivisions. Moreover, "each center and each regulated product category has its own statutory requirements and regulatory criteria," as noted in a 2009 paper by Gary Marchant,

Douglas Sylvester, and Kenneth Abbott. Each of those regulated product categories resulted from a particular crisis that provoked legislation. Much of the current FDA culture stems from the thalidomide birth defects scandal of the early 1960s and the 1962 amendments to the federal Food and Drug Act that mandated the current regime of requiring clinical trials to prove the safety and effectiveness of new prescription drugs. Nanotechnology does not fit easily and clearly within that framework and culture. As a result, significant delays and transaction costs in the commercialization of nanotechnology products may occur.



In June 2014, the FDA issued one draft and three final guidance documents related to the use of nanotechnology. As the terminology suggests, rather than being binding, they are representative of the FDA's current thinking. The good news is that the FDA says it will focus on the finished product rather than on the nanotechnological aspects of the manufacturing process. The bad news is that while the guidance refers to the definition of nanotechnology as having at least one dimension in the nanoscale range (1nm to 100nm), it can include materials or end products that could exhibit specific properties, the dimensions of which fall outside the nanoscale range (up to 1,000nm). Taking into account the uncertainty of measurement at this level, the definition of these particular properties can be quite complicated and vague.

The U.S. Environmental Protection Agency also claims regulatory jurisdiction over nanotechnology. Many nanotechnologies are regarded as "chemical substances" controlled by the Toxic Substances Control Act (TSCA). The EPA has imposed four new sets of rules for nanotechnology under the TSCA. Thus a nanostructure might receive approval from the EPA but not the FDA, or the other way round, thus delaying innovation commercialization. An example is the aggressive approach by the EPA to regulating nanoscale silver. In contrast, nanosilver is extensively used in drugs, foods, and medical devices under the approval of the FDA.

Policy suggestions / What can be done to clarify and expedite nanotechnology regulation? My first suggestion is to ensure a clear and widely accepted definition of nanotechnology. Based on previous arguments regarding dimensions, a clear definition would help firms understand what is and is not regulated.

Because nanotechnology transcends regulatory agencies, cooperation and coordination among different organizations are vital. This should include not only state and federal agencies, but also international organizations. The EPA, for example, is working collaboratively with the Organization for Economic Cooperation and Development and the International Organization for Standardization.

The participation of the private sector in setting standards, best practices, and self-regulation is essential. Public–private partnerships would encourage transparency through the participation of the entrepreneurial stakeholders in the regulatory process. Additionally, these partnerships would build capacity by providing technical skills, risk analysis, research, and knowledge sharing.

But the most important feature is to establish nonarbitrary methodology to assess not only the risks and costs of nanotechnology, but also the benefits. "Benefit-Cost analysis can play an important role in legislative and regulatory policy debates," Kenneth Arrow and coauthors noted in a 1996 *Science* article. The "Stanford Model" of risk assessment, as described by Henry Miller ("The Use and Abuse of Science in Policymaking," Summer 2012), could be a useful paradigm for risk-based regulation for nanotechnologies. It is a flexible protocol that could easily be applied to the commercialization of different kinds of technologies, industries, and regulatory preferences. *R*

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THE AMERICAN DREAM

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