



AMERICAN PETROLEUM INSTITUTE

Tier 3 Gasoline Rulemaking

Tier 3 is Unnecessary:

New Tier 3 regulations are discretionary. EPA has failed to demonstrate adequate scientific justification, technical need, and cost effectiveness. Tier 3 regulations would increase fuel manufacturing costs and increase greenhouse gas emissions. The rule should not be proposed.

Significance of the Refining Sector:

America's refining industry is a strategic and valuable asset. The industry supports more than 500,000 good paying jobs (avg. income \$94,000) and contributes 1.9% to GDP. It provides the U.S. with secure supplies of domestic fuel products, with nearly 90% of US gasoline consumption currently refined in the U.S.

- The rule would impose a high cost, minimal benefit regulatory requirement on America's already heavily regulated fuel supply.
- It could lead to significant domestic fuel supply reductions, higher petroleum product imports, potentially increased consumer costs, increased refinery emissions, closed U.S. refineries, and reduced energy security.

Tier 3 Costs are Significant:

- Baker & O'Brien examined the effect of *gasoline sulfur* specification changes. The impacts are significant:
 - Nearly \$10 Billion in refinery capital expenditures
 - Annual compliance cost of \$2.4 Billion
 - Increases in gasoline manufacturing costs up to 9 cents per gallon
 - 1% increase in refinery GHG emissions
- Baker & O'Brien also examined the impact of *both sulfur and RVP* changes; the impacts are severe:
 - 8% - 19% reduction in summertime domestic gasoline production
 - \$10 - \$17 Billion in refinery capital expenditures
 - Annual compliance cost of \$5 - \$13 Billion
 - Increases in gasoline manufacturing costs up to 12 - 25 cents per gallon
 - 1% - 2.3% increase in refinery GHG emissions
 - 4 - 7 refinery closures
- In February 2012, EPA affirmed its plans to propose gasoline sulfur changes only
 - EPA continues to anticipate RVP changes, whether as a part of Tier 3 or as an independent rulemaking
 - EPA has stated that they expect gasoline cost increases of a penny per gallon and pointed to a 2011 MathPro study.
 - Baker and O'Brien's modeling methodology is more detailed and robust than MathPro, using a refinery-by-refinery analysis based on a mass balanced model
 - MathPro models rely on four hypothetical refineries meant to represent the aggregated production of dozens of refineries in 4 of the 5 PADDs (Petroleum Area Defense Districts).

Rulemaking is Unjustified:

- EPA has stated that 17 refineries currently make 10 ppm S gasoline, but ignores the remaining over 110 refineries that would be required to make significant investments.
 - These 17 refineries likely produce gasoline to meet California's more stringent standards, which already required significant investments.
 - Gasoline sulfur was reduced from an average 300 ppm to 30 ppm in EPA's Tier 2 program.
- EPA has stated a need to reduce sulfur in gasoline to:
 - Improve air quality, but the 2008 EPA NAAQS Regulatory Impact Analysis did not mention sulfur or other fuel changes, even as it addressed need for various vehicle emission reduction technologies.
 - Facilitate fuel economy (CAFE) standards, but EPA has not identified any new vehicle technology expected to be deployed that would be enabled by lower sulfur levels or would be impaired by current sulfur standards.



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November 11, 2011

API Critique of the AAM October 6, 2011 Letter to Lisa Jackson and AAM White Paper: *Why EPA Tier 3 Market Gasoline Sulfur Limits Need to be Significantly Lower, Especially for MY 2017+ Vehicles*

According to AAM, reducing the Sulfur cap will improve fuel economy by enabling Lean Burn GDI engine technology

We question the assertion that a 10 ppm gasoline sulfur cap would have any significant impact on the utilization of lean burn gasoline direct injection (GDI) engine technology. In regions of the world where 10 ppm sulfur in gasoline was mandated (i.e., Europe and Japan), the penetration of lean-burn GDI peaked at 2% and has been declining thereafter. Data show that the AAM statement that "...Europe and Japan have been able to enjoy the benefits of lean burn gasoline over the past decade" is inaccurate. The real-world efficiency benefits of lean-burn GDI were found to be less than promised.

EPA, DOT and others have recognized that lean-burn GDI is a strategy that the automakers are unlikely to adopt in large scale for compliance with the Corporate Average Fuel Economy and tailpipe greenhouse gas emissions standards currently in place.¹ A recent assessment of the automakers' technology introduction plans concluded that: (a) the opportunity for lean GDI in the US is limited to 0-3% market penetration by 2020, and (b) 10 ppm max sulfur in gasoline will not result in lean burn engine production.²

According to AAM, regulatory flexibility (similar to the Tier 2 phase-in) should not be allowed for the refining industry

AAM states that sulfur "hot spots" have occurred in certain regions due to the flexibility granted by EPA to small refineries with respect to meeting the Tier 2 gasoline standard over an extended time frame. AAM barely acknowledges (and only in a footnote) that this regulatory flexibility ended at the close of 2010. The most recent AAM fuel survey data (for the winter of 2011) show no gasoline samples exceeding the 95 ppm sulfur cap at retail. In fact, according to this recent AAM data, 96% of US gasoline at the retail level now contains less than 50 ppm sulfur. The adoption of a flexible "systems-based" regulatory approach is what helped to assure the success of the Tier 2 program by giving the automakers 5 years to phase in the production of Tier 2 compliant vehicles and a nearly commensurate amount of time for certain small refineries to comply with the fuel requirements.

¹ See, for example, the EPA/NHTSA Joint Technical Support Document for the *Final Rulemaking: Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards (published May 7, 2010)* at: <http://www.epa.gov/otaq/climate/regulations/420r10901.pdf>. See also, the National Research Council report, *Assessment of Fuel Economy Technologies for Light Duty Vehicles*, 2011, at: http://www.nap.edu/openbook.php?record_id=12924&page=R1

² McMahon, K.B., et al, The Martec Group, *Lean GDI Technology Cost and Adoption Forecast: The Impact of Ultra-Low Sulfur Gasoline Standards*, Society of Automotive Engineers, Paper # 2011-01-1226, April 2011

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different sulfur levels over a broader range of real-world driving conditions (i.e., as embodied in the US06 test cycle) than found on the standard FTP cycle. The authors then infer that the need for such a cycle would be eliminated by reducing gasoline sulfur from 33 ppm to 3 ppm. Such reasoning is specious due to the fact that fuel parameters other than sulfur were allowed to vary, thus confounding any interpretation of the results.

EPA Certification Data – AAM argues that 10 ppm sulfur is necessary for vehicles that will be designed to meet the Tier 3 emissions standards that are currently being considered, and those standards are essentially equivalent to today's federal Tier 2 Bin 2 and California SULEV emissions levels (i.e., NMHC + NOx levels of 0.03 grams/mile). To check this assertion we accessed the Agency's model year 2011 vehicle emissions certification database and found that there are at least 19 vehicle model configurations already in production that have been designed to meet either the Tier 2 Bin 2 or California SULEV with almost 50% over compliance while operating on federal Tier 2 sulfur compliant certification gasoline.⁶ This suggests that the automakers already are successfully designing products taking into consideration today's gasoline sulfur levels. We are not aware of any published studies or anecdotal evidence that suggests that any of these vehicle models are experiencing issues while operating on gasoline that meets current federal sulfur requirements (e.g., 30 ppm refinery gate average/ 95 ppm retail max).

The impact of higher levels of ethanol in gasoline on NOx emissions - AAM's argument that lower levels of sulfur in gasoline are needed to counteract the NOx emissions impacts associated with expected higher future levels of ethanol in gasoline is unsupported. It ignores the dilution effect associated with adding more ethanol to gasoline. We know of no publicly available study that has quantified the emissions effects on modern vehicles associated with the systematic variation of both the sulfur and the ethanol content of gasoline.

Sulfur irreversibility - AAM argues that the effects of higher sulfur excursions on the emissions performance of modern technology vehicles are reversible with a return to lower sulfur gasoline only under driving conditions that are more aggressive than those represented by the EPA Federal Test Procedure (FTP) driving cycle. Recent investigations, including the Ball et al PZEV study prominently figured in the AAM White Paper, appear to support this observation.⁷ However, AAM's suggestion that the opportunity for high speed/high load driving is of limited availability to the inhabitants of ozone non-attainment areas (i.e., urban locations) is unsubstantiated.⁸

⁶ See EPA "Certified Vehicle Test Result Report Data" for MY 2011 vehicles at: <http://www.epa.gov/otaq/cert/veh-cert/cert-tst/11actrr-01-21-11.csv>

⁷ Hochhauser, A.M, *Review of Prior Studies of Fuel Effects on Vehicle Emissions*, CRC Project E-84, Final Report, August 2008, available at: <http://www.crcao.org/reports/recentstudies2008/E-84/E-84%20Report%20Final,%20Aug%202014.pdf>

⁸ See page 3 of the AAM White Paper: "EPA should consider that many consumers may drive in a manner not conducive to catalyst burn off..."

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in 2008 the contribution of electric utilities to the nationwide SO₂ emissions inventory was **183 times larger** than that of the on-road mobile source sector), leading one to question the cost-effectiveness of gasoline sulfur reduction for this purpose.¹³

According to AAM, an unspecified reduction in gasoline vapor pressure and an unspecified increase in octane number will be needed.

AAM supports a gasoline vapor pressure reduction by stating that it will decrease evaporative emissions. However, AAM does not acknowledge, as it does for sulfur, that the fuel and the vehicle need to work as a system, and that on board vehicle controls could also achieve this goal, perhaps at a lower cost.

AAM also states that increases in the octane number of gasoline are necessary to help the automakers to design vehicles that achieve higher fuel economy. This is yet another unsubstantiated argument. For decades, the petroleum industry has been offering the motoring public a choice to purchase gasoline with higher octane numbers. That gasoline is generally called "premium unleaded" and it is available for sale at most retail gasoline outlets.

It is noteworthy that the AAM letter appears to be inconsistent with the AAM statement on page 7 of Appendix 2 of the White Paper which reads "The Alliance believes it is acceptable for premium gasoline to be defined as having a minimum 91 octane $((R+M)/2)$."

AAM recognizes the high octane properties of ethanol, notes the prospect for greater volumes of ethanol to be blended into the gasoline pool to meet the RFS mandates, and argues that refiners should not be allowed to reduce the octane number of hydrocarbon base stocks used for blending with ethanol. Such a prohibition would significantly reduce refining flexibility with consequential impacts on product supply and costs. From the refiner's perspective, the ability to offer blendstocks for oxygenate blending (CBOB & RBOB) provides for a more cost effective final product when ethanol is added. Furthermore, requiring the vast majority of vehicles to use gasoline with an octane rating higher than for which they are designed is a misuse of resources.

It also is important to note that consideration for changes to both vapor pressure and octane number cannot occur in a vacuum or independently of one another. It needs to be based on an evaluation of all impacts on refining and distribution. (For instance, to reduce vapor pressure, refiners would likely need to curtail the amount of butane blended into the gasoline pool, but butane is a high octane blendstock, so this strategy cannot be considered alone).

Furthermore, any analysis of increased octane should include the entire pathway (well-to-wheels). Studies by MathPro and JCAP II (which we shared with your staff on

¹³ US EPA, 2008 National Emissions Inventory, <http://www.epa.gov/cgi-bin/broker? service=data& debug=0& program=dataprog.national.1.sas&polchoice=SO2>

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- **7% to 14% reduction in gasoline supply:** The new standard will prevent refiners from being able to utilize clean, higher vapor pressure gasoline, and reduce the amount of fuel they can produce.
- **1% to 2.3% increase in refinery CO2 emissions:** More energy intensive refining processes will be needed to meet the new fuel specifications, resulting in more refinery greenhouse gas emissions.
- **Significantly increased costs:** Up-front capital costs are projected between \$10 billion and \$17 billion. Recurring operating costs, including capital charge, to the refining industry are projected between \$5 billion and \$13 billion annually.
- **Gasoline manufacturing cost impacts of 12 cents to 25 cents per gallon:** Higher manufacturing costs could negatively impact the marketplace.
- **Between 4 and 7 refinery closures:** When coupled with EPA initiatives to reduce greenhouse gas emissions from refineries and other EPA regulatory programs, U.S. refineries will be put at a competitive disadvantage, potentially resulting in more refinery closures.



December 22, 2011

The Honorable Lisa P. Jackson
Administrator
U.S. Environmental Protection Agency
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: API and NPRA Concerns with a Tier 3 Rulemaking and Refinery Sector Rulemaking

Dear Administrator Jackson:

America's petroleum refining industry is a strategic and valuable asset for the United States. It provides secure supplies of products to American consumers and to the industries which depend on these products. Maintaining a strong domestic refining industry is critical to the nation's economic security. The American Petroleum Institute (API) and the National Petrochemical and Refiners Association (NPRA) are writing to express our concerns over two major regulations EPA plans to propose that could have serious negative impacts on the domestic refining industry: Tier 3 Gasoline Standards, and the Refinery Sector Rulemaking. Together, these initiatives could have serious implications for U.S. energy security and the refining industry's competitiveness in the global marketplace.

EPA needs to re-evaluate the science used to develop the proposals and make the relevant data and conclusions available for public scrutiny. The Agency should allow an appropriate amount of time for public review and stakeholder input before proceeding with proposed rules.

Tier 3:

Our members firmly support the principle that no Tier 3 regulation should be proposed without first providing a thorough science-based justification that demonstrates the health benefits along with a rigorous economic and supply impact analysis that assesses fundamental cost and energy security consequences related to the viability of a domestic refining industry.

The potential costs of a Tier 3 rule are significant. Baker and O'Brien determined¹ that new standards on sulfur and RVP reductions being considered by the Agency could result in initial aggregated capital investment costs of \$10 to \$17 billion or, when combined with operating costs, result in recurring annual costs between \$5 and \$13 billion. These impacts translate to a cost increase between 12 and 25 cents per gallon of gasoline produced. The study also projects that the additional economic pressure would likely cause 4 to 7 refineries to shut down. These

¹ Baker & O'Brien, "Potential Supply and Cost Impacts of Lower Sulfur, Lower RVP Gasoline", July, 2011.
http://www.api.org/Newsroom/upload/110715_LowerSulfur_LowerRVP_Final.pdf

are in addition to the 66 refineries that have closed in the last 20 years that U.S. Department of Energy determined² were in part due to the compounded burden of various regulations and economic pressure. In addition to the cost to refiners, supplies of domestic gasoline production were projected to decline by 8% to 19% in the summer, and CO₂ could increase by 1% to 2.3% at refineries that continue to operate.

While some reports^{3,4} have cited a MathPro study⁵ concluding lower cost impacts, the Baker and O'Brien modeling methodology employed a much more robust data set with a higher level of granularity. Baker and O'Brien modeled every individual U.S. refinery, rather than just 4 hypothetical refineries representing the production of an entire PADD, a technique which does not even allow for refinery shutdowns, a very real possible outcome that deserves serious consideration.

While the costs of a Tier 3 proposal are understood, no benefit has been demonstrated. Until EPA makes data and analysis available demonstrating a benefit, a comprehensive assessment of the proposed standard cannot be evaluated. The Anti-Backsliding study should be completed and made available prior to issuance of any proposed rule to change fuel quality. Congress mandated the study, which is now more than two years overdue. EPA also has indicated to industry that testing and data have been initiated on sulfur impacts to the existing fleet of vehicles. These data and analysis need to be made publicly available prior to the issuance of a proposed rule. Absent this information and a demonstration that fuel changes will achieve cost effective emissions reductions that would improve air quality or have other health benefits, EPA should not propose a Tier 3 Rule. By moving forward with a Tier 3 proposal, EPA is making conclusions based on an incomplete set of data and/or is allowing scant time for scrutiny from interested stakeholders.

Policies and programs designed to reduce the environmental impacts associated with transportation must evaluate changes from a systems perspective. API recently wrote to you expressing concerns with technical justifications provided by the Alliance of Automobile Manufacturers for a Tier 3 sulfur standard maximum of 10ppm.⁶ Any proposed changes to fuel specifications should be justified on sound science in order to accommodate vehicle technologies that automakers will commercialize in significant volumes within the same timeframe required of fuel providers. EPA has yet to identify automotive technologies that would be utilized to comply with increased CAFE standards or a Tier 3 standard that would benefit from lower sulfur gasoline.

² U.S. Department of Energy, Office of Policy and International Affairs, "Small Refinery Exemption Study; an Investigation into Disproportionate Economic Hardship", March 2011.

³ Northeast States for Coordinated Air Use Management, "Assessment of Clean Gasoline in the Northeast and Mid-Atlantic States", November 21, 2011.

⁴ National Association of Clean Air Agencies, "Cleaner Cars, Cleaner Fuel, Cleaner Air: The Need for and Benefits of Tier 3 Vehicle and Fuel Regulations", October, 2011.

⁵ MathPro, Inc. "Refining Economics of a National Low Sulfur, Low RVP Gasoline Standard" October 25, 2011.

⁶ Jack Gerard API, Letter to EPA Administrator Lisa Jackson, November 11, 2011

Refinery Sector Rulemaking

EPA also is moving forward on the Refinery Sector Rulemaking [thus far with no change from its public declaration of proposing a rule in December 2011]. This rulemaking encompasses a group of regulations including the new Greenhouse Gas New Source Performance Standards (NSPS) for refineries, an updated NSPS for conventional pollutants, a review and possible tightening of the existing National Emissions Standards for Hazardous Air Pollutants (NESHAP) for refineries, and establishing new “uniform standards” for relevant industrial processes on a whole facility basis.

This is the most comprehensive and complex rulemaking ever developed for the refinery sector. As of September 30, refineries have submitted over five million pieces of data and spent more than 70 million dollars in response to the Information Collection Request and Mandatory Reporting Rule that were intended to inform this rulemaking. EPA should not propose the refinery sector rules before thorough review of the data and verification of its analyses with stakeholders.

EPA’s own analysis, presented in June 2011 to the Clean Air Act Advisory Committee, shows that refinery emissions and risk are relatively low compared to other industry sectors and that GHG emissions are an order of magnitude less than utility emissions (see attached figure). In fact, EPA’s initial 2009 refinery risk review resulted in a finding of “no further action” necessary to control refinery Hazardous Air Pollutants. Based on the information provided at the EPA GHG “listening session” and by EPA’s initial analysis, there is little potential for increased efficiency controls at refineries because energy efficiency is an inherent part of the refining business.

Perhaps most importantly is that unlike most rules, NSPS regulations have a unique impact on industry upon proposal. Proposed NSPS revisions set triggers for new, modified and reconstructed sources on the proposal date. Resources must be committed at that time by facilities to plan to comply with the most stringent requirements under consideration. Without having the policy choices and control options vetted by the public and regulated community prior to proposal, the result may be the unnecessary cancellation of projects at great expense and loss of jobs.

Therefore, we ask EPA to take the following steps:

1. Before pursuing new rulemakings, the Agency should finalize the reconsideration of NSPS Subpart Ja for process heaters and flares, which was proposed in December 2008. This extended delay has unnecessarily complicated plans at U.S. refineries, which must continue to make important changes to meet America’s energy needs.
2. With respect to the rulemakings associated with the settlement agreement from December 23, 2010, we urge the EPA to issue an Advanced Notice of Proposed Rulemaking seeking input on the data submitted, analyses, results, and key policy recommendations before taking additional regulatory action. We believe this is an appropriate step to ensure that these rules will be based on sound science.

The Tier 3 and refinery sector regulatory initiatives can have serious implications for the refining industry and the communities in which we operate. Robust scientific justifications need to be

developed before proceeding with proposed rules. EPA should not propose a Tier 3 regulation without first providing a thorough science-based justification that demonstrates the health benefits along with a rigorous economic and supply impact analysis. Additionally, the Agency should not propose the refinery sector rules before a thorough review of the data and verification of its analyses with stakeholders. Basing the rules on sound science and avoiding unnecessary costs will help to ensure U.S. energy security and the refining industry's competitiveness in the global marketplace.

API, NPRA and our member companies appreciate your attention to these issues. For further information on these comments, please contact Bob Greco at 202-682-8167 or David Friedman at 202-552-8461.

Sincerely,



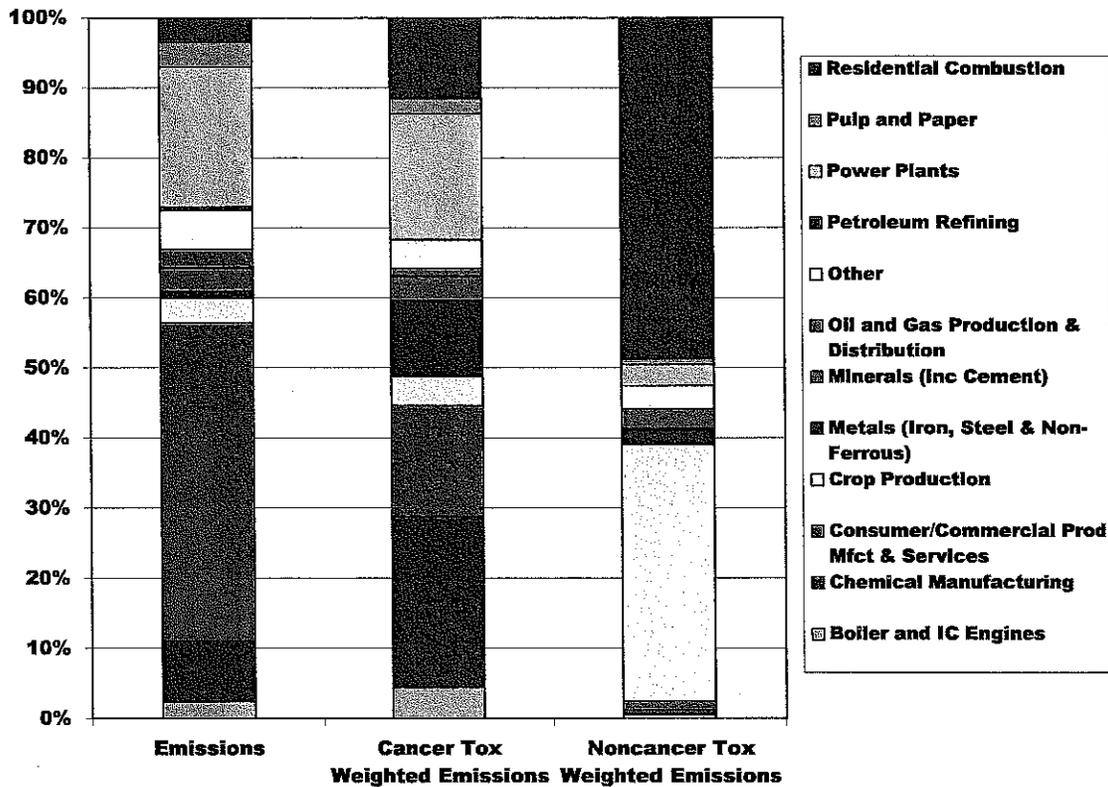
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cc: Cass Sunstein, Administrator, OMB Office of Information and Regulatory Affairs
Gina McCarthy, Assistant Administrator, EPA Office of Air and Radiation
Margo T. Oge, Director, EPA Office of Transportation and Air Quality

Combustion and Chemical Facilities Pose Highest Risks From Stationary Sources



Source: June 9, 2011 EPA CAAAC Meeting