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Dr. Sue Shallal
Designated Federal Officer
EPA Science Advisory Board (1400F)
U.S. Environmental Protection Agency
1200 Pennsylvania Avenue, NW
Washington, DC 20460

RE: Comments on Draft Report of SAB's Risk and Technology Review Methods Panel

Dear Dr. Shallal:

The American Petroleum Institute (API) is a national trade association with nearly 400 member companies that are involved with all aspects of the oil and natural gas industry. API member companies have worked with the U.S. Environmental Protection Agency (EPA) Office of Air Quality Planning and Standards (OAQPS) for over a decade on the development of the residual risk program and continue to do so through development of the draft Emission Estimation Protocol for Petroleum Refineries.

Because the risk assessment process is a tool that is used to identify a range of risk, it is important to represent risk to reflect the conservative nature of the inputs used in this process. Exposure and toxicity estimates used in the process are based on conservative practices that all tend to provide an over-estimate in the final risk assessment. To make this more transparent to non-professionals that may be interested in these assessments, we recommend that the risk assessment include a range of expected results with associated probability.

On March 24th, the chartered Science Advisory Board (SAB) is scheduled to hold a public teleconference to conduct quality reviews of three draft reports, including the draft report of the Risk and Technology Review Methods Panel (SAB 2009).[1] API appreciates the opportunity to offer comments to the EPA on that report.

COMMENTS

Our major comments, followed with additional detail, are as follows:

1. <u>We strongly support EPA's continued use of actual emissions as the basis for RTR risk assessments</u>. Use of actual emissions is more consistent with

   (a) The residual risk language of the Clean Air Act,

   (b) Risk assessment practice elsewhere at EPA and other agencies, and

[1] SAB. 2009. "Draft Report of the Risk and Technology Review Methods Panel." EPA Science Advisory Board, U.S. Environmental Protection Agency, Washington, D.C. December 3.

(c) The actual-emission basis of such important regulatory tools as the National Emission Inventory (NEI), the National Air Toxics Assessment (NATA), the Toxic Release Inventory (TRI) program, and state and local agency air toxics emission inventory and risk assessment programs (such as California's Air Toxics Hot Spots Program).

2. RTR risk assessments, while based on actual emissions, contain a large margin of high-side conservatism by assuming, for example, that exposures to the public occur continuously, each hour of every day for a 70-year lifetime, while outdoors and remaining fixed at the same residence, without moving residences or traveling during the day to work, school, or for other purposes.

3. Risk estimates based on actual emissions provide more realistic and reliable information to decision makers and the public about actual risks because they are more representative of physical conditions that may actually occur.

4. Reliance on actual emissions better recognizes that, in the case of large, complex, and integrated facilities such as petroleum refineries, it is not physically possible for equipment to operate simultaneously at maximum allowable levels, even for short periods of time, let alone for an entire lifetime as assumed by EPA in calculating cancer risks.

DISCUSSION OF COMMENTS

1. We Strongly Support EPA's Continued Use Of Actual Emissions As The Basis For RTR Risk Assessments

In its draft report, the SAB panel recommends that RTR risk assessments be conducted in two steps. As a first step to assess the effectiveness of current MACT standards, the SAB panel recommends that RTR risk assessments be redone using allowable emissions. Only in a second step to assess current risk in the surrounding community would risk be calculated using actual emissions.

While we also have concerns about other aspects of the SAB panel's draft report, we are particularly concerned about their recommendation to use allowable emissions instead of actual emissions in RTR risk assessments. The use of allowable emissions to evaluate MACT adequacy will result in unrealistic estimates of refinery risk that, as a result, will be materially misleading to decision makers and the public.

In support of the use of actual emissions rather than allowable emissions, we note that:

(a) Use of actual emissions is more consistent with the residual risk language of the Clean Air Act. EPA's use of actual emissions, as well as its use of U.S. census data to specify the actual geographical locations of potentially exposed individuals in its RTR risk assessments, are both consistent with the residual risk language in §112(f)(2)(A) of the Clean Air Act. That provision directs EPA to determine the need for a residual risk-based rule by reference to the "lifetime excess cancer risk to the individual most exposed," which EPA has termed the maximum individual risk (MIR). The Clean Air Act's language has been interpreted, correctly we believe, to require use of realistic conditions, not hypothetical, extreme ones that do not and cannot actually occur. In its Air Toxics Risk Assessment (ATRA) Reference Library[2], for example, EPA defines the MIR to be the "point of maximum modeled concentration at an actual receptor location," which EPA states "may be an actual residence, a location within a census block, or some other populated area." EPA has recognized this definition of MIR in the de-

[2] EPA. 2004. "Air Toxics Risk Assessment Reference Library, Volume 2, Facility-Specific Assessment." EPA-453-K-04-001B. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. April. [2]

sign of its HEM-3 risk model, which EPA has used for a broad range of air toxics risk assessments over a number of years, including for RTR risk assessments.

(b) Use of actual emissions is more consistent with facility-specific risk assessment practice at EPA and other agencies. For some time, EPA has recommended a tiered risk assessment approach be used to assess facility-specific risks.[2,3] In its ATRA Reference Library, for example, EPA recommends that emissions in all risk assessment tiers use the "best information available for the facility," among the sources for which EPA lists as facility records, the National Emission Inventory (NEI), and the Toxics Release Inventory (TRI), all of which are based on actual emissions. Even in the most conservative, screening-level Tier 1 risk assessment, EPA recommends use of emissions from a "high-production year," which is defined as the single year with the highest emissions during a five-year period, again all of which are based on actual emissions. In addition, state and local air toxics emission inventory and risk assessment programs also use actual emissions. For example, California's Air Toxics Hot Spots Program (AB2588) requires that industrial facilities, including refineries, develop air toxics emission inventories, and if necessary, conduct risk assessments, all of which are based on actual emissions.

(c) Use of actual emissions is more consistent with the fundamental basis of many of EPA's important regulatory and public information tools. EPA uses actual emissions as the basis of such important regulatory tools as the National Emission Inventory (NEI), the National Air Toxics Assessment (NATA), and the Toxic Release Inventory (TRI) program. These programs represent important sources of information that are used, not only by EPA in its regulatory programs, but by the public as well.

2. RTR Risk Assessments, While Based On Actual Emissions, Contain A Large Margin Of High-Side Conservatism Designed to Avoid Understating Actual Risk

The SAB panel appears to be concerned that RTR risk assessments based on actual emissions may understate risk to the public. However, RTR risk assessments, like many other regulatory risk assessments, contain a large margin of high-side conservatism deliberately designed by EPA to guard against underestimation of actual risk. These conservative assumptions include the following:

- Toxicity is assumed to be characterized using the 95 percent upper confidence limit estimate of responses in toxicological studies.

- Exposure is assumed to be continuous over a lifetime, that is, it is assumed to occur every hour of every day for a 70-year lifetime.

- Exposure is assumed to occur while outdoors, even though concentrations of outdoor-generated pollutants are typically lower indoors, often by a wide margin.

- Exposure is assumed to occur at the same fixed residence location, never moving to a different residence or traveling away from home during the day, even though the average person moves every 7 to 9 years and most people spend significant portions of the day away from home.

The above exposure assumptions alone could overstate actual risk by an order of magnitude or more, offsetting in part, or perhaps much of, the SAB panel's concern that use of actual emissions might introduce a significant risk underestimation bias.

[3] D.E. Guinnup. 1992. "A Tiered Modeling Approach for Assessing the Risks Due to Sources of Hazardous Air Pollutants." EPA-450-/4-92-001. U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. March.

The Clean Air Act requires EPA to determine the need for residual risk rules by reference to the "individual most exposed." The criteria for defining this term were not stated. Rather, Congress established the Commission on Risk Assessment and Risk Management in Section 303 of the Clean Air Act Amendments of 1990 and, as stated in CRARM (1997)[4], mandated the Commission "to advise what exposure scenarios should be used."

The CRARM stated that "past exposure assessments and health risk assessment practices have relied on exposure estimates derived from a hypothetical MEI [maximally exposed individual] who might spend a 70-year lifetime living at the point of greatest deposition from a plume of industrial contaminant emissions." Concluding that "(t)he MEI was often so unrealistic that its use impaired the scientific credibility of health risk assessment," the CRARM instead made the following recommendation:

> *"Use of Realistic Scenarios in Exposure Assessments: The Commission supports basing risk management decisions [including residual risk] on exposure assessments derived from realistic scenarios. Agencies should continue to move away from using the hypothetical 'maximally exposed individual' to evaluate whether a risk exists, toward more realistic assumptions based on available scientific data." (CRARM 1997, p. iv)*[4]

The CRARM further recommended that exposure assessments be done that "evaluate the distribution of a population's varied exposure" and that "rely on population exposure data…instead of assumptions."

We strongly support these recommendations and urge EPA to modify its RTR risk assessments to further implement them. We also urge EPA to calculate risk using a range of exposure scenarios designed to characterize not just upper-end MIR risk, but also risk under other, more typical exposure scenarios, including risk to the average exposed person.

3. <u>Risk Estimates Based On Actual Emissions Provide More Realistic And Reliable Information To Decision Makers And The Public About Actual Risks</u>

Risk estimates based on actual emissions are more realistic and better represent actual physical conditions in a community than risk estimates based on hypothetical allowable emissions that may not, and perhaps cannot, occur. As a result, actual emissions should form the basis of RTR risk assessments to evaluate current MACT adequacy.

The SAB panel expresses a concern that estimates of actual emissions as self-reported by refineries may be biased low and that refineries might actually emit at significantly higher rates at times other than those reported. The panel also expresses concern that RTR risk assessments understate facility-wide risk because they include only sources in a single category.

Other refinery risk assessment results not cited by the SAB panel, however, are available with which to evaluate the risk significance of the SAB panel's concerns. To place the panel's concerns in context with those other results, the SAB panel's draft report should be expanded to include a discussion of other refinery emission inventory preparation and risk assessment examples, such as California's Air Toxics Hot Spots Program.

While risk assessments done under the Air Toxics Hot Spots Program are based on actual emissions, the process by which those actual emissions are calculated is rigorous and subject to agency

[4] CRARM. 1997. "Risk Assessment and Risk Management in Regulatory Decision-Making, Final Report, Volume 2." The Presidential/Congressional Commission on Risk Assessment and Risk Management, Washington, DC.

review and approval, which should reduce the SAB panel's concerns about underestimation bias in these risk assessments due to self-reporting. Moreover, these risk assessments are facility wide and multi-pathway, and thus include all sources, all HAPs, and all exposure pathways. Results of these risk assessments should help reduce the SAB panel's concern about the extent to which there is a material difference between single-category and facility-wide risks for refineries.

The California Air Resources Board website lists individual Air Toxics Hot Spots risk assessment results for a large number of facilities statewide, including refineries. For the year 2006 (the most recent year for which they are provided), risk results are listed for sixteen operating refineries (SIC Code 2911, Petroleum Refining), as shown in Figure 1.

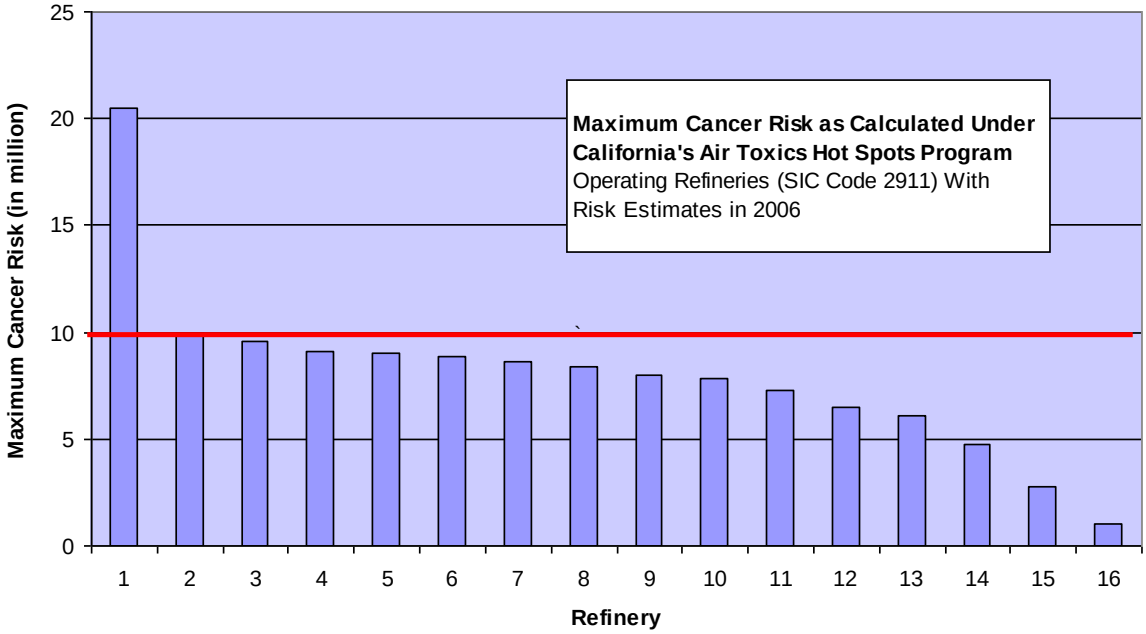


Figure 1. Maximum cancer risk as calculated under California's Air Toxics Hot Spots Program (operating refineries with listed risks for 2006)

Of the sixteen refineries, a single refinery (at just over 20 in a million) had a facility-wide maximum cancer risk greater than 10 in a million. Note that these risk estimates do not include risk due to diesel PM calculated using California's diesel PM toxicity value, thus making them more directly comparable to risks calculated in EPA's RTR risk assessments.

For reference, in the final version of EPA's RMACT1 RTR risk assessments,[5] which are also based on actual emissions, the highest-risk refinery among the156 that EPA analyzed was calculated to have a maximum cancer risk of 28 in a million. The next highest cancer risk was 21 in a million. All of the other 154 refineries (or 99%) had a calculated maximum cancer risk below 20 in a million, with risk below 10 in a million for 137 of those refineries, or 88%.

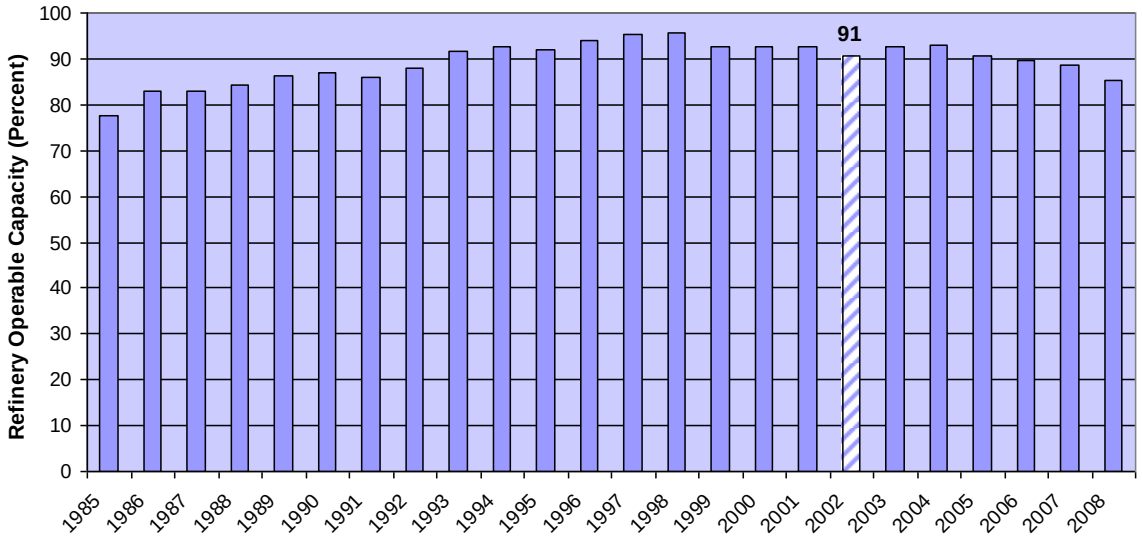
[5] EPA. 2009. "Final Baseline Residual Risk Assessment for MACT I Petroleum Refining Sources." U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, North Carolina. January.

4. <u>Reliance On Actual Emissions Better Recognizes That, In The Case Of Large, Complex, And Integrated Facilities Such As Petroleum Refineries, It Is Not Physically Possible For Equipment To Operate Simultaneously At Maximum Allowable Levels</u>

In the case of large, complex, and integrated facilities such as refineries, it is not physically possible for all equipment to operate simultaneously at maximum allowable levels. If SAB panel recommendations were to result in such an assumption being made, risks calculated by EPA in their next round of refinery RTR risk assessments likely would be materially (and unrealistically) overstated.

Moreover, use of allowable emissions instead of actual emissions is inconsistent with refinery operations. Refineries typically operate at a high percentage of capacity, as is evident in Figure 2 below, which plots the percentage utilization of U.S. refinery operable capacity, as compiled by the U.S. Energy Information Administration (EIA) for the years 1985 through 2008. This percentage represents the utilization of refinery atmospheric crude distillation capacity. For reference, the percentage utilization is shown by cross-hatching for 2002, the base year of EPA's RTR RMACT1 risk assessments.

As shown in Figure 2, the percentage utilization of refinery operable capacity has remained between 78% and 96% for the twenty-four year period from 1985 through 2008. Since 2000, the percent utilization has been between 85% and 93%. In 2002, the base year for EPA's RTR RMACT1 risk assessments, operable capacity utilization was 91%.



Source: EIA (2010)[6]

Figure 2. Percentage utilization of U.S. refinery operable capacity from 1985 - 2008

With such a high refinery utilization, it seems, on a fundamental basis, that the difference between actual and maximum-capacity refinery operations is and has been comparatively small (that is, less than about 20% of maximum capacity and more typically about 10% to 15%), notwithstanding concerns of the SAB panel about the difference between actual and allowable emissions.

* * *

[6] EIA. 2010. Data downloaded from U.S. Refinery Utilization and Capacity. U.S. Energy Information Administration, Washington, DC. March 14.

For reasons we discuss here, it's probable that use of allowable emissions to evaluate current MACT standards instead of actual emissions would cause calculated RTR refinery risks to be substantially misstated. If so, EPA's implementation of the SAB panel's recommendation could lead to unrealistic and misleading refinery risk estimates, and possibly (and erroneously) affect RTR rulemaking.

API and its members will continue to demonstrate our commitment to EPA to improve RTR risk assessments and their supporting databases. We welcome the opportunity to discuss these comments and recommendations with EPA and provide additional information or clarifications as needed.

Sincerely,

Matthew A. Todd