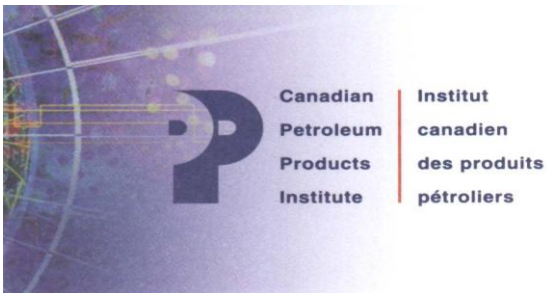


Sept. 29, 2009

Ms. Minnie de Jong
Manager, Human Toxicology and Air Standards Section
Standards Development Branch
Ministry of the Environment
40 St. Clair Avenue West, 7th Floor
Toronto Ontario M4V 1M2

Re: ON Reg. 419 PAH Air Standard EBR 010-6213

Dear Ms. de Jong:

This letter contains input from the Canadian Petroleum Products Institute (CPPI) in response to the EBR Posting 010-6213.

CPPI is the national association representing the interests of the downstream petroleum industry for all aspects of petroleum refining, distribution, transportation and marketing of petroleum products. In the province of Ontario, CPPI members include Imperial Oil, NOVA Chemicals, Petro-Canada, Shell Canada, Suncor and Ultramar. This includes operation of the 6 petroleum refineries processing about 380,000 barrels per day of crude oil, and as well, the operation of a substantial portion of the distribution and marketing infrastructure in the province.

CPPI members have maintained and demonstrated a long-standing commitment to improving environmental performance and helping protect Ontarians from being exposed to toxic substances from their operations, as well, in partnering with MOE to provide meaningful input on new developments.

From reviewing the proposed PAH annual air standard of 0.00001 µg/m^3, it appears that the science based input and arguments made by CPPI in our Dec. 19, 2009 submission to the science consultation document, that would credibly support a higher air standard was not accepted. This is disappointing. CPPI draws your attention to our Dec. 19, 2008 input, as well has outlined further specific scientific input for the MOE to reconsider. Based on this science basis, CPPI has recommended different annual AAQC values.

PAH Annual AAQC

- MOE needs to consider the level of conservatism in the critical study, and balance this against the uncertainty factors and its risk benchmark to avoid multiplying the amount of conservatism in deriving the AACQ.
- It is disappointing and scientifically flawed that MOE has decided to drop the "inverse uncertainty factor" of 3-10 that was originally applied to the WHO guideline value. As MOE clearly describes in the Science document, exposure to known and potent carcinogenic non-PAH chemicals is likely to have significantly contributed to the increased cancer risk of coke-oven workers in the Allegheny County cohort. In addition, the cohort study does not take into account the known confounding effect of smoking habits.
- MOE suggests that cancer risks may be underestimated when using B[a]P as a surrogate. One of the reasons that MOE lists is the assemblage of ambient air, which is suggested to be more toxic due to the formation of e.g. nitro-PAH. It is of pivotal importance to realise that coke-oven workplace air (originally derived from outside air) includes significant levels of aromatic heteronuclear and substituted aromatic compounds. These are not taken into account in the Allegheny County cohort study. In addition, the basis of the B[a]P as a surrogate method is that B[a]P is chosen as surrogate amongst others because of its potency. Therefore, the presence of extremely low levels of nitro-PAH or comparable reaction products in ambient air cannot lead to an underestimation of the risk, when using the Allegheny cohort as a basis. In conclusion, B[a]P can be used as a surrogate, because ambient air is no more toxic than the workplace air in the Allegheny cohort study.
- Another argument put forward by MOE that should indicate why cancer risks might be underestimated when using B[a]P as a surrogate, is B[a]P losses. MOE bases this argument on data presented by Ravindra (2008) and Lane and Katz (1977). All PAH half-life data presented in these studies refer to non-standard, non-GLP laboratory studies; similar effects need to be established in well-designed field studies. Ravindra (2008) highlights this shortcoming and does not state any conclusions regarding the actual atmospheric degradation, which is suggested in the MOE document.
- What is actually more striking is that Goriaux et al. (2006) reported that the atmospheric PAH concentrations measured using conventional samplers not equipped with an ozone trap can underestimate the PAH concentration by more than 200%. This was especially found when the samples were collected in the vicinity of a point source of particulate PAHs and for highly reactive compounds such as B[a]P (Ravindra, 2008). It is very well feasible that this was the case when determining exposures in the Allegheny County cohort, indicating that B[a]P concentrations may have been significantly underestimated, hence the carcinogenicity risk overestimated. Altogether, the literature referenced on this topic by MOE rather suggests another overestimation of the risk, rather than an underestimation.
- The suggested underestimation of risk due to extrapolation issues from higher concentrations should indeed be interpreted with caution due to imprecision in the exposure measurements, especially at the higher end, as the authors indicate themselves (Armstrong et al., 2004).
- Sensitive subpopulations remain a subject of debate. CPPI would like to reiterate the recommendation not to accumulate several layers of conservatism. The WHO Air Quality Guidelines are deemed to protect 'public health'. Conservatism in the derivation of the cancer slope is already introduced by using the upper bound estimate of individual lifetime unit risk using the linearized multistage model.

- Other authoritive bodies recognize the layers of conservatism in the derivation of the cancer slope as well as the factors leading to the probable overestimation of risk (*vide supra*). Therefore the authoritive bodies using the same cohort study use a risk benchmark of 10^{-5} or 10^{-4} to prevent unnecessary and unwanted conservatism in the air quality standard.
- Note that WHO clearly advises the following: "In setting legally binding standards, considerations such as prevailing exposure levels, technical feasibility, source control measures, abatement strategies, and social, economic and cultural conditions should be taken into account."
- **Taking together the conservatism of the cancer slope and the factors leading to the probable overestimation of risk in the Allegheny cohort study, CPPI strongly recommends that MOE uses an "inverse uncertainty factor" of 10 analogous to WHO. Therefore, CPPI recommends that the resulting PAH annual AAQC be 0.0001 µg/m^3.**

PAH ½ hour and 24 hour AAQC

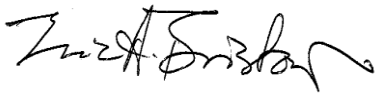
- PAH poses a chronic disease risk and the appropriate standard to protect against chronic effects should be an annual average. Therefore, the MOE calculating a short-term standard based on an effect that is the result of long-term exposure, is scientifically indefensible.
- If MOE would like to develop a ½ hour and 24 hour AAQC, it is recommended that an acute health effect be used as endpoint. The Toxicological Profile of PAH prepared by the Agency of Toxic Substances and Disease Registry (ATSDR, 1995) may be of help. If no suitable studies can be located (analogous to ATSDR), then the MOE should not be deriving a ½ hour and 24 hour AAQC from the annual standard for the reasons stated.

References

- Agency of Toxic Substances and Disease Registry (ATSDR) 1995 Toxicological Profile for Polycyclic Aromatic Hydrocarbons. http://www.atsdr.cdc.gov/toxprofiles/tp69.pdf
- Armstrong B, Hutchinson E, Unwin J, Fletcher T. 2004. Lung cancer risk after exposure to polycyclic aromatic hydrocarbons: a review and meta-analysis. Environ Health Perspect 112:970-978.
- Goriaux, et al., 2006. Field comparison of PAH measurements using a low flow denudeur device and conventional sampling systems. Environmental Sciences and Technology 40, 6398–6404.
- Lane DA, Katz M. 1977. The photomodification of benzo[a]pyrene, benzo[b]fluoranthene and benzo[k]fluoranthene under simulated atmospheric conditions. In: Fate of Pollutants in the Air and Water Environments. I.H. Suffet, ed. 1977, Wiley, New York
- Ravindra K, Sokhia R, Van Grieken R. 2008. Atmospheric polycyclic aromatic hydrocarbons: Source attribution, emission factors and regulation. Atmos Environ. 42:2895-2921

We welcome the opportunity to meet with you for further discussion in order to support the MOE in developing an appropriate PAH air standard.

Sincerely,



Eric A. Bristow
Director Government & Stakeholder Relations
Canadian Petroleum Products Institute - Ontario Division
20 Adelaide St E. Ste 901
Toronto, On M5C 2T6
Tel 416-492-5677 ext 34   [fax 2514]
E-Mail [ericbristow@cppi.ca]

Cc Mr. Carl Griffith, ADM, Environmental Sciences and Standards Division, MOE
Mr. Dale Henry, Director, Standards Development Branch, MOE
Ms. Faith Goodman, Vice-President Ontario Division, CPPI