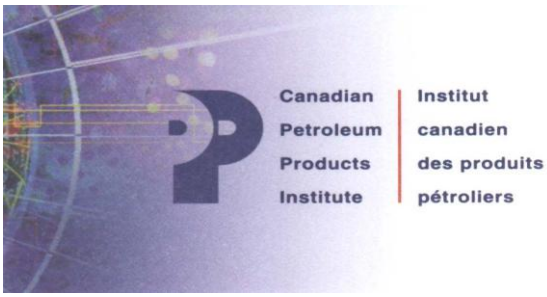


Sept. 29, 2009

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: Proposed Amendments to ON Reg. 419/05: Air Pollution – Local Air Quality to include Air Standards for Nine Contaminants, July 2009
EBR Posting # 010 - 7190

Dear Ms. de Jong:

This letter contains input from the Canadian Petroleum Products Institute (CPPI) in response to the proposed Reg. 419/05 Amendments to Air Standards, EBR Posting # 010 - 7190.

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, 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.

The MOE proposed amendments to the air standards contained in EBR Posting # 010-7190, relate to the individual postings for the listed nine substances. In terms of these nine substances, CPPI is also making coincident submissions to the following related EBR Postings: # 010-7186 (Benzene); # 010-6214 (1,3 Butadiene); # 010-7193 (Dioxins, Furans, and Dioxin-Like PCBs); # 010-7188 (Nickel and Nickel Compounds); and # 010 – 6213 (Polycyclic Aromatic Hydrocarbons).

CPPI recommendations related to the above EBR postings can be summarized as follows:

- In consideration of the well founded and supportable international scientific studies and research that CPPI has outlined, the MOE proposed standards for these substances are significantly lower than is appropriate or necessary for the protection of health.
- Short-term standards (i.e. ½ hour and 24 hour) should be based on acute, and not chronic health effects.
- Although CPPI can support the URT-derivation methodology as presented in the GIASO (http://www.ene.gov.on.ca/envision/gp/5166e02.pdf), CPPI does not support that the MOE is using a different methodology for Benzene and 1,3 Butadiene.

The basis for our concerns with the posted AAQCs and URTs is reflected in the related CPPI submissions to the EBR Postings for Benzene, Butadiene, PAH, Dioxins and Nickel. Key scientific points from those individual submissions have been included in the Attachment to this letter. CPPI has outlined the specific basis that supports from a health protective standpoint, different standards than the MOE has proposed:

Compound	**CPPI Recommended Annual AAQC** **(MOE Proposed AAQC)**	**CPPI Recommended 1/2-hour AAQC (MOE Proposed AAQC)**	**CPPI Recommended 24-hour AAQC** **(MOE Proposed AAQC)**	**CPPI Recommended 1/2-hour URT (MOE Proposed URT)**	**CPPI Recommended 24-hour URT (MOE Proposed URT)**
Benzene	10 µg/m^3 (0.45 µg/m^3)	178 µg/m^3 (7 µg/m^3)	60 µg/m^3 (2.3 µg/m^3)	1780 µg/m^3 (300 µg/m^3)	600 µg/m^3 (100 µg/m^3)
1,3-Butadiene	20 µg/m^3 (2 µg/m^3)	500 µg/m^3 (30 µg/m^3)	170 µg/m^3 (10 µg/m^3)	5000 µg/m^3 (900 µg/m^3)	1700 µg/m^3 (300 µg/m^3)
PAH	0.0001 µg/m^3 (0.00001 µg/m^3)	- (0.00015 µg/m^3)	- (0.00005 µg/m^3)	- (0.015 µg/m^3)	- (0.005 µg/m^3)
Nickel	0.05-0.16 µg/m^3 in PM_{10} 0.10-0.32 µg/m^3 in TSP (0.02 µg/m^3 in PM_{10}) (0.04 µg/m^3 in TSP)	6 µg/m^3 in PM_{10} 12 µg/m^3 in TSP (0.3 µg/m^3 in PM_{10} (0.6 µg/m^3 in TSP)	2 µg/m^3 in PM_{10} 4 µg/m^3 in TSP (0.1 µg/m^3 in PM_{10} (0.2 µg/m^3 in TSP)	60 µg/m^3 in PM_{10} 120 µg/m^3 in TSP (3 µg/m^3 in PM_{10} (6 µg/m^3 in TSP)	20 µg/m^3 in PM_{10} 40 µg/m^3 in TSP (1 µg/m^3 in PM_{10} (2 µg/m^3 in TSP)
Dioxins	-	1.2 pg/m^3 WHO_{2005}-TEQ pg/m^3 (0.3 WHO_{2005}-TEQ pg/m^3)	0.4 pg/m^3 WHO_{2005}-TEQ pg/m^3 (0.1 WHO_{2005}-TEQ pg/m^3)	12 pg/m^3 WHO_{2005}-TEQ pg/m^3 (3 WHO_{2005}-TEQ pg/m^3)	4 pg/m^3 WHO_{2005}-TEQ pg/m^3 (1 WHO_{2005}-TEQ pg/m^3)

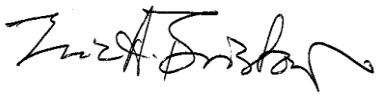
In our earlier submissions on the Science Document consultation for these substances, we requested that the Ministry share with us how they considered the economic and social impacts of these proposed air standards. One of the purposes of the 1994 Environmental Bill of Rights (EBR) Act is 'to protect, conserve and where possible, restore the integrity of the environment'. CPPI members support this regulatory requirement and would suggest the reduction of the emissions from existing and future facilities is an attempt to restore the integrity of the environment. Consistent with the EBR and the MOE Statement of Environmental Values, the Ministry is 'to consider the effects of its decisions consistent with sustainable development principles'. As this is not specifically addressed in these postings, CPPI re-states this request.

A recent concern that CPPI and others in industry has raised with the MOE is the need for alignment and consistency between the Standards Development Branch and the Approvals Branch. While there is a 5-year timeframe from promulgation to compliance, there have been situations where the Approvals Branch has been requesting that companies model and comply with new standards both prior to promulgation as well as not allowing for the 5 years to comply. CPPI requests that the MOE ensure that Approvals is respecting the compliance period. This 5-year compliance timeframe needs to apply both to new standards, as well as the associated Upper Risk Threshold (URT).

We suggest that the establishment of unnecessarily low and unattainable air standards will not only put Ontario industry at a competitive disadvantage with US industry, it will also force Ontario industry to ask for the public's indulgence to allow them to operate in a manner that exceeds the Ministry's conservative health based standard. For many companies, this approach to the public destroys their efforts to demonstrate social responsibility and the principles of sustainable development both in Ontario and around the world. It is counter to their corporate beliefs and values. This approach to setting air quality standards is having a significant negative impact on the perception from industry regarding Ontario as a place to do business.

We welcome the opportunity to meet with you for further discussion on this input.

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: Ms. Doris Dumais, Manager, Approvals Branch, MOE
Mr. Dale Henry, Director, Standards Development Branch, MOE
Mr. Carl Griffith, ADM, Environmental Sciences and Standards Division, MOE
Mr. Kevin French, ADM, Operations Division, MOE
Ms. Faith Goodman, Vice-President Ontario Division, CPPI

Attachment
Supporting Science Points for CPPI Covered Substances

Benzene Annual AAQC

- The low-dose risk of acute myelogenous leukemia in humans is best described by a sub-linear model based on epidemiology data. Other evidence like genotoxicity and enzyme saturation do not support one simple mode of action, as the Rationale Document would like us to believe. MOE selectively cites a small number of studies to make a case for a linear (if not supralinear) dose-response, and fails to take a weight-of-evidence approach using the vast literature on benzene genotoxic potential and metabolism. Furthermore, MOE provides no basis, (e.g., a critical review), for excluding the mass of studies that do not support the Ministry's conclusions. This is not good science. Other jurisdictions have used the same cohort study to set reasonable standards for benzene. CPPI cited the ACGIH acceptance of a sub-linear model for an occupational exposure, at least until more conclusive evidence became available on effects in the low exposure range.
- As other jurisdictions set risk management objectives for lifetime cancer risks between 10^{-4} and 10^{-6}, by choosing the lowest of this range, the MOE takes the most conservative goal and compounds it by the conservatism in how it extrapolated risks from the Pliofilm cohort. The resulting annual AAQC based on linear models used by EPA (0.45 µg/m^3) may be below rural Canadian background levels (0.3-1.0 µg/m^3).
- **Based on the above scientific basis, CPPI recommends an annual AAQC for benzene no lower than 10 µg/m^3, using sub-linear extrapolation from relatively high exposure occupational epidemiology studies, with consideration given to molecular and genetic toxicology studies.**

Benzene ½ hour and 24 hour AAQC

- MOE calculates a ½ hour and 24 hour AAQC based on carcinogenicity after long-term exposure. Calculating a short-term standard based on an effect that is the result of long-term exposure, is scientifically indefensible.
- However for short-term exposure, The Texas Commission on Environmental Quality based their 1-hour ESL of 178 µg/m^3 on acute haematotoxicity, which is an appropriate basis for a short-term standard.
- Given the variability of benzene emissions, if a facility were able to meet the ½-hour and 24-hour standards for an entire year, the actual annual emission value would likely achieve a population risk that is 1- or 2-orders of magnitude lower than the MOE's conservative objective.
- **Based on the above scientific basis, CPPI recommends that the Benzene half-hour standard be changed to 178 µg/m^3, and that the Benzene 24 hour standard be changed to 60 µg/m^3 (based on 178/3).**

Benzene Upper Risk Threshold (URT)

- By the MOE using the ATSDR MRL of 0.009 ppm (acute inhalation MRL, which is applicable for exposure up to 14 days!) as starting point, CPPI believes that the MOE then calculates the URT probably as follows: 0.009 ppm x 3.26 x 1000 = 30 µg/m^3. HQ=10, hence URT ½h is 300. A problem with this is that the MOE is not accounting for the fact that the acute MRL is applicable for exposures up to 14 days and is not a ½-hour standard! This is mixing apples and oranges.
- **Consistent with the science points above, the ½-hour URT should be based on acute health effects as presented by TCEQ and be based on the one hour TCEQ ESL of 178 µg/m^3 (based on haematotoxicity). The half hour URT should be 10 times that value, or 1780 µg/m^3.**

1,3 Butadiene Annual AAQC

- MOE based the AACQ on the TCEQ evaluation of 1,3 Butadiene. The high scientific quality of this document is recognized and emphasized by MOE, as well as by CPPI. The TCEQ derives an ESL of 20 µg/m^3. This level is established using a risk benchmark of 10^{-5} and takes into account the conservatism in the calculation of the cancer slope. The value of 20 µg/m^3 is considered to be health protective in Texas. If 20 µg/m^3 is health protective in Texas, why is this not health protective in Ontario?
- MOE clearly insists on using the conservative risk benchmark of 10^{-6}. However, the TCEQ value of 20 µg/m^3, which carefully weighed all levels of conservatism, cannot simply be transformed to 2 µg/m^3 using a different risk-benchmark. If the more conservative risk-benchmark of 10^{-6} is used, it is also advised to reduce the conservatism in the TCEQ value by inclusion of high-intensity tasks. This would result in a modestly higher AAQC of 4-5 µg/m^3.
- **Based on the above scientific basis, CPPI recommends that the MOE adopt the TCEQ value of 20 µg/m^3 for the annual AAQC.**

1,3 Butadiene ½ hour and 24 hour AAQC

- The TCEQ ESLs are chemical-specific air concentrations set to protect human health and welfare. Short-term ESLs are based on data concerning acute health effects, odour potential, and vegetative effects. Long-term ESLs are generally based on data concerning chronic noncarcinogenic and/or carcinogenic health effects. It is not appropriate therefore to derive a 30-minute standard for 1,3 Butadiene, based on carcinogenic health effects. It is recommended that short-term (½ and 24-hour) AAQC's are based on acute effects only.
- TCEQ calculates a 1-hour ESL of 500 µg/m^3 based on odour. The most relevant acute health effect reported in an animal study is reduced fetal bodyweight gain. However, the 1-hour ESL based on this health effect would be significantly above (i.e. 3700 µg/m^3) the odour threshold.
- **Therefore, CPPI recommends that the 1,3 Butadiene half-hour standard be based on acute health effects as presented by TCEQ, which is odour and use the one hour TCEQ ESL for the half hour standard of 500 µg/m^3 and that the 1,3 Butadiene 24 hour standard be changed to 170 µg/m^3 (based on 500/3).**

1,3 Butadiene Upper Risk Threshold

- **If the Upper Risk Threshold (URT) is based on odour, then the URL should be 5000 µg/m^3. Note that the TCEQ acute reference value based on acute health effects is 3700 µg/m^3 for HQ = 1. The proposed URT (HQ = 10) based on odour is therefore far below the HQ = 10 for acute health effects.**
- **For the reasons outlined, CPPI does not agree that the carcinogenic effects should be the basis for the URT. Even if this was the case, the URT would have been 3000 µg/m^3, rather than the MOE proposed URTs in Schedule 6 of 900 and 300 µg/m^3 respectively.**

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.
- 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. 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, it is recommended not to derive a ½ hour and 24 hour AAQC (analogous to ATSDR).

PAH 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

Dioxins, Furans, and Dioxin-Like PCBs (Dioxins) ½ hour and 24 hour AAQC

- TDI's (TCDD equivalents) of different organisations average 2.5 pg/kg/d (ranging from 1 – 4 pg/kg/d) and MOE uses this range to calculate an AAQC using route-to-route extrapolation. It should be noted that, whereas the tolerable daily intake has been calculated with the utmost precision using toxicokinetic information and body burden models, a simple application of route-to-route extrapolation negates the accuracy of the oral value.
- Whereas the the tolerable daily intake has been calculated meticulously accurate, the less accurately estimated allocation factor to air has an unreasonable large impact on the AAQC. The allocation factor to air has been reduced from 10% in the Science Document for Stakeholder review to 3% in the current version. The allocation to air is based on a few studies determining dioxin exposure to the general population. However, media-allocation strongly depends on the food and living habits of the exposed population. Data from Nauman *et al*. (1987) show that significant dioxin exposure occurs through fish and inhalation. These data support a higher allocation factor than 3%. In addition, a study investigating dioxin exposure in an UK worker population with a relatively high inhalation exposure showed that the estimated daily intake via inhalation was 0.35 pg WHO-TEQ $kg^{(-1)}$ body weight (bw) in the worst case scenario (Aries *et al*., 2008). Considering that the average UK adult exposure to dioxins from the diet is 1.8 pg WHO-TEQ $kg^{(-1)}$ bw $day^{(-1)}$, this may account for nearly 20% of the average daily intake. It is therefore well possible that the allocation factor to air of an urban or industrialized area is rather closer to 20% than to 3%. CPPI strongly recommends to revise the media allocation factor to air to a more realistic number, such as 10%. The resulting 24-hour standard would then be 0.4 pg/m^3 WHO_{2005}-TEQ.
- **Based on the above scientific basis, CPPI recommends that the Dioxin 24-hour standard be changed to be 0.4 pg/m^3 WHO_{2005}-TEQ (0.0000004 $\mu g/m^3$ WHO_{2005}-TEQ). The half-hour standard should be adjusted accordingly, resulting in a ½ hour standard of 1.2 pg/m^3 (0.0000012 $\mu g/m^3$ WHO_{2005}-TEQ).**

Dioxins Upper Risk Threshold

- **The Upper Risk Threshold should be adjusted according the proposed ½-hour and 24-hour standards above and should be 0.000012 $\mu g/m^3$ WHO_{2005}-TEQ for the ½-hour URT and 0.000004 $\mu g/m^3$ WHO_{2005}-TEQ for the 24-hour URT.**

Dioxins References

- Aries E., Anderson D.R., and Fisher R. (2008) Exposure assessment of workers to airborne PCDD/Fs, PCBs and PAHs at an electric arc furnace steelmaking plant in the UK. Ann Occup Hyg. 52(4): 213-225.
- Nauman C.H., and Schaum J.L. (1987) Human Exposure Estimation for 2,3,7,8-TCDD. Chemosphere 16(8/9): 1851-1856

Nickel and Nickel Compounds (Nickel) Annual AAQC

An annual AAQC between 50 and 160 ng Ni/m^3 (0.05 to 0.160 µg/m^3) would be protective of human health since it is based on: (1) the most sensitive endpoint for toxicity, (2) the most sensitive species (rats), and (3) the nickel compounds which are more potent with regard to pulmonary toxicity (water soluble nickel compounds).

1) The EU Working Group uses the NTP Nickel Sulfate Hexahydrate study to derive a LOAEL of 60 µg Ni/m^3. However, this NTP study established a NOAEL of 30 µg Ni/m^3 in male rats, although a marginal (not significant) increase in the rate of fibrosis occurred in the low exposure group. A causal relationship between the not significant increase in the rate of fibrosis with exposure to nickel sulfate hexahydrate is not supported because there is no increase in chronic active inflammation (a condition related to the formation of fibrosis) in the group exposed to 60 µg Ni/m^3 compared to the control group. In addition, analysis of control data from 56 NTP studies demonstrated a historical control range of response for lung fibrosis from 0/50 (0 %) to 8/50 (16 %) animals. The NOAEL of 30 µg Ni/m^3 is also supported and used by the California EPA. Starting from A NOAEL of 30 µg Ni/m^3 and using uncertainty factors of 6 for exposure time, 3-10 for interspecies differences and 10 for intraspecies differences, the resulting value is 50 – 160 ng Ni/m^3.
2) Comparing the exposure concentrations that result in adverse effects in rats to the (10 to 100-fold higher) concentrations that workers are exposed to in the workplace without any adverse effects indicates that rats are more sensitive than humans to the respiratory effects of inhaled nickel compounds. Thus, the data support a toxicodynamic factor of 1, resulting in a total factor of 3 (i.e., the default factor for toxicokinetics) for interspecies extrapolation.
3) The NTP nickel sulfate hexahydrate study should be chosen as the key study because results of animal studies show that the insoluble nickel compounds present in ambient air (e.g., nickel oxides) are less irritating than nickel sulfate hexahydrate at equal concentrations of nickel.

Based on the above scientific basis, CPPI recommends an annual AAQC for Nickel and Nickel compounds in the range of 0.05 to 0.160 µg/m^3 for nickel and nickel compounds in the PM_{10} size fraction.

Nickel ½ hour and 24 hour AAQC

- Pulmonary fibrosis is a health effect that may occur upon chronic exposure to dust (e.g. metal dust, wood dust, etc). Calculating a short-term standard based on an effect that is the result of long-term exposure, is scientifically indefensible.
- Soluble nickel compounds appear to be the greatest concern for acute health effects. In contrast to the long half-life of the insoluble forms of nickel in the nasal mucosa, the elimination half-life of Ni^{2+} in the plasma is 1-2 days in mice (California OEHHA, 2008).
- The California OEHHA, based their 1-hour Inhalation reference exposure level (REL) of 6 µg Ni/m^3 on small decrements in acute airway function tests in asthmatics upon inhalation of 0.3 mg/m^3 $NiSO_4 \cdot 6H_2O$ (LOAEL 67 µg Ni/m^3). This is an appropriate basis for a short-term standard.

Based on the above scientific basis, CPPI recommends that the Nickel half-hour standard be changed to 6 µg/m^3 for nickel and nickel compounds in the PM_{10} size fraction, and 12 µg/m^3 in the TSP fraction. Subsequently the Nickel 24 hour standard be changed to 2 µg/m^3 (based on 6/3) for nickel and nickel compounds in the PM_{10} size fraction, and 4 µg/m^3 in the TSP fraction.

Nickel Upper Risk Threshold (URT)

- Consistent with the science points above, the URT should be based on acute health effects as presented by California OEHHA and based on the one hour Inhalation Reference Exposure Level (use for half hour standard).
- **Since the REL is 6 µg/m^3, the half hour URT should be 10 times that value, or 60 µg/m^3 (for nickel and nickel compounds in the PM_{10} size fraction, and 120 µg/m^3 in the TSP fraction). The 24-hour URT should be derived accordingly, resulting in a value of 20 µg/m^3 for nickel and nickel compounds in the PM_{10} size fraction, and 40 µg/m^3 in the TSP fraction.**

Nickel Reference

- California Office of Environmental Health Hazard Assessment (OEHHA), 2008. TSD for non-cancer RELs. http://oehha.ca.gov/air/hot_spots/