

**Response to Charge Question on**  
**Public Health Committee – Air Toxics**  
  
Summary Report  
of the NJDEP Science Advisory Board

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The following report has been issued by the Science Advisory Board to the Commission or the New Jersey Department of Environmental Protection:

Response to the Charge Questions:

Air Toxics

This report was initially prepared by the Public Health Standing Committee (PH) and sent to the SAB for review. The Science Advisory Board (SAB) based this final report on those recommendations from the PH

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NJDEP SAB Public Health Standing Committee (PHSC) Response to Charge Questions:  
**Considerations for Adding Air Toxic Compounds to the List of Air Pollutants Regulated by NJ**

September 30, 2013

*This document was developed by the full membership of the PHSC and Joann Held, who represented the Climate & Atmospheric Science SAB Panel*

**Executive Summary**

The PHSC developed responses to the general question “*What data and information should be considered by the NJDEP to support regulating additional air toxic compounds?*” and to additional specific questions related to this general question. A list of factors to be considered was recommended, and there was agreement that health effects and the potential for exposure in New Jersey are the two most important general factors to be considered. It was recognized that risk management/policy considerations may also be considered in addition to scientific data. There are several contaminants that the DEP Air Program believes should be listed as air toxics immediately, based on existing toxicity and exposure data, and the PHSC recommended that “emerging contaminant of concern nationally or worldwide” be a high priority for future consideration. It was recognized that the NJDEP Air Program is not currently addressing the issue of “emerging contaminants” that are impacting other media and may impact air in the future, and that air emissions of some chemicals results in contamination of other media (e.g. water, fish), where they may be persistent and hazardous. It was suggested that regulation of a chemical by another NJ state agency or another NJDEP program may be a consideration in deciding whether to add a contaminant to the regulated air toxics list, if there is an air exposure pathway. It was recognized that adding a contaminant to the NJDEP air toxics list may allow NJDEP to obtain additional information on use and exposure in the state. It was recommended that NJDEP use the approaches and processes used by USEPA when it develops risk assessments for air toxics, and that NJDEP use risk assessments from USEPA or other state agencies if they are considered by NJDEP to be scientifically valid and public health protective. It is recommended that any substance for which USEPA has been petitioned to add to the federal Hazardous Air Pollutant (HAP) list be evaluated for inclusion in NJ air toxics list, and the information in the USEPA docket for these substances be considered.

**Introduction**

The original charge question was: “*Is the background data and information assembled by the Air Quality Permitting Program (AQPP) sufficient to support regulating additional air toxic compounds as hazardous air pollutant?*”

The charge question was later revised for clarification purposes to: “*What data and information should be considered by the NJDEP to support regulating additional air toxic compounds?*”

The detailed request to the SAB was:

1. *Advise and provide input on the procedures, from a scientific and technical standpoint, for making a determination, advising the public, and publishing the determination and justification, to regulate additional air contaminants, as specified in NJSA 26:2C-9.2.i*
2. *Review the attached draft table (Attachment B of this document), “Considerations for Adding Chemicals to the New Jersey List of Regulated Air Pollutants,” and provide feedback, including the following:*
  - a. *Is the list of factors to consider sufficient?*

- b. What factors should have a greater priority?*
- c. Are there any factors that are insignificant and should be deleted?*
- d. How should this list of factors be modified?*
- 3. *Advise if this checklist is a reasonable starting point for considering addition of a chemical*
- 4. *Suggest a format for writing a determination and justification*
- 5. *Provide input on the types of data that should be included in a determination and justification*

Originally, the NJDEP Science Advisory Board (SAB) Climate and Atmospheric Sciences (CASSC) Standing Committee asked to respond to the charge question about adding air toxics to the list of air pollutants regulated by New Jersey. The Chairs of both the CASSC and the PHSC agreed that the expertise of the PHSC is more relevant to this topic. It was agreed that the topic would be more appropriately addressed by the PHSC, and it was then assigned to the PHSC (with input from the CASSC, which was represented by Joann Held).

The full PHSC, with input from the CASSC, developed the response to the questions above through email exchanges, a teleconference on February 14, 2013, an in-person meeting on June 24, 2013.

### **Background Information**

The NJDEP Air Quality Permitting Program is considering adding additional air pollutants (air toxics) to the list of chemicals regulated through the permitting process. In the NJDEP air program, the terms “regulated air contaminant” and “regulated air pollutant” describe the chemicals that are subject to state air laws and regulations. These terms are often used interchangeably, since, according to the New Jersey Air Pollution Control Act (APCA) (N.J.S.A. 26:2C-2): “ ‘Regulated air contaminant’ means the same as the term ‘regulated air pollutant’ as defined by the EPA in rules and regulation adopted pursuant to the federal Clean Air Act at 40 CFR 70.2 or any subsequent amendments thereto.” (See below.)

“ ‘Air contaminant’ means any substance, other than water or distillate of air, present in the atmosphere as solid particles, liquid particles, vapors or gases.”

“ ‘Air pollution’ means the presence in the outdoor atmosphere of one or more air contaminants in such quantities and duration as are, or tend to be, injurious to human health or welfare, animal or plant life, or property, or would unreasonably interfere with the enjoyment of life or property throughout the State and in those areas of the State as shall be affected thereby...”

As defined in 40 CFR 70.2, regulated air pollutants are those pollutants which are regulated by the Clean Air Act or by regulations which USEPA has promulgated to implement the Clean Air Act.

Specifically, 40 CFR 70.2 states:

“*Regulated air pollutant* means the following:

- (1) Nitrogen oxides or any volatile organic compounds;
- (2) Any pollutant for which a national ambient air quality standard has been promulgated;
- (3) Any pollutant that is subject to any standard promulgated under section 111 of the Act;
- (4) Any Class I or II substance subject to a standard promulgated under or established by title VI of the Act; or

(5) Any pollutant subject to a standard promulgated under section 112 or other requirements established under section 112 of the Act, including sections 112(g), (j), and (r) of the Act, ....”

As directed by the APCA (N.J.S.A. 26:2C-9.2.i), NJDEP is currently limited to regulating the air pollutants regulated by the U.S. Environmental Protection Agency (USEPA), unless a process is followed to add additional regulated air contaminants. The APCA states:

“The department may require the reporting and evaluation of emissions information for any air contaminant. However, prior to requiring that such information be included on a permit or regulating any air contaminant not regulated by the EPA pursuant to the federal Clean Air Act, the department shall first make a determination and advise the public of its conclusion that regulating that air contaminant is in the best interest of human health, welfare and the environment, and publish that determination and justification in accordance with the provisions of the ‘Administrative Procedure Act,’ P.L.1968, c.410 (C.52:14B-1 et seq.).”

“Air toxics” are not defined in the APCA, but are often informally equated with air contaminants that are listed by the federal Clean Air Act as “hazardous air pollutants” (HAP). The informal definition of air toxics typically implies that other pollutants, not listed as HAPs, could be considered air toxics. For example, California has listed Diesel Particulate Matter as a Toxic Air Contaminant (<http://www.arb.ca.gov/toxics/toxics.htm>); and many pollutants covered by accidental release prevention programs, such as hydrogen sulfide, have obvious adverse health effects but are not listed as HAPs. USEPA has the authority to add chemicals to the HAP list, but has not done so since the promulgation of the list in 1990.

New Jersey’s regulated air toxics have been limited to EPA’s HAP list for about two decades. In light of emerging toxicity information, new concerns regarding differential effects on children, emerging concerns about chemical effects on development and the endocrine system, new chemicals, and new uses of chemicals, NJDEP is considering expanding its list of regulated air toxics consistent with the APCA.

NJDEP would like to add chemicals to its list of regulated air contaminants in cases where it can be determined that regulating the air contaminant is in the best interest of human health, welfare, and the environment. A chemical would be considered for addition to the list of regulated air contaminants if some of the following circumstances are met:

- If the public can be exposed to the chemical through air emissions;
- If it is a new chemical, or a chemical not previously regulated;
- If there is a new use of a chemical that now results in air emissions;
- If there is emerging or known information on its toxicity, based on human, animal, and/or *in vitro* data.

### **Response to NJ DEP Detailed Request of the SAB**

*1. Advise and provide input on the procedures, from a scientific and technical standpoint, for making a determination, advising the public, and publishing the determination and justification, to regulate additional air contaminants, as specified in NJSA 26:2C-9.2.i*

The PHSC recognizes that decisions about which chemicals to list as air toxics may include risk management/policy considerations, in addition to considerations of the scientific data on health effects and exposure.

The PHSC recommends that, in general, relatively new compounds with known exposures through air should be added to the Air Toxics list. There are several contaminants that the DEP Air Program believes should be listed as air toxics immediately, based on existing toxicity and

exposure data, and whether there is currently sufficient data is not in question for these contaminants. An example is n-propyl bromide, a relatively new compound being used as a replacement for chlorinated solvents in dry cleaning (Blando et al., 2010). There is limited toxicity information on this emerging contaminant, but it should be prioritized for addition to the air toxics list because of known exposures.

On the other hand, it is recognized that the general questions of how much work/data are required before an emerging contaminant can be proposed for listing as an Air Toxic is broader than the issues for which the Air Program is requesting guidance from the Public Health SAB panel. This question would become relevant if the Air Program addresses additional emerging contaminants in the future.

Some other chemicals which could be evaluated in developing criteria and a process for adding air toxics include hydrogen sulfide (H<sub>2</sub>S) and acetone. H<sub>2</sub>S was on the initial list of HAPs but was removed by an act of Congress almost immediately (USEPA, 2007). Although acetone is only toxic at high air concentrations, its odorous qualities lead to complaints about sources that emit it. If there is no requirement to report emissions to NJDEP, it is difficult for NJDEP enforcement staff to respond appropriately to such complaints.

The PHSC recommends that a high priority for future consideration be given to “emerging contaminant of concern nationally or worldwide.” The PHSC also recognizes that the Air Program is not currently addressing the issue of “emerging contaminants” that are possibly impacting other media and may impact air in the future. For some contaminants, there are multi-pathway exposures, such as water or soil ingestion, which may also raise concern. Some chemicals contaminate other media (e.g. water, fish), where they may be persistent and hazardous, after they are emitted into air. Methyl tertiary butyl ether (NJDEP, 2001), mercury (USEPA, 1997) and perfluorooctanoic acid (Shin et al., 2011) are examples. Conversely, contaminants in other media may impact air; for example, asbestos may enter the air from soil, resulting in exposure via inhalation..

The PHSC suggests that if a substance is regulated by another NJ agency (e.g. Dept. of Health, Dept. of Community Affairs) or another NJDEP program (e.g. Pesticide Control), that may be an added incentive for inclusion on the regulated air contaminant list, presuming of course that there is an air pathway for exposure. Some pesticide active ingredients and carrier gases may fit this category.

The PHSC recommends that if exposure from a point source results in potential health risk, the contaminant should be listed as an air toxic even if exposures are greater from consumer products and/or indoor air. The NJDEP Air Program does not have the authority to regulate indoor air exposures or toxicity of consumer products, although the levels of volatile organic compounds (VOCs) in consumer products are limited by state air regulations (N.J.A.C. 7:27-24) to prevent ozone formation. If the NJDEP Air Program concludes that indoor air or consumer product exposures are a health concern, the issue could be brought to the attention of another agency with authority to address it.

The PHSC also recognizes that listing some contaminants not currently included on the NJDEP air toxics list would allow NJDEP to obtain additional information on use and exposure in the state.

The PHSC recognizes that NJDEP has strong capabilities in the area of human health risk assessment, and believes that it is important that NJDEP’s risk assessment capabilities be maintained and expanded, if possible. However, it is recognized that NJDEP does not have the

resources to develop chemical-specific risk assessments for all of the chemicals that require evaluation. It is recommended that NJDEP use risk assessments from USEPA or other state agencies when they are available and considered by NJDEP to be scientifically valid and public health protective, but that New Jersey-specific considerations should be taken into account when appropriate. It was discussed that inhalation risk assessments and toxicity factors [cancer Unit Risk Factor (URF) or non-cancer Reference Concentration (RfC)] for most chemicals that would be considered for listing by NJDEP are available from the USEPA IRIS database (<http://www.epa.gov/IRIS/>) and/or the California Air Resources Board ([http://www.oehha.ca.gov/air/toxic\\_contaminants/tactable.html](http://www.oehha.ca.gov/air/toxic_contaminants/tactable.html)). It is recognized that NJDEP would likely not be frequently adding a large number of chemicals to the Air Toxics list, and that NJDEP should tap into existing toxicity evaluations done by USEPA, California Air Resources Board, or other government agencies which have the capability to develop these evaluations. However, it cannot necessarily be assumed that inhalation risk assessments and toxicity factors are available from EPA or other agencies (such as California EPA) for all toxic air contaminants for which exposure occurs in New Jersey, and it is recommended that NJDEP's limited resources should be used to develop risk assessments only when necessary. We also recommend that NJDEP use the approaches and processes used by USEPA when it develops risk assessments for air toxics. It is recommended that any substance which USEPA has been petitioned to add to the HAP list should be evaluated for inclusion in NJ, and the vast amount of information that is in the EPA docket for these substances can be used by NJDEP.

The PHSC recommends evaluation of approaches used by other states to determine if their experiences are useful to the Air Program. California has the most active state program for evaluation of air toxics (<http://www.arb.ca.gov/toxics/toxics.htm>). Texas (<http://www.tceq.texas.gov/toxicology/AirToxics.html>) and some other states also have active air toxics programs.

The PHSC is aware of the recent effort by the main NJDEP SAB to develop a framework for identification and prioritization of contaminants of emerging concern in New Jersey, including air toxics and other types of environmental contaminants (NJDEP SAB, 2012). This effort is related to the air toxics issues discussed in this document, and the results of this project are expected to be useful as part of the future evaluation of contaminants being considered for listing as air toxics.

If public participation is desired, a stakeholder process could be developed to allow for public input and participation. The PHSC recognizes that public outreach is included in many aspects of the NJDEP Air Program.

*2. Review the attached draft table, "Considerations for Adding Chemicals to the New Jersey List of Regulated Air Pollutants," and provide feedback, including the following:*

The draft table provided to the PHSC for review by NJDEP is found in Attachment B. The PHSC's made recommendations for a revised version of this draft in the "List of Considerations for Adding Chemicals to the New Jersey List of Regulated Air Pollutants" (Attachment A). The PHSC suggested that there is a need to more clearly define the level of evidence and the factors to be considered in order for a contaminant to be added to the list. Some examples of potential factors related to health effects which could be considered are discussed in the sections on evaluation of the quality of epidemiologic and toxicology studies and weighing the overall evidence for effects from such studies (Sections 4 and 5) of the recently developed draft preamble to USEPA Integrated Risk Information System (IRIS) Toxicological Reviews (USEPA, 2012). For exposure, sources of information include, but are not limited to, the

USEPA Toxics Release Inventory (<http://www2.epa.gov/toxics-release-inventory-tri-program>) and the USEPA Exposure Factors Handbook (USEPA, 2011).

It should be clarified in the revised version of the table that “New chemical” and “New use of chemical” refers to chemicals or uses that were added after the USEPA HAP list was developed.

*a. Is the list of factors to consider sufficient?*

There is agreement that health effects and the potential for exposure in New Jersey are the two most important general factors to be considered.

It is important that the potential for air pollutants to increase the risk of chronic disease be considered. Therefore, it is suggested that an inclusive term for non-carcinogenic toxicity, “systemic effects,” be used, and it is recommended that some relevant health effects (e.g. renal toxicity, immune system toxicity) be added to the draft table. It is particularly important that potential health effects in susceptible subpopulations such as children, pregnant women, the elderly, and those with medical conditions such as asthma, immune system deficiencies, etc. be specifically considered. Toxicity from dermal exposure (in addition to effects from inhalation and oral exposures) should also be considered. Because data from *in vitro* studies can provide information on the potential for environmental contaminants to cause adverse effects *in vivo*, it is also recommended that *in vitro* toxicity be included for consideration. Additionally, it is suggested that additive effects or synergy with other environmental contaminants should be considered, if such information is available. Finally, it is recommended that meta-analyses and overall “weight of evidence” approaches as typically used in human epidemiologic assessments be considered.

Some questions and issues related to exposure include:

- Is there potential for public exposure in New Jersey due to use or other sources of emission?
- What is the potential for public exposure?
- Consideration of the exposure profile of the populations or regions affected, i.e. the public health benefit of:
  - (1) reducing the population exposed to the upper tail of the exposure distribution and/or
  - (2) decreasing the level of exposures in the main part of the population exposure distribution.

Ozone, lead, and radon are examples of contaminants for which there's often an “upper tail” in the population exposure distribution, as well as a lower-concentration mode of exposure (Klotz et al., 1992).

*b. What factors should have a greater priority?*

The PHSC did not recommend that any of the factors listed should be given a greater priority than others. The PHSC suggests that clarification is needed from the Air Program as to how the checklist in the draft table would be used. It was discussed that it is not necessary to meet all of the criteria if there is evidence for both exposure and potential health effects. Just a few of the criteria could be sufficient if they suggest that there could be harm to human health, welfare or the environment.



c. *Are there any factors that are insignificant and should be deleted?* There are no factors that are considered insignificant and should be deleted. The list of factors to be considered and how these factors should be considered have been clarified.

d. *How should this list of factors be modified?*

The draft table “Considerations for Adding Chemicals” should be revised to group the criteria into toxicity and exposure considerations. The draft table should also be revised to include the existence of vulnerable populations as a factor for both exposure and health effects.

The PHSC suggests that the Air Program consider whether other adverse effects resulting from exposure to air toxics, in addition to those effects traditionally defined as part of “toxicity,” should be considered.

3. *Advise if this checklist is a reasonable starting point for considering addition of a chemical*

The PHSC concludes that this checklist is reasonable if the changes suggested by the SAB are made. These suggested revisions are shown in the list at the end of this document.

The PHSC emphasizes that this is not a “checklist” of factors that must be found to be present in order to add a chemical to the list of regulated air toxics, but rather a broad list of factors to be considered, and that the factors are not ranked or presented in order of importance.

4. *Suggest a format for writing a determination and justification*

The PHSC is not making a recommendation about the format and specific content of the document for a determination and justification. It is not the role of the PHSC to be prescriptive on this topic.

5. *Provide input on the types of data that should be included in a determination and justification*

The determination and justification should include:

- The manner in which pollutants come to the attention of the DEP as possible candidates for regulation.
- The criteria that would lead to considering regulation of the contaminant.
- The types of data or studies that were evaluated in making the decision to list.

### **Citations**

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**PHSC Recommendations for  
List of Considerations for Adding Chemicals to the New Jersey List of Regulated Air Pollutants**

- Evidence of toxicity in humans?
- Evidence of toxicity in animals?
- Nature of toxic effects:
  - Cancer
  - Developmental
  - Neurological
  - Behavioral
  - Endocrine
  - Respiratory
  - Reproductive
  - Immune
  - Systemic effects
    - Liver
    - Kidney
    - Gastrointestinal
    - Cardiac
    - Sensory organ
    - Other organs or systems
- Subpopulations with increased susceptibility?
- *In vitro* data indicating potential for toxicity?
- Route of exposure for effects:
  - Inhalation
  - Ingestion
  - Dermal
- Toxicity data quantified?
- Accepted by regulatory agency(ies)?
- Toxicity value developed by regulatory agency(ies)?
- Regulated by other agency(ies)?
- Emerging contaminant of concern in New Jersey, nationally , or worldwide?
- New toxicity information
- New chemical
- New use of chemical
- Past use & contamination
- In New Jersey:
  - Use?
  - Air Emissions?
  - Other type of release?
- Properties of Contaminant:
  - Persistent?
  - Bioaccumulative?
  - Other considerations:
- Odorous
- Greenhouse gas forming potential
- Communities with disproportionate exposure
- Economic damage potential

**Attachment B**

**Draft provided by NJDEP to PHSC for Review:  
Considerations for Adding Chemicals to the New Jersey List of Regulated Air Pollutants**

Factor		Yes	No	Comment/Source of Data
Evidence of toxicity in humans?				
Evidence of toxicity in animals?				
Nature of toxic effects				
	Cancer			
	Developmental			
	Neurological			
	Endocrine			
	Respiratory			
	Reproductive			
Route of exposure for effects				
	Inhalation			
	Ingestion			
	Other			
Toxicity data quantified?				
Accepted by regulatory agency/ies?				
Tox value developed by regulatory agency/ies?				
Regulated by other agency/ies?				
Emerging contaminant of concern nationally or worldwide?				
New toxicity information				
New chemical				
New use of chemical				
Past use & contamination				
In New Jersey:	Use?			
	Air Emissions?			
	Other type of release?			
	Contaminant?			
Persistent?				
Bioaccumulative?				

References (footnote)