



Memo

To: Cleaner Air Oregon Regulatory Reform Advisory Committee

From: DEQ and OHA

Date: October 12, 2016

Subject: Setting and Administering Allowable Risk Levels

Request for Advisory Committee Members

The Oregon Department of Environmental Quality (DEQ) and the Oregon Health Authority (OHA) have identified six discussion topics for the advisory committee meetings. The following document describes one discussion topic, with three related program elements. DEQ and OHA are seeking Advisory Committee input on the following questions:

- 1) What should DEQ and OHA be considering in relation to setting and administering acceptable risk levels when choosing an approach for Cleaner Air Oregon?
- 2) Are there additional elements, other than the ones listed, that DEQ and OHA should consider?
- 3) Are there other air toxics permitting programs that provide unique examples not described in this discussion paper?

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Introduction

The Cleaner Air Oregon rulemaking is a partnership between OHA and DEQ to develop a new regulatory system for managing air toxics emissions from industrial sources. The new rules will be based on the potential risk to human health and will allow DEQ and OHA to carry out their respective missions of cleaner air while protecting and promoting health in Oregon. In developing this new regulatory approach, the two agencies will begin looking at individual sources of industrial emissions across the state in relation to public health.

After receiving input on the different aspects of a health risk-based air toxics permitting program from the Technical Workgroup, the Policy Forums, and the Advisory Committee, DEQ and OHA will draft proposed rules. All interested parties will have a chance to comment on the proposed rules during the public notice period in 2017.

DEQ and OHA have evaluated air toxics permitting programs in Louisville, Kentucky; New Jersey; New York; Rhode Island; South Coast Air Quality Management District, California; and Washington. These programs were recommended as being innovative, representing a range of diverse approaches to air toxics permitting programs. In addition, Washington's program was included because it is often compared to DEQ's. Key elements of these air toxics programs were summarized and discussed at Technical Workgroup meetings in June and July 2016. Documentation of Technical Workgroup discussions and background information for Oregon, along with elements to consider are presented below.

DEQ and OHA will be asking for Advisory Committee input for each discussion topic and if there are any additional topics that should be considered.

A glossary of terms can be found at this link:

<http://www.oregon.gov/deq/RulesandRegulations/Advisory/8Glossary.pdf>

Purpose

This discussion paper addresses the key elements of setting and administering allowable risk levels. This document reviews how other states define allowable levels of risk. Note that cumulative impacts are covered in the "Cumulative Risks and Background" discussion paper.

For detailed information on the six air toxics permitting programs that DEQ and OHA researched, please see the Appendix below.

The Technical Workgroup (<http://www.oregon.gov/deq/RulesandRegulations/Pages/2017/cleanerair2017w.aspx>) provided an evaluation of other state's approaches to human health risk-based air toxics programs for industrial facilities and answered technical questions in support of rulemaking, as requested by DEQ and OHA. The workgroup was tasked with providing focused and specific input to help DEQ prepare policy issues for discussion at Regional Forums and Advisory Committee meetings in the fall of 2016. The workgroup was not a decision-making body. The Technical Workgroup included individuals with expertise in toxicology, modeling, pollution prevention, and representatives of other state air toxics programs.

The Regional Forums occurred in the months of September and October in all regions of the state to provide an opportunity for informal community input.

The Advisory Committee includes a variety of representatives from community level organizations, advocacy groups to city/county government representatives to small businesses and large businesses. (<http://www.deq.state.or.us/nwr/docs/metalsem/CAOacroster.pdf>)

Program Element 13: Setting the initial screening levels for allowable cancer and non-cancer risk

State and local regulatory agencies generally start at a 1 in 1 million risk level for carcinogenic contaminants and a hazard quotient of one for non-carcinogenic contaminants from a single piece of equipment as an initial screening step. These levels were developed in the early 1980s by EPA and continue to be used by most state agencies. The potential for a carcinogen to cause one additional chance of cancer among a population of one million is commonly used as a risk level.

The overall probability of an American developing cancer over a lifetime is about one in 3, due to genetics, smoking, diet, and other common exposures that occur over the course of a lifetime. The cancer risk protectiveness level for an individual carcinogen is typically 1 in 1 million; if presented as a decimal value, it would be 0.000001. Comparing this decimal value to that associated with the overall cancer risk,

which is 0.33 (1 in 3), shows that the overall risk of developing cancer is about 333,333 times greater than a 1 in 1 million risk. This is not meant in any way to dismiss or minimize the concern related to the burden of exposure to a carcinogen emitted by a facility, but rather to show that a cancer risk level of 1 in 1 million is protective in comparison to the every-day risk of developing cancer over a lifetime.

There are two primary types of air toxics: those that are known or suspected to cause cancer (carcinogens), and those that don't cause cancer (non-carcinogens). Air toxics that do not cause cancer result in other kinds of adverse health effects, such as liver damage, nervous system damage, lung damage, etc. Carcinogenic and non-carcinogenic air toxics are assessed in different ways to protect human health. The increased potential to contract cancer is generally referred to as Excess Lifetime Cancer Risk or simply cancer risk, while the increased likelihood of having an adverse, non-cancer-based health effect occur is generally referred to as a non-cancer risk.

The underlying assumption for carcinogens is that exposure to even a single molecule of a carcinogen has the potential to start the process of cancer formation, which may develop in the body years or decades after exposure. In the case of carcinogens, the potential (and not the certainty) to develop cancer is estimated by comparing measured air concentrations of chemicals against concentrations that have been shown to cause cancer in scientific studies. Regulatory agencies strive to achieve actual air concentrations of individual air toxics that pose no more than 1 in 1 million risk of cancer development related to breathing that air over a lifetime. In other words, the goal is that the potential for the carcinogen in question to cause cancer is no more than one additional case in a population of one million people.

In contrast to cancer risk, non-carcinogens are assumed to have a level of exposure below which there are no negative health effects. This means that there is a level of exposure assumed to cause no health risks. Inhalation Reference Concentration is a term used to describe an air concentration below which there is no significant risk of health effects other than cancer. The Inhalation Reference Concentration is an estimate of a continuous exposure or a daily exposure of a human population (including sensitive populations) to a non-carcinogen that is likely to be without a significant risk of causing negative health effects other than cancer during a lifetime. The non-cancer risk is calculated by dividing a measured concentration of an air toxic by the Inhalation Reference Concentration for that air toxic (specific to the chemical). If the result (referred to as a Hazard Quotient) is equal to or less than one, then no negative health effects are expected. If the Hazard Quotient exceeds one, then it is possible that negative health effects would be more likely to occur.

Oregon information

The target cancer and non-cancer risk levels related to the 52 ambient benchmark concentrations are defined in Oregon Administrative Rule. The ambient benchmark concentration levels apply to individual air toxics. Oregon Administrative Rule 340-246-0030 defines "Ambient benchmark" as "the concentration of an air toxic in outdoor air that would result in an excess lifetime cancer risk level of 1 in 1 million (1×10^{-6}) or a non-cancer hazard quotient of one." This is the level used in the current Oregon air toxics program.

Oregon's air toxics ambient benchmark concentrations help DEQ identify, evaluate and address air toxics problems. Oregon air toxics benchmarks are based on concentration levels that would result in a cancer risk of one-in-a-million additional cancers based on a lifetime of exposure and protect the health of our most sensitive individuals. For non-carcinogens, the benchmarks are levels you could breathe for a lifetime without any non-cancer health effects. The [ambient benchmark concentrations](#) for 52 air toxics of concern in Oregon are based on consensus recommendations from the [Air Toxics Scientific Advisory Committee](#), a panel of experts that provides advice on the state air toxics program that is scientifically and technically sound, independent and balanced. For more information, <http://www.deq.state.or.us/aq/toxics/benchmark.htm>

Summary of Technical Workgroup input

- For EPA, less than 1 in 1 million is an allowable health risk level.
- South Coast Air Quality Management District (CA) says if risk is under 1 in 1 million, then additional air toxic controls are not needed at the facility.
- Current methodologies for assessing risk to carcinogens assume that even limited exposure to a carcinogen can lead to some potential risk (there is no zero risk). A line needs to be drawn somewhere. The starting point for risk decisions is typically 1 in 1 million risk, meaning that risk below 1 in 1 million is considered insignificant.
- Be consistent. Other DEQ programs use 1 in 1 million. That should be taken as the baseline for the new air permitting program.
- The levels of allowable risk for cancer or non-cancer air toxics depend upon their use. Examples include a permitting decision for new units or establishing a facility-wide threshold for existing sources. The public notification requirement could also be triggered by a different risk level. Look at how much health protectiveness is built into Oregon's current methods.
- DEQ and OHA could look at maximum individual risk and population risk using census blocks. Nationwide there are around 8 million people exposed to risk from refineries. EPA looked at demographic information and about half that population lives in communities with environmental justice concerns. EPA was able to reduce risk from 8 in 1 million to 4 or 5 in 1 million.

Summary of considerations for setting the initial screening levels for allowable cancer and non-cancer risk

This is preliminary information DEQ and OHA have gathered in discussions with the Technical Workgroup and from experience in Oregon's existing air program. We consider this a starting point for Advisory Committee discussion and input.

- Typically, the cancer risk level of 1 in 1 million is used for a single chemical and a single piece of equipment, and usually in a screening step to determine if further, more refined assessment is needed. This level is also used in the current Oregon air toxics program in order to protect health at the most stringent level for individual pollutants and to protect against exposure to multiple air toxics.
- A non-cancer risk level of 1 (or Hazard Quotient of 1) means there is no appreciable chance of adverse health effects from exposure. This risk level discussed as a Hazard Quotient of 1 is used for single chemicals, and usually in a screening step to determine if further, more refined assessment is needed.
- The discussion paper on "Cumulative Risk and Background" (program elements 8, 9, 10, 11, 12) discusses how risk from multiple air toxics for a facility as a whole, as well as how risks from multiple facilities in an area might be addressed.
- For a single chemical and a single piece of equipment, the cancer risk level of 1 in 1 million and a non-cancer risk level of 1 are typically considered protective of human health.
- For a single chemical, Oregon's air toxics benchmarks are set at a cancer risk level of 1 in 1 million and a non-cancer risk level of 1

Potential elements for setting the initial screening levels for allowable cancer and non-cancer risk

The following are potential elements for which DEQ and OHA are seeking additional discussion and input from the Advisory Committee. If there are additional elements not included below, please raise them.

Potential Elements
A. 1 in 1 million cancer risk and hazard quotient of one for non-cancer risk
B. Placeholder for elements developed by advisory committee members

Program Element 14: Allowable risks levels

The term “allowable” when used in conjunction with limits on cancer and non-cancer risks refers primarily to regulatory policy set by the EPA in the early 1980s. Over time, these allowable risk levels were used by other EPA programs and by state programs as screening tools to make decisions about which air quality situations require additional regulatory attention. EPA identified a range of allowable risk levels that go from 1 in 1 million up to 100 in 1 million. Use of the different risk levels in this range is dependent upon specific circumstances. Some programs have a provision for allowing higher levels of risk if facilities have demonstrated that they are using TBACT, or the best available control technology to control air toxics. TBACT means the most effective emission control technique which has been achieved in practice for a particular type of facility or source. TBACT may include process and equipment changes that are technologically feasible taking into account energy, environmental and economic impacts, and other costs.

Many air toxics permitting programs use an allowable risk level higher than 1 in 1 million when considering health risks from an entire facility versus a single piece of equipment; or when considering cumulative risk from multiple air toxics or facilities. Among state and federal industrial air quality permitting programs, these allowable health risk levels for cancer ranged from 3.8 to 100 in 1 million for the entire facility, including cumulative effects from multiple pollutants. The allowable Target Organ Specific Hazard Index (TOSHI – sum of hazard quotients for multiple air toxics that target the same organ system) for allowable non-cancer risks ranged from 1 to 5. Some programs have a risk level beyond which they will not issue a permit, while others determine permit issuance on a case-by-case basis and do not have a health risk or hazard index level beyond which they will not issue a permit.

“Best Available Control Technology” or “BACT” means a control technology standard used in preconstruction permit programs. It is determined on a on a case-by-case basis, taking into account energy, environmental, and economic impacts and other costs.

“Best Available Control Technology for toxics” or “TBACT” means best available control technology, as applied to toxic air pollutants.

“Lowest Achievable Emission Rate” or “LAER” means the rate of emissions which reflects the most stringent emission limitation achieved in practice. It is determined on a on a case-by-case basis and does not take into account economic impacts.

“Maximum Achievable Control Technology” or “MACT” is a federal control technology requirement used for hazardous air pollutants.

Oregon information

The “allowable” cancer and non-cancer risk levels for the 52 ambient benchmark concentrations are defined in Oregon Administrative rule. These levels apply to individual air toxics. Oregon Administrative Rule (OAR) 340-246-0030 defines "Ambient benchmark" as “the concentration of an air toxic in outdoor air that would result in an excess lifetime cancer risk level of 1 in 1 million (1×10^{-6}) or a non-cancer hazard quotient of one.”

Summary of Technical Workgroup input

- South Coast Air Quality Management District (CA) does not require Best Available Control Technology for toxics for an individual piece of equipment if risk is under 1 in 1 million but allows 10 in 1 million as allowable cumulative risk for individual pieces of equipment with TBACT and 25 in 1 million for existing whole facilities. There is an appeal process to the hearings board, but they are very rarely granted.
- Washington does not have a risk threshold for requiring TBACT, but uses de minimis emission levels based on risk as a threshold for requiring permits and TBACT for new and modified sources. Because Washington doesn't have different cost effectiveness thresholds for air toxics, TBACT decisions for most air toxics typically reflect the limits obtained by BACT analyses for criteria pollutants, most often particulate matter and volatile organic compounds. BACT may not be sufficient to control air toxics because it is based on criteria pollutant emissions. In most cases BACT and TBACT are the same (volatile organic compounds and particulate matter that are also toxics).
- Lowest Achievable Emission Rate (LAER) is typically required in nonattainment areas for criteria pollutants across the country. Of the air toxics programs investigated, Rhode Island is the only program that uses LAER. The acceptable ambient levels for most of their listed air toxics is ten times higher if LAER is installed.
- When the risk is between 1 and 100 in 1 million, there is a great opportunity for facilities to get creative, using pollution prevention or green chemistry to lower risks. Agencies should build in incentives so facilities could change production to reduce emissions and risk.
- There is an advantage in Oregon's existing air quality permitting program because of cyclic process to look at permits at the time of permit renewal. Dialogue with facilities that want to be good citizens can include how they can reduce risk. There can be inexpensive fixes because BACT allows for creativity.
- EPA reviews MACT standards every 8 years, looking for new technology and changing regulation if necessary. Generally, if the risk that remains after MACT is applied is still greater than 100 in 1 million, then MACT needs to be more stringent.
- If MACT or TBACT does not provide sufficient protection, please don't rule out the option of innovative technology development. Too long we have been stuck in a less effective box when we need a more protective solution.
- There is a public concern that no level of risk is acceptable because risk assessments are uncertain. Be as protective as possible.
- South Coast Air Quality Management District (CA) does not take population into account when reviewing a permit, but does have a cancer burden tool for evaluating impacts to populations, which is sometimes triggered. They also take into account current zoning and future land use (i.e., residential zoning even if no one lives there yet).

- Caution should be taken if setting a hard line for allowable risk for non-carcinogens. Risk based concentrations for non-carcinogens have different levels of certainty behind them. Decisions need to take into account the amount of certainty and balance this against the economic impacts of regulation. There are real considerations about driving industry out of state or out of the country.
- EPA has a three-step process for using different allowable cancer risk levels. Less than 1 in 1 million is allowable. There is a gray zone between 1 in 1 million and 100 in 1 million, where other factors such as technology, costs, environmental justice, number of people exposed, cost of controls and environmental effects are taken into account. This gray zone is where pollution prevention and green chemistry are effective. EPA considers risks to the maximum exposed individual that exceed 100 in 1 million to generally be unacceptable.
- Oregon might need a higher risk level for existing sources, such as South Coast Air Quality Management District allows (25 in 1 million).

Summary of Environmental Justice Task Force Input

- Promulgate health-based standards for industrial source air toxics and base permit decisions on compliance with such standards.
- Apply enhanced permitting requirements to new and renewal permits, with shorter renewals to account for changing demographics, health science, and technology.

Summary of Individual Environmental Justice Task Force Member Input

- Using a cumulative risk assessment methodology, each permit should be considered in the context of whether it will disproportionately impact communities with environmental justice concerns, whether we are dealing with criteria air pollutants (for which there are health-based NAAQS) or hazardous air pollutants (which, unfortunately, there are only technology-based standards).
- It is incumbent upon DEQ (ideally with OHA collaboration) to ensure health-based assessments for all such permitting, whether they are criteria or HAPs. This is true whether or not a particular facility can be identified as the proximate cause (or substantial contributor) to exceeding a health-based standard. Both Title VI and the CAA require a primary focus on protecting human health.

Summary of considerations for higher allowable risk levels

This is preliminary information DEQ and OHA have gathered in discussions with the Technical Workgroup and from experience in Oregon's existing air quality permitting program. We consider this a starting point for Advisory Committee discussion and input.

- Different state programs use various cancer risk levels, such as 1 in 1 million, 10 in 1 million, and 100 in 1 million in different ways, depending on defined circumstances (see above bulleted items for details). At least two state programs also use 25 in 1 million as a risk level for specific parts of the permitting process.
- The most-typical range of cancer risk levels used by other states matches the range that has been used by EPA since the early 1980s: 1 in 1 million up to 100 in 1 million.
- Different state programs use various non-cancer risk levels, with hazard quotients typically ranging from 0.1 to 1 for individual chemicals, and target organ-specific hazard indices ranging from 1 to 5 for multiple chemicals.

- Different risk levels are used as limits for various steps in a health risk-based air permitting process, based on the state programs reviewed. Whether or not TBACT (as well as other technological tools, such as MACT) is first applied, and whether the source being reviewed is a new facility or an existing one, are two things considered by most other state programs when setting risk levels that have to be met.
- BACT and TBACT will likely be the same in most cases.
- Developing the cost thresholds for TBACT will be work for DEQ, and might have to be evaluated on a case-by-case basis if no BACT is available.
- Lower allowable risk levels are more protective of human health, and may increase the cost of compliance for industry in the near term.
- In some cases, it may be technologically infeasible to reduce risk below a certain level.
- DEQ has authority to regulate air toxics, including setting allowable risk levels, requiring control technologies based on risk, and setting conditions for permit issuance or permit renewal.

Potential elements for allowable risk levels

The following are potential elements for which DEQ and OHA are seeking additional discussion and input from the Advisory Committee. If there are additional elements not included below, please raise them.

Potential Elements
A. Allow higher cancer risk levels for entire facility if control technology such as TBACT is installed. Other programs have allowed risk in the range of 3.8 in 1 million to 100 in 1 million. Some program do not have a limit on allowable risk levels.
B. Require control technology, without considering cost or energy in the decision (Lowest Achievable Emission Rate - LAER) if entire facility risk of cancer or non-cancer effects is above a specified level.
C. Allow higher hazard index for non-cancer effects if control technology such as TBACT is installed. Other programs have allowed from a 1 to 5 hazard index. Some program do not have a limit on allowable non-cancer effects levels.
D. Require LAER if entire facility hazard index is: <ul style="list-style-type: none"> a. Above 1 b. Above 5 c. Above some other level
E. Require LAER if entire facility hazard index is: <ul style="list-style-type: none"> a. Above 1 b. Above 5
F. Do not require LAER. Allow 1 in 1 million for cancer risk from each piece of equipment at a facility or up to a facility-wide risk of 10 in 1 million, whichever is lower
G. Allow 0.5 non-cancer risk from each piece of equipment at a facility or up to a facility-wide risk of 5, whichever is lower

Potential Elements
H. Allow a non-cancer Hazard Index of 0.5 from each piece of equipment at a facility or up to a facility-wide hazard index of 5, whichever is lower. Require pollution prevention plan at some level of risk or hazard index. (e.g., require a facility to perform an alternative chemical analysis to substitute less toxic chemicals).
I. Require pollution prevention plan at some level of cancer risk or hazard index. (e.g., require a facility to perform an alternative chemical analysis to substitute less toxic chemicals). Use a lower allowable risk (more stringent) for sensitive populations, overburdened communities, or communities with environmental justice concerns.
J. Placeholder for elements developed by advisory committee members

Program Element 15: Different risk levels for existing and new sources

Some programs have different maximum individual cancer risk values for new/modified sources (e.g., 1 in 1 million without TBACT or 10 in 1 million with TBACT) and existing sources (e.g., 100 in 1 million).

Some programs have different non-cancer risk levels for new/modified and existing sources. Louisville’s cancer risk goal for a single contaminant for a single piece of new equipment is 1 in 1one million or a hazard quotient of 1. The cumulative risk goal for multiple carcinogenic contaminants for a new source is 3.8 in 1 million. The cumulative risk goal for multiple carcinogenic contaminants from an existing source is 7.5 in 1 million.

For South Coast Air Quality Management District (CA), Cumulative cancer risk from a new or modified single piece of equipment cannot exceed 1 in 1 million if T-BACT is not in place. 10 in 1 million is acceptable if T-BACT is in used. The Target Organ-Specific Hazard Index cannot exceed 1 (applies only to new or modified equipment). For existing sources, cumulative “action risk levels” for an entire facility are 25 in 1 million cancer risk, and no TOSHI can exceed 3. “Significant risk levels” are 100 in 1 million cumulative cancer risk for entire facility or a TOSHI of 5 for non-carcinogens. Public notification requirements on existing sources are triggered at 10 in 1 million cancer risk or a TOSHI of 1 for non-cancer risk.

Oregon information

Currently, the Oregon air quality permitting program regulates both new and existing sources. Permits are issued for whole facilities with requirements for individual pieces of equipment. Sources are required be in compliance with regulatory requirements or on a compliance schedule before receiving an approved permit.

Summary of Technical Workgroup input

- Washington’s rule is specific to new or modified individual pieces of equipment only. An individual piece of equipment cannot cause an increased cancer risk greater than 1 in 1 million and the cumulative risk of all emitted pollutants from a new source or modification cannot exceed 10 in 1 million.

- If you look at existing sources, do you consider allowable risk at the facility-wide level? Allowable cumulative risk for all facilities in area? When you consider risk from all facilities, stationary sources and mobile sources, it may be difficult to choose where to determine a level of allowable risk for stationary sources in areas where the bulk of toxic air pollutant exposures might be coming from cars and trucks. (Note that this is addressed in the discussion paper on “Cumulative Risks and Background.”)
- South Coast Air Quality Management District (CA) allows 10 in 1 million with TBACT for new individual pieces of equipment. When regulating existing sources, South Coast looks at the entire facility, all permitted and unpermitted equipment at facility and allows 25 in 1 million. Facility-wide risk that exceeds 10 in 1 million requires public notification. Facility-wide risk that exceeds 25 in 1 million requires sources to conduct risk reduction.
- It can be challenging to have different levels of risk for new and existing units. You could give existing units more time to comply, whereas new units would need to comply immediately. Creativity will be necessary for deciding how to implement a health risk-based approach for existing facility implementation.

Summary of considerations for allowing different risk levels for existing and new sources

This is preliminary information DEQ and OHA have gathered in discussions with the Technical Workgroup and from experience in Oregon’s existing air program. We consider this a starting point for Advisory Committee discussion and input.

- Health impacts can occur regardless of whether harmful emissions are from an existing, a new, or a modified source.
- Existing sources are likely to have the oldest technologies which might emit more than newer technologies.
- Retrofitting some existing sources with pollution control equipment might be technically difficult or costly. New sources are usually installed with the latest pollution control equipment.
- Holding existing and new/modified sources to different standards might create a fairness or competitive disadvantage issue.
- DEQ has the authority to allow different risk levels for existing and new sources.

Potential elements for allowing different risk levels for existing and new sources

The following are potential elements for which DEQ and OHA are seeking additional discussion and input from the Advisory Committee. If there are additional elements not included below, please raise them.

Potential Elements
A. Allow existing facilities higher cancer risk levels, up to 10 in 1 million risk. Other programs have allowed between 7.5 in 1 million and 100 in 1 million risk levels. Some programs do not have a limit on the allowable risk.
B. Do not allow existing facilities higher risk than new or modified sources
C. Placeholder for elements developed by advisory committee members

APPENDIX

1. How have other programs defined the allowable level of risk?

Program	Program Description
Louisville, Kentucky	<p><u>Initial screen</u></p> <p>Screening level starts with 1 in 1 million cancer risk and a hazard quotient of 1. If initial screen indicates higher risk, a more refined risk assessment is done to determine whether emissions pose an actual risk to public health. Adjustments for roadways and industrial properties allowed.</p> <p><u>More refined risk assessment</u></p> <p>Cancer risk goal for a single contaminant for a single piece of new equipment is 1 in 1 million or a hazard quotient of 1. The cumulative risk goal for multiple carcinogenic contaminants for a new source is 3.8 in 1 million. The cumulative risk goal for multiple carcinogenic contaminants from an existing source is 7.5 in 1 million. Sources that cannot meet the goal must implement TBACT or “best available control technology for toxics” and apply for a modification or implement a Risk Reduction Plan developed by the District.</p> <p>There is no guidance on cumulative risk from multiple contaminants for non-cancer risk. No individual contaminant can have a hazard quotient greater than 1.</p>
New Jersey	<p>Total incremental risk less than or equal to 1 in 1 million is considered negligible.</p> <p>If Incremental Cancer Risk is between 1 in 1 million and 100 in 1 million, case by case review by Risk Management Committee is required. The permit may be issued if risk is acceptably minimized.</p> <p>If Incremental Cancer Risk is greater than or equal to 100 in 1 million, (unacceptable risk), the permit will not be approved.</p> <p>A hazard quotient less than or equal to 1 is considered negligible.</p> <p>A hazard quotient greater than 1 requires review on a case-by-case basis by the Risk Management Committee.</p>
New York	<p>Risk-based concentrations for carcinogens are set at the 1 in 1 million risk level and a hazard quotient of 1 for individual contaminants for screening-level analysis. If initial screening is failed, then TBACT analysis and application are used. If screening still fails, then 10 in 1 million cumulative cancer risk or hazard index of 2 is allowable.</p>
Rhode Island	<p>Allowable risk is set within the range of 1 in 1 million to 10 in 1 million cancer risk. Non-cancer allowable risk is a hazard quotient less than 1.</p>

Program	Program Description
South Coast Air Quality Management District (CA)	<p><u>New or modified sources</u></p> <p>Cumulative cancer risk from a single piece of equipment cannot exceed 1 in 1 million if TBACT is not in place. 10 in 1 million is allowable if TBACT is in used (applies only to new or modified equipment).</p> <p>Organ-specific hazard index (cumulative risk for non-carcinogens that affect same organ or system) cannot exceed 1 (applies only to new or modified equipment).</p> <p><u>Existing sources</u></p> <p>Cumulative “action risk levels” for an entire facility are 25 in 1 million cancer risk, and no organ-specific hazard index can exceed 3. “Significant risk levels” are 100 in 1 million cumulative risk for entire facility or an organ-specific hazard index of 5. Public notification requirements on existing sources are triggered at 10 in 1 million cancer risk or an organ-specific hazard index of 1.</p>
Washington	<p>Tier 1 – Screening. Emissions (or modeled concentrations) of each regulated toxic air pollutant are compared to respective Small Quantity Emission Rate or Acceptable Source Impact Level. Each Acceptable Source Impact Level based on cancer effects is set at a lifetime increased risk level of one in 1 in 1 million (annual averaging time). For non-cancer hazards, no individual contaminant can have a hazard quotient greater than 1 (based on 24-hr average or less), If any pollutant exceeds an Acceptable Source Impact Level, then a Tier 2 (health impact assessment) is required.</p> <p>Tier 2 – Health Impact Assessment – although a single pollutant may trigger second tier review, Ecology considers the cumulative cancer risk of all emitted pollutants from the new source or modification. This additive risk cannot exceed 10 in 1 million. For non-carcinogens, the agency has more flexibility about which non-cancer risk-based concentrations and averaging times to use. The rule does not specify an allowable non-cancer hazard quotient or index. This decision is left to the discretion of Ecology.</p> <p>Tier 3 – Risk Management Decision is essentially a repeat of Tier 2, but applicants can attempt to demonstrate that the benefits of their facility’s activities outweigh the modeled risks, and the director of Ecology makes the final decision. A mandatory public meeting is required under Tier 3.</p>

2. What are the advantages of these approaches to allowable risk?

Program	Program Description
New Jersey	This approach is flexible and allows for consideration of technical feasibility and unique site characteristics

Program	Program Description
South Coast Air Quality Management District (CA)	Provides South Coast with flexible range of allowable risk with various actions triggered at different risk levels.
Washington	This approach allows for rapid screening in Tier 1 assessments with very conservative, health protective assumptions, and greater flexibility for the agency in addressing those applicants that choose to move forward with a Tier 2 assessment.

3. What are the challenges of these approaches to allowable risk?

Program	Program Description
Louisville, Kentucky	These levels of risk from a point source may be very difficult to achieve for some contaminants because additional sources other than point sources (cars, trucks, wood burning, etc.) also contribute ambient background concentrations for many air toxics in many areas.
New Jersey	There is no absolute risk number that is used as a result of the flexible approach.
New York	These levels of risk may be very difficult to achieve for some contaminants, especially if background is considered and the contaminant has other sources besides industrial stationary sources. Initial screen does not consider cumulative risk across contaminants, although second screen (post TBACT) does consider cumulative risk.
Rhode Island	Allows facilities with risk greater than 1 in 1 million to be permitted and operate at that risk level.
South Coast Air Quality Management District (CA)	System is somewhat complex and requires guidance from South Coast in order for regulated community to understand how to comply.
Washington	The practice of 24-hour averaging times compared against chronic toxicity values for non-carcinogenic compounds is potentially overly conservative and may screen facilities into the Tier 2 process when it may not really be necessary.