Technical Workgroup Meeting Notes

July 27, 2016

Cumulative Risk – David Farrer

- The discussion is about protecting public health from risk due to air toxics exposure. Protection of health is the basis for the risk assessment.
- Health is the basis and the driver for what we are talking about this morning related to risk.
- Cumulative risk can be discussed as the risk from multiple pollutants, multiple facilities, and/or combined risk from a facility and background or ambient risk. Another type of risk that could make up a portion of the cumulative risk originates from non-chemical stressors (e.g., psychological stress; population groups already suffering from chronic health problems that makes them less resilient to exposure to air toxics). The goal is to make sure concentrations are protective of the most vulnerable people.

Pros and Cons of assessing cumulative risks related to multiple pollutants:

- All South Coast risk assessments look at all toxics identified as being emitted from a facility and so don't assess risks from a single pollutant unless that is only one emitted. There are concerns when you look at multiple pollutants because the risk assessments typically don't address whether the chemicals interact with each other. What are the synergistic effects? What are the antagonistic effects (where chemicals cancel each other's effects out?) There isn't much data on this because the science isn't there yet. Typically, pollutants are looked at one by one then the related risks are summed.
- AB 2588 deals with existing sources that report to South Coast every 4 years. Health risk assessments (HRAs) are based on actual emissions (not permitted) if they meet triggers. Sources may need to do HRAs for multiple calendar years. These periodic snapshots don't add up completely but can show how things change over time, and whether risk is increasing or decreasing. It takes time to build up that kind of a database.
- EPA adds carcinogenic risk from multiple carcinogens because people don't just breathe individual pollutants. For non-cancer effects, EPA has target-organ specific hazard indices (TOSHI) for some pollutants because the hazard quotients from multiple non-carcinogens affecting the same organ or organ system are added together. The approach for cancer and non-cancer risk is very different. Even exposure to one molecule of a carcinogenic pollutant is assumed to increase the risk of getting cancer. For non-cancer effects, unlike for cancer risk, there are levels of non-carcinogens below which there is no measureable impact. EPA looks at exposures for 70 years (a lifetime) for cancer effects and at an exposure duration of 20-30 years for non-cancer effects. EPA uses the "porch

potato" approach, which assumes someone lives in one location on their porch breathing outdoor air for 70 years in order to be health protective.

- From a toxicological perspective, it makes the most sense to focus on TOSHI, rather than on individual non-carcinogenic air toxics.
- Consider using an approach in the screening process that takes into account multiple chemicals.
- The Southwest Clean Air Agency, (SWCAA) looks at all pollutants from a new facility and does not sum risk but conservatism is built into the numbers.
- In CA, risk assessment for non-cancer risks is done differently than for cancer risks. One molecule of a carcinogen is assumed to cause an unknown amount of cancer risk, but it increases linearly as the dose increases. Lead is one pollutant that has well-recognized non-cancer effects. One molecule of lead can have non-cancer effect. There are no safe exposure levels for lead so you can't perform a cumulative risk assessment with lead that you can with other pollutants. Most non-carcinogenic air toxics are assessed using hazard indices, but for lead, it depends on whether the national ambient air quality standard (NAAQS) for lead is exceeded. Lead (a criteria pollutant) is assessed differently from other air toxics because it is the only compound for which a model based on blood levels is used to make health-based decisions. There was a good health study done for lead with the NAAQS development.

Pros and Cons of assessing multiple pollutants from multiple sources within an area:

- In Washington, the rule specifies that sources of toxics air pollutants other than the facility of concern in area must also be considered. There are three ways to do this:
    1. Use a modeling approach by looking at sources that emit pollutants within in 1.5-mile radius of the facility in question;
    2. Use the NATA census block data; or
    3. Use monitoring results, which WA Ecology has not yet seen used.

  How the final decision in issuing a permit is influenced by cumulative concentration is not specified in the rule so this vagueness causes confusion. The rule only specifies what the cumulative concentrations should be when doing modeling from commercial and industrial sources. Traffic pollutants may be the biggest concern in an area. Oregon may want to consider background concentrations from non-stationary sources.
- When you try to model everything within a certain distance, you really need a good emissions inventory. If you look at emissions from the area outside the facility, one idea is to build that into the threshold value. Monitoring data is excellent but is typically very limited due to cost and the time involved in collecting, analyzing, and interpreting the data. Some states use the highest monitored value as a background level over a large area, but toxics are a very localized issue so that approach may not be appropriate. There is a lot of uncertainty with this approach, so you should build background levels into the threshold value rather than trying to model all sources.

- South Coast treats cumulative risk differently for new versus existing sources. SCAQMD has done a study similar to NATA called the Multiple Air Toxics Exposure Study (MATES). They input more local monitoring data and more refined emission estimates into MATES than NATA is able to do. The average cancer risk within the main airshed that SCAQMD oversees is 900 in 1 million. The data is used as an informational tool, not a permitting tool. For new sources, SCAQMD doesn't look at cumulative risk except as required by the California Environmental Quality Act (CEQA). For port complexes and refineries, if you put a benzene monitor in the area, how do you tease out where the benzene is actually coming from across the region? Fugitive emissions are definitely a concern because they are hard to quantify. You need a good emissions inventory to do modeling but it's incredibly difficult to obtain credible emissions data for fugitive emissions. The best way to address fugitives is through monitoring. You can use both modeling and monitoring to quantify fugitive emissions and to craft mitigation solutions to reduce pollutant exposures.
- You need a complex monitoring system if you are looking at pollutants emitted from all sources but be careful that you don't double count.
- If you look at a single piece of equipment for air toxics emissions and related risk, you are really just unnecessarily slicing and dicing things. If you are looking at an air toxics program, you need to look at all pollutants from all pieces of equipment within a facility or the facility as a whole. Industry appreciates having the flexibility to control another area that could cause larger environmental benefit rather than the new piece of equipment.
- WA looks at individual pieces of equipment but also looks at the sum of those emissions from pieces of equipment when making a decision. If an existing facility modifies only one piece of equipment, then they look at just that one piece. For a new facility, WA looks at all the proposed equipment emissions and then adds the risks together by compound for screening. If the facility is required to go beyond the screening approach because their proposed levels exceed screening level), then they sum the cumulative risks from compounds and equipment.
- Existing permitting requirements apply to the control of criteria pollutants, as are the related air monitoring protocols. The existing permitting protocols do not focus on air toxics. As Oregon builds its new air toxics rules, it needs to think about the actual availability of monitoring data for air toxics and whether or not it can really be used to set permitting requirements, because monitoring data is much less available for air toxics than for criteria pollutants.
- For SCAQMD, permits are equipment-based and that's what the thresholds apply to. Existing sources must look at facility-wide emissions minus motor vehicle emissions. When thinking about a single pollutant approach on a single piece of equipment, there are some pollution control technologies that create other unexpected pollutants (e.g., combustion or selective catalytic reduction) so there might be a tradeoff of one pollutant for another.

Pros and Cons of including background/ambient concentrations in the assessment of risk:

- Take advantage of spreadsheets to account for the locations of receptors and background concentrations. However, background could be built into the generalized criteria for all sources and locations.
- A tool that is simple enough to apply in all cases will be difficult to create. It depends on how conservative the first screening step is and whether you need to add background data.
- What role does background play in the regulatory scheme? If it is included, then estimating background can be difficult if only very sparse monitoring data is available.
- The downside to models and tools is that they eventually become outdated. What happens when the EJSCREEN tool changes? What if sensitive receptors in the area change, like a new hospital being built in the area? Models provide good information but how do you move them forward in time? It becomes an implementation issue. If you know what is going to happen in the future, then you can account for that but you may need to rerun model in the future to account for changes.

Pros and Cons of methods to set risk-based concentrations:

- Flexibility is important in regard to adding new pollutants to a state list as well as the related risk-based concentrations. Because WA's list of pollutants is written in rule, there is not much flexibility. If they want to update list and add new pollutants or change a concentration, it would require going through the long process of rulemaking for a relatively small change. It's better to be able to make changes outside of rulemaking. Can Oregon's list of pollutants be separate from rule?
- If you want maximum flexibility but also want to use established toxicological sources such as EPA or CalEPA to identify pollutants of concern and related risk-based levels, you need a decision making process that will address cases of disagreement among the established sources, like whether something causes cancer or not. Even if you use a hierarchy, you still need to be able to decide on the most credible and appropriate risk-based concentration.
- These are good things to consider when developing a list. Timeliness should be highlighted as an issue. Recent research is changing things. EPA's IRIS numbers are quite old and may be replaced by newer information or more current science. For example, cadmium has had many biomedical studies that have changed how we look at cadmium. Flexibility is critical in order to consistently look at new toxicology information about air toxics that is always becoming available. Consider European Union information because the EU is more active at looking at emerging toxicological information for air toxics.
- For the hierarchy used at EPA, the Science Advisory Committee said you need to be able to consider latest science. Keep the list as flexible as possible. EPA has RBCs for about 140 chemicals. To add to list is very difficult. If you add chemicals, how do you address existing sources?
- Toxicity values from different agencies vary. The website, ITER (International Toxicity Estimates of Risk) https://toxnet.nlm.nih.gov/newtoxnet/iter.htm, compares different

databases and saves time. With advances in science, the values from EPA may remain the same, along with the uncertainty factors but the scientific methods may have changed. Make sure you use the advanced method to derive the current value.

- South Coast defers to CalEPA for toxicity data. If there is a process for determining RBCs, there is some thought given to input, public participation, and technical discussion because this is as technical as it gets. Otherwise, the process can be very opaque to the public and stakeholders. Make sure the process for public and stakeholder input is clear and transparent.
- Look at a hybrid approach because not all pollutants will fit into these boxes for setting RBCs. Some HAPs are in groups (for example cadmium and compounds, rather than cadmium alone), and are not discrete chemicals. With these differences in mind, would you treat all those compounds exactly the same? Bring in old and new databases to bring in good science.
- If you start with 187 HAPs, that may cover 90% of chemicals but you need to do something different for other 10%. That is a hybrid approach. Don't be tied to one method and lose sight of other methods that can be used.
- This is a great step by step approach to take. Don't limit yourself to peer reviewed literature. Most toxics studies are conducted by industry and trade groups and typically are not considered as credible as other sources. Make sure the study is done by reputable researchers under good laboratory practices (GLP). Industrial chemical studies are not always published, making it hard to provide the information to the public.
- The surrogate analysis, in relation to Quantitative Structure–Activity Relationship (QSAR), is a single model. The read across approach is done manually and this information was sent to David Farrer.
- Consider GLP studies too. NIOSH gets papers in different languages and pays for translation and use.

Pros and Cons of using default toxicity values:

- You can be too conservative or not conservative enough in setting default toxicity values for chemicals which do not have much toxicity information available. The New York approach of having low, medium and high toxicity bins is good.
- Default toxicity values should be used as a last resort. Other better approaches you could use are route to route extrapolation (that is, using oral toxicity values to come up with inhalation toxicity values) and QSAR (preferable).
- Look at similarities to other compounds that are better known, a kind of surrogate chemical approach. Being able to look at similarities and differences helps you look at other chemicals. But using a toxicity default value as a last resort can be very helpful.
- If a facility is going to emit an unknown chemical, put the burden back on industry to prove that the chemical is not causing adverse impacts to human health. Industry should have some idea of where the chemical fits on a hierarchy instead of using default toxicity values.

- SCAQMD doesn't use default toxicity values. Apply some caution with this approach because you need a trigger to say whether something is toxic. For example, is there a reason to believe that the chemical is toxic? You need other steps before you trigger use of the default value. Using default toxicity values for chemicals that have little toxicological information is an example of the precautionary principle in action.
- The National Institute of Occupational Safety and Health, NIOSH, uses a hazard banding approach, like a globally harmonized system (GHS) classification of a chemical. This is a higher level approach than using a default toxicity value. There is a framework for using hazard banding. When you have chemical x, if you don't have risk values or do a surrogate analysis as a precautionary approach, you go to the framework and check the information you have for that chemical. Based on that information, the chemical is banded as high, medium, or low toxicity.

Pros and Cons of modifying occupational or chronic RBCs to generate acute RBCs:

- This falls to the method of last resort when there are no other options. The way the American College of Governmental Industrial Hygienists (ACGIH) derives Threshold Limit Values (TLVs) differs dramatically from the way other agencies derive toxicity values. Newer TLVs are often based on a NOAEL or LOAEL approach similar to other agencies, but many of the older TLVs are based on what level caused an irritation in an occupational population. Some RBCs are risk based, some are irritant based. Dividing TLV by 100 doesn't make toxicological sense. You need the foundational information on what that TLV is based on.
- Going from chronic to acute RBCs doesn't make sense because acute toxicity looks at the irritant property and short term health effects. In the process of designing chronic studies, agencies will often have preliminary short term studies to identify the maximum tolerated doses. Those studies are often available in the literature or agencies can give you access to them.
- Generally, when extrapolating from a subchronic study to a chronic toxicity value, the practice is to divide by 10 (apply an uncertainty factor for extrapolation from subchronic to chronic). In a case where this type of extrapolation was done, multiplying by 10 would get you back to a subchronic toxicity value, but this may not be enough to get you all the way to an acute toxicity value. If you don't have a chronic study for a chemical and only have subchronic information, then what can we do? This practice of applying the uncertainty factor for extrapolating from a subchronic study to a chronic toxicity value goes all the way back to the 1980s and 90s.
- When WA was trying to figure out what to do about acute affects, there were a couple schools of thought. Try to use Haber's Rule which is a function of the concentration and time you are exposed. Typically this relationship reveals an exponential decline in toxicity with either decreased concentration or exposure duration. However, you don't know the constant part of that formula for most chemicals you are dealing with, without which this approach cannot be applied. An alternate approach is multiplying an annual concentration by 8760 hours/year to get a short term concentration but this is not scientifically defensible. If a short-term toxicity value is published by an established

agency, use it. Don't use chronic toxicity as a short-term or acute screening concentration.

Pros and Cons of adjusting Risk Based Concentrations for cross-media exposure pathways:

- A recommendation was made to include persistence and bioaccumulative factors in the list of criteria to consider about pollutants. Washington only looks at inhalation during the initial screening step but considers other pathways of exposure during subsequent tiers of analysis.
- It can be difficult for an air specialist to address other media without expertise in those media. The Washington State Environmental Policy Act requires applicants to tell what they are doing and how it will affect all aspects of the environment. This document is circulated to agencies around the state to help inform others about multimedia impacts.
- Environmental justice says there are cumulative exposures that should be considered in different ways because of different exposure pathways such as groundwater pollution, soil gas pollution, and air pollution. In CA, different media are governed by different agencies so it's hard to look at cumulative risk from different pathways. South Coast performs a full multipathway assessment every time a risk assessment is done for new or existing sources. You can look at cumulative risk through time by looking back at risk assessments done previously for the same facility with the best information available at the time. Historical exposure is real to the population but it's difficult to quantify what those impacts are. Sometimes you just have to acknowledge there are previous exposures that we don't know how to quantify.
- From a toxicological perspective, DEQ/OHA shouldn't use a modifying factor to address multipathway exposure. Some kind of trigger is needed to require a broader risk assessment rather than adding modifying factors to inhalation risk based concentrations to account for cross-media exposure pathways.
- Total Risk Integrated Methodology (TRIM) is an EPA model that evaluates multimedia chemical fate, transport, exposure and risk. It establishes de minimis emission levels based on ingestion, consumption, etc.
- Pollution prevention looks at getting rid of regulatory silos and considers cross media health impacts. In the overall "toxic soup" that people encounter throughout their lives, there are so many other factors that can cause adverse health effects, such as the food we eat and the water we drink. When you look at the risk limit for a single facility of 1 in 10,000 (also expressed as 100 in 1 million), this level is very low compared to the overall cancer lifetime risk of about 1 in 4.
- How do you take retrospective risk into account? Through litigation and looking at responsible parties to assign quantified blame to each facility? Litigation is not best way but has resulted in development of some sophisticated analyses which can help.
- For retrospective risk, it is difficult to quantify risks that occurred 20-30 years ago. One thing you can do in a risk assessment is to discuss retrospective risk in a qualitative way in the uncertainty section.

- Academic longitudinal epidemiological studies are used to inform the regulatory approach and risk assessments in CA. There is not a direct connection to permitting. These involve following what people's actual exposures to a chemical were and require a lot of research and resources.

Statewide air toxics overview:

- All monitoring for metals was shown as PM10. Total Suspended Particles (TSP) might be worth considering rather than just PM10. The different targets for Portland and La Grande are aspirational targets to make continued progress. This slide is helpful but can be something to think about for risk communication. You need to state the ultimate risk reduction goal for 2020 or other future year.

Public Comment:

Mary Peveto: Speaking on behalf of 17 organizations and tens of thousands of Oregonians. Encouraged by willingness to take comments. Many opportunities for cooperation in establishing air toxics program. Submitted written comments. Identified relevant concerns and continue to work with DEQ. Key deficiencies: high quality data is key to getting it right. PATS data flawed. How do we get to health based regulations from cumulative impacts? Over emphasis on risk based moves away from health based. Does risk analysis adequately address health concerns? Existing versus new sources is a policy decision and should not be discussed at technical workgroup. Single biggest omission is environmental justice. Lack of expertise to ensure that disparate impacts of air pollution are being looked at. CA has established screening tools that may offer assistance in Oregon. Concerns about technical workgroup outcomes. Want to see widespread monitoring.

Andy Mecklin: Left Bay Area after chemical accidents. Train exploded by old house. Assumptions made in risk assessment. Need to make conservative assumptions to be protective. Big chemicals accidents are of concern. Topography and meteorology are important. Cumulative risk assessment versus acute risk assessment. Acid gas injection is the preferred disposal method of sulfide gas but actually brings oil up. Near misses in acid gas accidents. Risk assessment needs to be done in Portland to address chemical accidents.

Nikki Barnes – Concerns about PowerPoint slide that showed lead trending downward. Hillsboro airport is the largest source of lead in the state. Piston engine aircraft is the source. Not aware of any lead monitoring done in the state at airports. When DEQ modeled for lead in 2005, they found exceedances of NAAQS. Port of Portland used EDMS to model to change the numbers. Disturbing to show downward trends in lead from no data at airports. Must reach 25 tons before monitoring is required based on EPA regulation. Oregon Aviation petitioned DOJ to investigate Port of Portland and DEQ lead studies.

Greg Thielen: Ian mentioned an opaque area of how levels are set. Studies are done on animals and results are given with factors added to determine human risk. Senthilkumar – People want human data to address risk. Most of the time that data is not available. Creating human data takes

years so we cannot wait. We establish the human studies based on scientific evidence. There are uncertainty factors used to provide the most health protective and conservative levels for humans. Google "Human health risk assessment steps" to show how this is done. What are the units? How does a dose response translate to risk? EPA has elearn videos on toxicology. Several guidance documents are available from agencies, hundreds of pages.

Dale Feik: Look at Hillsboro's website for air permits. Question for Gary: Difference between PSD and ACDP permits? Oregon should do PSD permits. "Making Better Environmental Decisions," "Refining Expertise," and "Nature's Trust" books submitted to Chair Rider. Twenty-one youth sued federal government. Dale will go to trial for petition on challenge of Intel's permit.

Pollution Prevention:

- Everyone agrees that pollution prevention is a good approach to reduce pollution. How do you build this into your program? Make it incentivized? Discount on fees? With the aerospace industry, EPA did residual risk evaluations in 2005. They delayed doing an inventory and later showed chromium emissions were eliminated because of paint replacement. You need to be careful of the toxicity of any replacement chemicals that are proposed.
- As you look forward, incentives are really valuable. By adding the air toxics program to Oregon's current permitting program where there are already many existing facilities, the workload increase will be significant. If you went in looking from a pollution prevention standpoint, you could see what you could do to prevent pollution. Pollution prevention can save the cost of pollution control equipment that can be expensive to add to existing facilities. You should require a pollution prevention plan as part of an application for new source review.
- The Oregon pollution prevention tax credit sunseted around 2006. The program was viewed as corporate welfare, but it was aimed at getting companies to integrate pollution prevention protocols into their operations. That might be something to look at in policy or a legislative package.
- Money is a good motivator. Just recognition can also be a good thing because most companies want to be viewed as good citizens. They want to be recognized for doing the right thing. You have to be careful of media switching though (i.e., removing pollution from the air and putting it into the water).
- Energy Star was one of the most successful EPA programs.

Significant Emission Rates/Screening Steps:

- The Washington SQERs are based on the model "SCREEN3" and use 1-hour concentrations and EPA factors that convert the 1-hour to 24-hour and annual concentrations. SQERs have been useful in screening those projects most likely to not cause problems but larger sources cannot get out of doing the analysis because the

SQERs are pretty conservative. When you get to that point in the analysis for larger sources, there is an incentive to reduce emissions to avoid a full-blown risk assessment to meet an Acceptable Source Impact Level, which is more reasonable than a SQER. The refined analysis usually produces a lower concentration than if you looked at ratio of emission rate proposed divided by SQER. The SQER is typically more conservative compared to the refined analysis using a dispersion model.

- Sometimes for very complex facilities, with large numbers of emission points, SQERs are helpful to do a quick analysis. One recent company had 150 compounds and all of them were below the SQERs. Very simple sources can screen out of risk analysis along with some complex ones.
- At some facilities, individual pollutants may be just under the SQER but when the contribution from many release points are added up, the total is over the SQERs. EPA has a tool called T-REX (Terrestrial Residue EXposure) that has health benchmarks built in, and you can set a threshold value. You could use this spreadsheet to add up all pollutants to see if they are below a combined threshold. There was a recommendation to take advantage of technology, like spreadsheets, rather than to use static lookup tables.
- A screening model as a first step is a wise approach. You can get very different levels depending on assumptions.

Using annual average SERs for initial screening level analysis:

- Some states use annual average Significant Emission Rates (SERs) for the initial screening level analysis.
- Some annual average concentrations could be used to scale down to emission rates that are based on exposures that occur 8 hours/day and 5 days/week. If it's a one-hour concentration, then you wouldn't need to scale.
- It is typical to have different averaging time related to the assessment of cancer risk as compared to those used for chemicals that also have short-term, or acute, effects. Acute effects are generally related to non-cancer effects that can occur over 1-hour, 8-hour, or 24-hour averaging times. Use of only an annual SER is too simple.
- From a non-cancer perspective, when you compare a chronic value to an acute value, the related ratio varies and depends on the pollutant being assessed. It's inappropriate to take an annual risk-based number and compare it to a one-hour exposure duration. The ideal situation is to obtain a chronic value from a chronic study, and an acute value from an acute study. You need two different analyses to compare annual and however many acute values you have.
- Using multiple averaging periods for SERs is good and hasn't posed a problem in Washington, because it's not that cumbersome to look at multiple averaging times.
- For a quick and dirty check, use of an annual averaging period is good as a conservative approach. There might be some value to looking at different averaging periods.

- How often do you run into situations where a facility fails chronic but not acute and vice versa? It depends on the pollutant and the source of data. It can happen in both situations.
- When looking at acute numbers, EPA uses California's Reference Exposure Limits (RELs). For shorter time periods, the exposure is different. For chronic, you look at households where people live the majority of their lives.

De minimis screening level in addition to SER:

- The way the Washington rule is structured, the first screening step involves comparing a facility emission level to the de minimis level for each chemical. The de minimis level is the SQER divided by a factor of 20. Dividing the SQER by 20 was a policy decision; they just wanted the de minimis level to be a very low level. If you are emitting pollutants below de minimis levels, then you don't have to do anything else.
- De minimis is tied to T-BACT in WA. If your emissions are greater than de minimis, then T-BACT is required even if your emissions are less than the SQER. Oregon needs to determine whether or not it will include this approach in its new rules.
- WA needs de minimis levels or else there would be lots of unnecessary permit applications. You need a threshold to define what is too small. SWCAA is in charge of making a de minimis threshold determination; the source does not get to determine their de minimis status.

Pros and cons of using exposure concentrations versus ambient concentrations:

- In NATA, they calculate exposure concentrations based on census tract data. Exposure to ambient air is different for people that stay in their homes as compared to people who spend most of their time outside. Exposure concentrations and risk are generally lower than modeled ambient concentrations and risk. Using exposure concentrations made the analysis less conservative. Don't include exposure and keep the analysis conservative.
- Homeless people who live largely outside are exposed to air toxics 24 hours a day. People who leave windows open 24 hours/day also have higher exposure to ambient air. Therefore, you can't count on people's exposure being limited because you assume they're inside buildings during the day.
- When the SER is used, it assumes continuous exposure of a human receptor, which is a very protective assumption. In the second step of the analysis, concentration and risk can be adjusted based on site-specific exposure frequency and duration. Risk assessment guidance from EPA and CA can be used to identify relevant exposure scenarios and exposure frequency.
- Taking site-specific exposure into account for more refined analyses can be appropriate, as done in CA and WA.
- Does the use of SERs and other screening tools assure that the risk based benchmarks are protective of public health while not placing an undue burden on permitted sources?

Consideration of the progression of assessment steps is the right framework to ensure this.

- You need a balance between number of staff and how many permits you can handle and yet protect public health. You can't tell industry that it will take 6 years to get a permit. To check the balance, take sources from the existing inventory and test the proposed system of screening tools to see how many source fall through and pass the test, and how many fail and have to do a refined analysis.
- If you have a whole new set of permittees of sources that are similar, it makes sense to come up with a general order or permit to implement consistent types of controls across these sources.

Generating and verifying high quality data from permittee:

- Under the permitting scheme, when a facility is being built, the engineer must use professional judgment and discretion to see if emissions estimates make sense. If a facility proposes emission factors (EFs) that are in the middle of the range of published EFs, then a source test might be required. If the source proposes an EF that is conservative, then the permitting authority may elect to not require a source test. Also, if a source is willing to take an emission limit, then a source test may not be necessary. You need a quality assurance (QA) step in this process to verify emissions comprehensively.
- For the National Emissions Inventory (NEI), a compendium of all state toxics inventories, you can do a check by industry type or SIC or SCC codes to compare emissions. You can recognize outliers. To estimate emissions for the risk screening analysis, use emission factors and production data, material balance data, source test results, engineering judgment, and informed guesses when other information is not available. You can compare Oregon's emissions inventory to other states.
- The more unusual the source, the more unreliable the emission factors will be. Surrogates may not be accurate. Chamber testing may be worthwhile method to estimate emissions. Initial cost may be expensive, but cheaper than a stack test.
- SCAQMD found that when looking at all tools in the kit, source testing is a very critical component. Not all source tests are equal. A source test for PM doesn't get at air toxics. For fugitive emissions, you can never get emission factors or source test results, so monitoring can be a very important way to estimate emissions. For EPA NEI, emissions are generally self-reported in CA. South Coast does some auditing but there are too many to do all facilities. You can spot check for outliers. Monitors can find unexpected information. Use the same agency approach for consistency across sources.
- Don't confuse precision and accuracy in emissions inventories. Something can be repeatable but may still not be accurate. That's why we build conservatism into models.
- Continuous Emissions Monitors (CEMs) would be great but are very expensive and may not be feasible. SCAQMD has some experience with CEMS for metals. Testing against more accepted methods have given good correlations so sometimes SCAQMD is requiring CEMS for metals. Source test data is next on the hierarchy but only one source

test isn't enough, especially under variable conditions. Is the test repeatable? Use industry-wide emission factors. AP-42 provides conservative EFs.

- South Coast uses AP-42 too but there is California Air Toxics Emission Factor (CATEF) database on CARB's website (http://www.arb.ca.gov/ei/catef/catef.htm) with source test information for a whole variety of sources. There are also default toxic emission factors.
- Include ambient monitoring as another tool to develop emissions inventory.

Wrap-up:

- There are technical aspects of environmental justice - CAL EnviroScreen tool is technical tool. It's worth discussing these technical issues.