

This document represents the findings of the Air Toxics Advisory Committee on November 18, 2005. It does not reflect recommendations made since then by the ATAC subcommittees. This draft document was prepared by David Wright of the Maine DEP, based upon meeting notes from the 11-18-2005 Air Toxics Advisory Committee (ATAC) meeting & as discussed by the Science Advisory Subcommittee on January 30, 2006. This document is based on the Majority Recommendation of the Subcommittees that developed the Air Toxic Priority List recommendations, which was considered at the 11-18-2005 ATAC meeting. This draft is being circulated for review by the Air Toxics Advisory Committee. Comments on this draft should be forwarded to:

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CONSENSUS REPORT
of the
MAINE AIR TOXICS ADVISORY COMMITTEE
Regarding the
MAINE AIR TOXICS PRIORITY LIST AND NEXT STEPS
in the **MAINE AIR TOXICS INITIATIVE**
As Agreed To At The ATAC's
NOVEMBER 18, 2005 MEETING

Revision of February 9, 2006

Table of Contents

1. The MATI Process	3
2. Development of the Air Toxics Priority List.....	3
2.1 ATPL Development Overview	3
2.2 MATI Inventory.....	5
2.3 Toxicity Factors.....	5
2.4 Toxicity Weighting.....	6
2.5 Consideration of Other Factors	6
2.5.1 1996 National Air Toxics Assessment.....	6
2.5.2 Persistence and Bioaccumulation.....	8
2.5.3 Ambient Air Monitoring Data	8
3. Air Toxics Priority List.....	8
3.1 ATPL.....	8
3.2 Sources of Air Toxics	9
4. ATAC Conclusions and Recommendations	9
4.1 Discussion of the ATAC Findings.....	10
4.2 Conclusion	13
5. ATAC Recommendations For The Next Steps in the MATI Process.....	13
5.1 Science Advisory Subcommittee and Charges	14
5.2 Control Options Subcommittees and Charges	17
5.2.1 Stationary Sources Subcommittee:.....	17
5.2.2 Mobile Sources Subcommittee	18
5.2.3 Additional Charges of the Two Control Options Subcommittees	18
5.3 Subcommittee Communications and Decision Making Authority	19
5.4 Subcommittee membership and logistics.....	19

1. THE MATI PROCESS

In 2003 MEDEP convened a group of people representing the varied interests in Air Toxics to form the Air Toxics Advisory Committee (ATAC). The ATAC met on several occasions in 2003 and early 2004 to undertake the first step in the MATI scope of work, which was to develop a Maine Air Toxics Priority List.¹ The Air Toxics Advisory Committee (ATAC) has successfully accomplished its phase I assignment by the Maine Department of Environmental Protection under the Scope of Work for the Maine Air Toxics Initiative (MATI). This document represents the findings and conclusions of the ATAC that were made at a November 18, 2005 meeting at the DEP offices in Augusta, Maine.

The Department designed the MATI process, shown in Figure 1, to achieve the following objectives: get a sense of whether Air Toxics may be a concern for Maine, and if yes, establish an air toxics priority list (ATPL) of hazardous air pollutants (HAPs), identify the sources of those HAPs, and ultimately to develop strategies to reduce emissions of those HAPs. While air toxics remain a concern, the ATAC recognizes substantial improvements in Maine's air quality have resulted from many state and federal HAP reduction programs. These continuing programs are expected to further reduce HAP emissions in Maine. These programs include: (1) implementation of the National Emission Standard for Hazardous Air Pollutants (NESHAPs), (2) the federal motor vehicle emission control program, (3) Maine's adoption of federal Maximum Achievable Control Technology (MACT) standards for many types of sources, (4) Maine's State Implementation Plan for Ozone which has achieved significant reductions of volatile organic compounds (VOC) many of which are also HAPs, (5) Maine's air emission licensing program which requires use of the best available control technology as fuel burning and processing equipment is replaced, and (6) other requirements under the Clean Air Act.

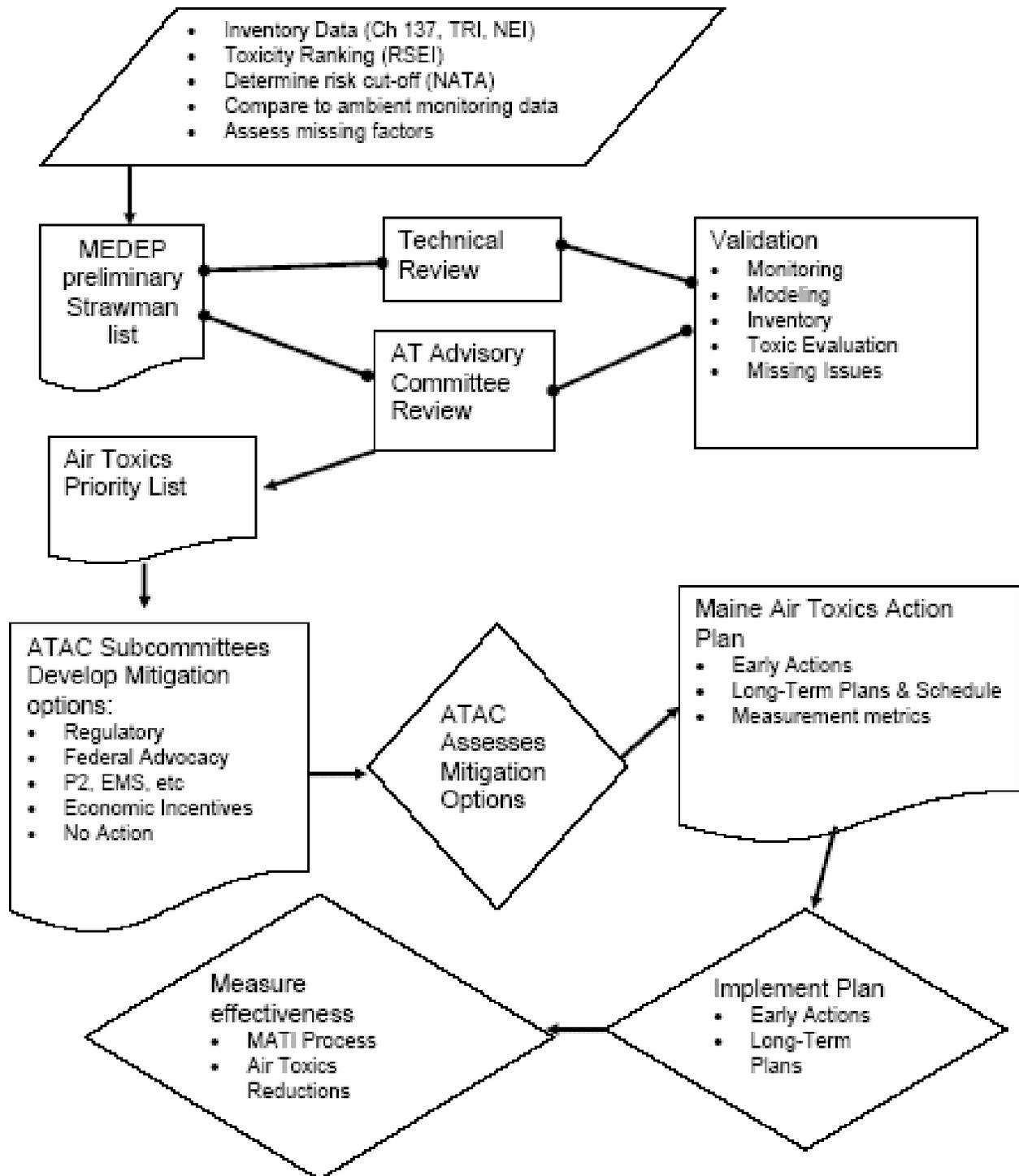
2. DEVELOPMENT OF THE AIR TOXICS PRIORITY LIST

2.1 ATPL Development Overview

In developing the Air Toxics Priority List (ATPL), the ATAC undertook as comprehensive an evaluation as possible given existing data. As shown in Figure 2, the ATAC used the results of ambient air monitoring programs operated by the Bureau of Air Quality, annual emission statements filed by individual facilities, input from the Maine Bureau of Health on the toxicity of various HAPs, and the 1996 National Emissions Inventory (NEI), in conjunction with the 1996 National Air Toxics Assessment (NATA) conducted by the EPA which included emission estimates and modeled exposure concentrations. Three ATAC subcommittees were established to provide analysis of data in three key areas: (1) an Inventory subcommittee to evaluate assumptions concerning the activity level and emission factor appropriate for each HAP from each category of source, (2) a Toxicity subcommittee chaired by the Bureau of Health to consider the toxicity rating scale and grouping of some categories of HAPs, and (3) a Benchmarking subcommittee to formulate a way to "benchmark" the toxicity-weighted emissions against some known risk standard. The methods, assumptions and results of the analysis of each of the subcommittees are contained in the detailed Maine Air Toxics Priority

¹ A complete list of stakeholders is available at: <http://www.maine.gov/dep/air/toxics/mati-groups1.htm>.

Figure 1: The Maine Air Toxics Initiative Process



List & Basis Statement, Draft for ATAC Review, Revised: October 7, 2005² (draft ATPL Background Document). The draft ATPL Background Document was prepared for review by the Air Toxics Advisory Committee. The ATAC did not reach agreement on all of the information in the draft ATPL Background Document. The areas of agreement are contained in this document.

The ATAC found that the approach proposed by the MEDEP in its original “Strawman” list of Air Toxic Priorities was a reasonable approach. The MEDEP had used a toxicity-weighted emissions approach, in which emissions are “weighted” to account for the differing toxicity of air pollutants. In this way, “apples to apples” comparisons could be made between air toxics.

2.2 MATI Inventory

The first step in developing the air toxics priority list (ATPL) was, therefore, to develop the MATI emission inventory. The inventory subcommittee’s evaluation of the 1999 National Emission Inventory (NEI) identified several source categories where the emission estimates were not accurate and should not be used in the ranking process. It was concluded that no existing inventory met the needs for the ranking system; therefore, the subcommittee analyzed different data sources, alternative emission factors and developed what has become known as the MATI inventory.

The MATI inventory is considered a more appropriate basis for evaluating air toxics in Maine than any nationally derived inventory because activity levels (amount of fuel burned, acres burned, etc) are based on Maine specific data, point source information is based on annual reports submitted to the Department by licensed facilities and a variety of potential emission factors were screened prior to acceptance. In addition, the inventory “back-filled” emission factors from one source category to similar source categories for which no factor had been included in the NEI or NATA inventories. For example, factors for one category of wood burning were applied to other categories of wood burning; factors for different grades of oil were applied to other source categories burning the same fuel. In this way, the MATI inventory is considered more representative of emissions in Maine than the NEI or NATA inventories.

2.3 Toxicity Factors

The toxicity factors that were used to “weight” the inventory were based on the toxicity factors used in EPA’s Risk Screening Environmental Indicators (RSEI) model. DHHS updated the RSEI toxicity factors with any recently available toxicity data. The Toxicity Subcommittee developed Toxicity factors for two important groups of air toxics for which a RSEI toxicity factor was not available: Mobile Source Diesel Particulate Matter (DPM) and Polycyclic Organic Matter (POM).

² Maine Air Toxics Priority List & Basis Statement, draft revision of October 7, 2005 (Air Toxics Program, Maine DEP, 17 SHS, Augusta, ME 04333-0017, or from <http://www.maine.gov/dep/air/toxics/mati.htm>)

2.4 Toxicity Weighting

The statewide sum of the pounds of each pollutant emitted was then multiplied against its respective toxicity factor, to develop a toxicity-weighted inventory. The entire toxicity-weighted inventory is presented in Appendix 2.

The ATAC recognizes that there remains a high degree of uncertainty surrounding many of the toxicity-weighted emission values including the number 1 (acrolein) and number 2 (POM) HAPs on the Toxicity-weighted inventory list. A sensitivity analysis conducted by the Bureau of Air Quality shows that the toxicity-weighted emissions for acrolein could be 400 % greater or 90% lower, if different emission factors were used for large wood combustion sources. The ranking also assumes a RSEI factor of 6400 for all Polycyclic Organic Matter (POM), some constituents of which have much greater individual toxicity scores. The ranking does not take into consideration the “confidence level” of the factors. Thus some compounds for which the ATAC has a high degree of confidence in both emissions and toxicity rank lower than compounds for which both emissions and toxicity scores are relatively uncertain.

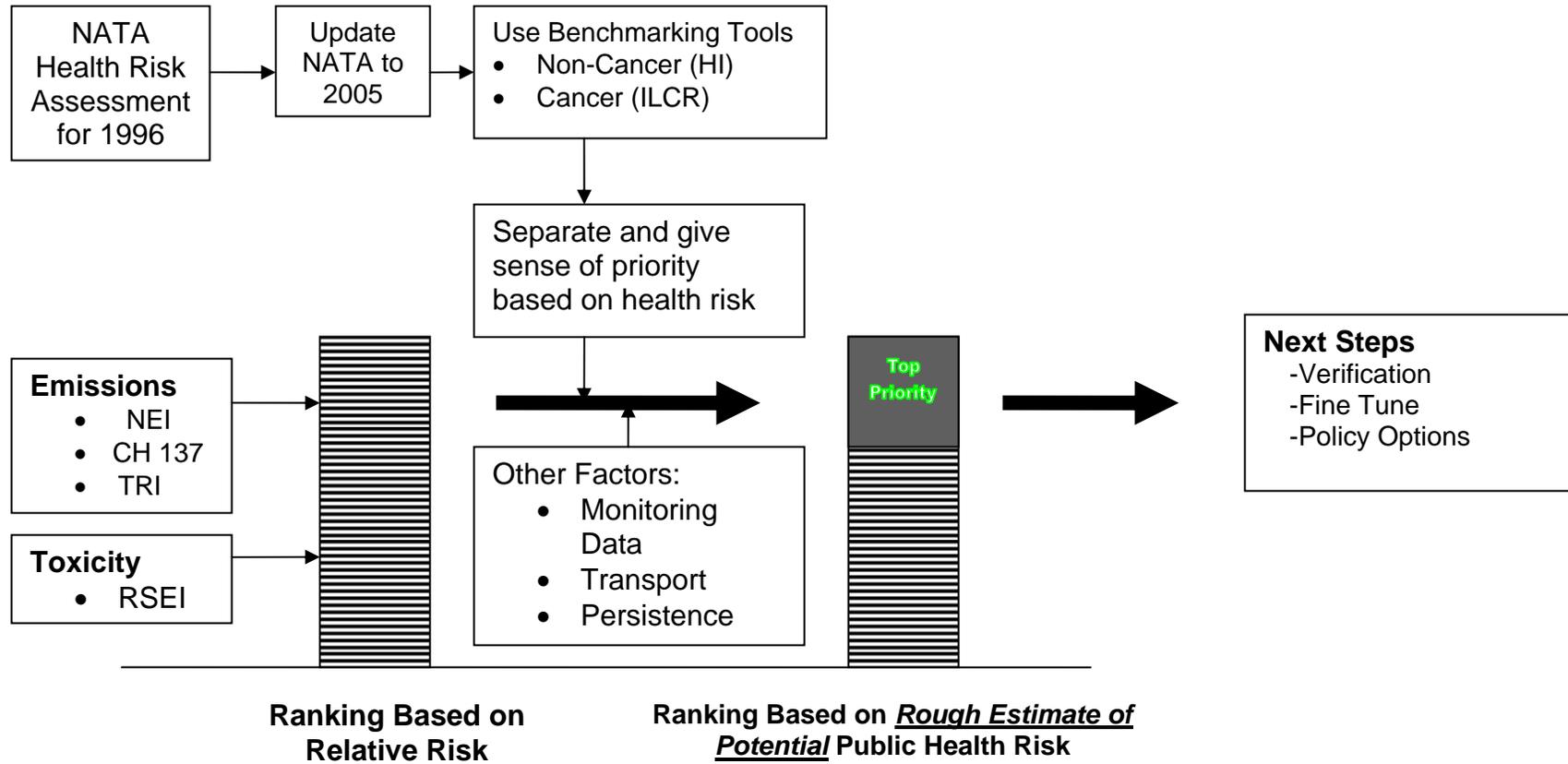
2.5 Consideration of Other Factors

2.5.1 1996 National Air Toxics Assessment

The toxicity-weighted ATPL, however, was only a relative ranking of HAPs. It did not assess which, if any, air toxics might exceed a health based guideline. To address this issue, the Benchmarking Subcommittee compared the Toxicity-weighted inventory to the 31 compounds assessed in the 1996 National Air Toxics Assessment, as roughly updated to current emissions. The Inventory and Benchmarking Subcommittees found that there were some significant flaws and missing data in the 1996 emissions inventory used in the NATA modeling. However, since the 1996 NATA provided the only county-level model that assessed the potential theoretical impacts to public health the subcommittees used it as a beginning point to provide a sense of whether it might be worth expending resources on Air Toxic reductions. The Benchmarking Subcommittee updated the 1996 NATA risk to reflect current conditions by simplistically applying the ratio of current emissions to the 1996 emissions to the 1996 NATA risk to obtain a **rough estimate** of current risk. The ATAC finds this screening-level approach is a reasonable first step to help focus further action but that it should not be considered as providing definitive estimates of actual risk.

The Benchmarking Subcommittee then summed risks posed by individual compounds from each of the inventory subcategories (point sources, area sources, on-road mobile sources and off-road mobile sources). The results of the benchmarking calculations are presented in Tables 10, 11, 12 and 13 of the full draft ATPL Background Document. Table 12 demonstrates that the projected risk from all carcinogens attributable to exposure to emissions from point, area, and mobile sources plus background is substantially lower today than estimated by the 1996 NATA results. The reductions are attributable to both actual emission reductions since 1996 and corrections to the emissions inventory for some source categories. The actual emission reductions reflect

Figure 2: Schematic of the Process Used to Develop the Air Toxics Priority List



the effectiveness of several state and federal emission control programs, as well as the closing of many industrial facilities.

2.5.2 Persistence and Bioaccumulation

In developing the ATPL, the persistent and bioaccumulative nature of air toxics was qualitatively assessed. That is, an assessment was made of which air toxics last in the environment long after they are emitted, and whether these pollutants concentrate in the higher levels of the food chain, such that current emissions may magnify over time. For example, the rank of dioxin and some metals were placed higher on the list to adjust for persistence and bioaccumulation. Brominated flame retardants and PM from Nano-technology, for which we do not have emissions data, were added to the list, due to persistence and bioaccumulation.

2.5.3 Ambient Air Monitoring Data

Ambient Air Monitoring data was also evaluated by the subcommittees as they developed the ATPL. The data suggested that background levels of metals are low as compared to health guidelines, but some air toxics in “hot spots” impacted by local emission sources are relatively high. Additionally, four HAPs have been added to the ATPL because the NATA assumed background concentrations are relatively high as compared to health guidelines: carbon tetrachloride, chloroform, ethylene dibromide and ethylene dichloride.

3. AIR TOXICS PRIORITY LIST

3.1 ATPL

The final Air Toxic Priority list is shown in Table 1. It should be noted that this list is based on the best information that is currently available, but due to uncertainties in this information, it is only a rough estimate of rank, and pollutants will be added and deleted as new information comes to light and emission reductions are implemented. The ATAC finds that every six months, it should re-evaluate whether any previously unknown pollutants should be added to the ATPL

Table 1: Final Maine Air Toxics Priority List

	Pollutant Category
1	Acrolein
2	Polycyclic Organic Matter
3	Manganese
4	Formaldehyde
5	Nickel
6	1,3-Butadiene
7	Diesel PM
8	2,4-Toluene Diisocyanate
9	Sulfuric Acid
10	Benzene
11	Lead
12	Cadmium

	Pollutant Category
13	Dioxins
14	Chromium
15	Arsenic
16	Cyanide & Compounds
17	Mercury
18	Brominated Flame Retardants
19	PM from Nano-Technology
20	Acetaldehyde
21	Tetrachloroethylene (Perchloroethylene)
22	Chloroform
23	Carbon Tetrachloride
24	Ethylene Dichloride
25	Ethylene Dibromide
26	Methyl bromide
27	Chlorine
28	Hydrochloric acid
29	Chlorine dioxide

3.2 Sources of Air Toxics

It is also possible to assess the source of current emissions using the MATI inventory. It is important to note that the way that categories are lumped together greatly influences the relative ranking of source categories. The ranking of these source categories is also greatly influenced by uncertainties in the inventory, particularly uncertainty with the emission factor for Acrolein. Again, total Acrolein emissions could be 400 % greater or 90% lower, if different emission factors were used for large wood combustion sources. Given these uncertainties, one possible toxicity-weighted ranking of sources is included in Appendix 1: Maine Sources of Air Toxic Emissions based upon the MATI 2005 Estimated Toxicity-Weighted Inventory. The ATAC finds that new emission factors for acrolein should be developed, and that the source rankings should be reassessed at that time.

4. ATAC CONCLUSIONS AND RECOMMENDATIONS

The ATAC has accomplished the objective for this phase of the MATI Scope of Work by establishing a toxicity-weighted priority ranking of air toxic compounds, as shown in Table 7 of the draft ATPL Background Document. Recognizing that toxicity-weighted emissions are not a direct indicator of potential risk, the ATAC took the analysis to the next level by establishing a “Benchmarking” Subcommittee to analyze data from EPA’s National Air Toxics Assessment (NATA) modeling and various air monitoring programs to establish which compounds on the toxicity-weighted priority list should be the focus of further efforts. Based on both the priority ranking and benchmarking evaluation, the ATAC has reached consensus on each of the following conclusions and recommendations.

4.1 Discussion of the ATAC Findings

Significant quantities of a wide range of air toxic compounds are emitted by point, area and mobile sources in Maine. Yet there remains a considerable degree of uncertainty in many source categories resulting from imprecise emission factors to limited data on the activity level of some source categories. Nevertheless, the ATAC finds it is appropriate to move to the next phase of the MATI process, while continuously improving the emission estimates by updating data as technically supported new information becomes available.

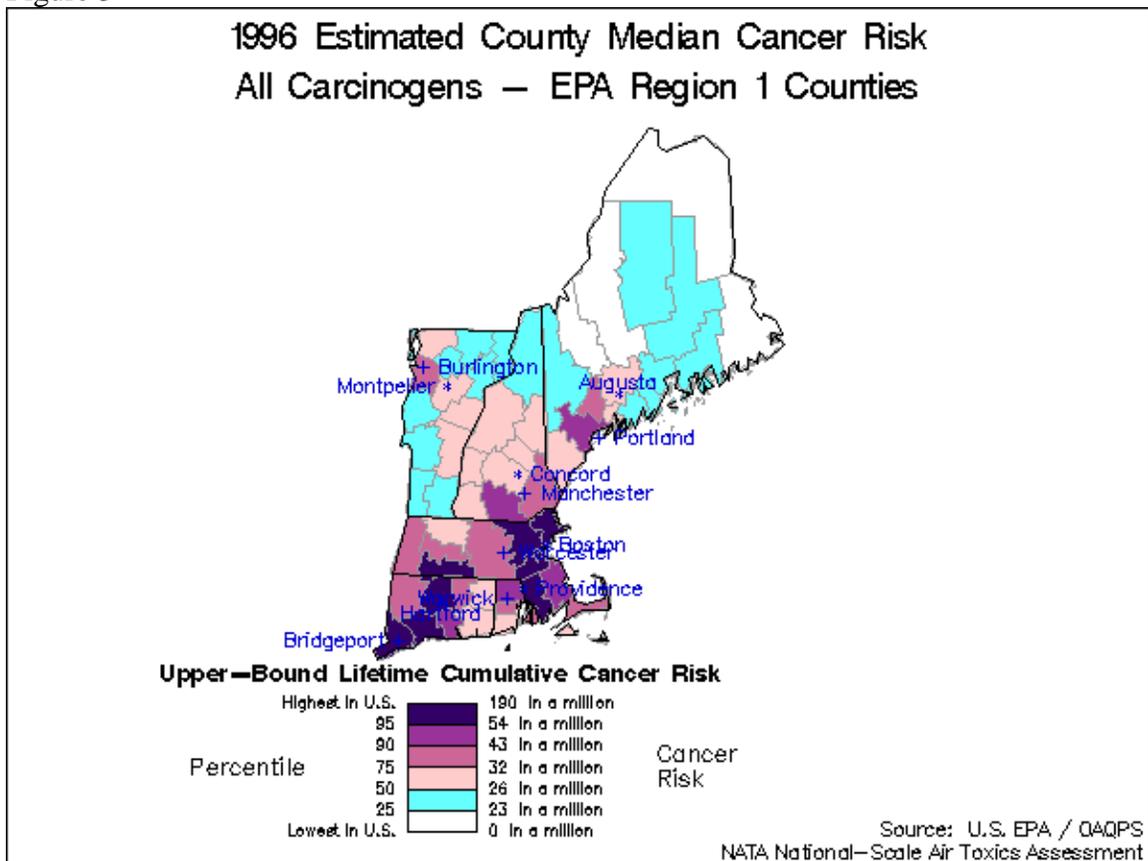
Toxicity ranking factors range from less than 1 to 271,428,576. Some factors are based on extensive scientific studies, while others include a high degree of uncertainty. The toxicity factor does not present the full concern for many toxic compounds such as the potential for some to bio-accumulate, interact and persist for long periods in the environment. Nevertheless, the ATAC finds it is appropriate to move to the next phase of the MATI process.

As the ATAC moves forward, it must be aware of the uncertainties and take them into consideration when it develops solutions. Further inventory refinement and risk assessment may be necessary before a solution can be fully considered.

The ATAC Inventory Subcommittee has estimated emission factors for several source categories that were not used by EPA for the NEI and NATA inventories. These emission factors were based on applying emission factors from related source categories, and were applied in a process the subcommittee termed “back-filling”. The subcommittee deemed backfilling appropriate on the basis that such estimates, though uncertain, are better than an estimate of “zero emissions” in situations where it is reasonable to expect a pollutant to be emitted, but no emission factor has been developed. For example, 47% of the total toxicity score for emissions from residual oil burning (industrial) were from backfilled emission factors; 52% of the toxicity score of residential wood burning were from backfilled emissions and 62% of the total toxicity score from burning distillate oil were from backfilled emissions. The ATAC agrees that it is reasonable to backfill emissions in these cases but cautions that any comparison to NEI or NATA or another state’s air toxic emission inventory must consider the effect of the MATI estimates being higher. From the perspective of the MATI priority ranking and benchmarking, the backfilling adds a degree of accuracy to the analysis.

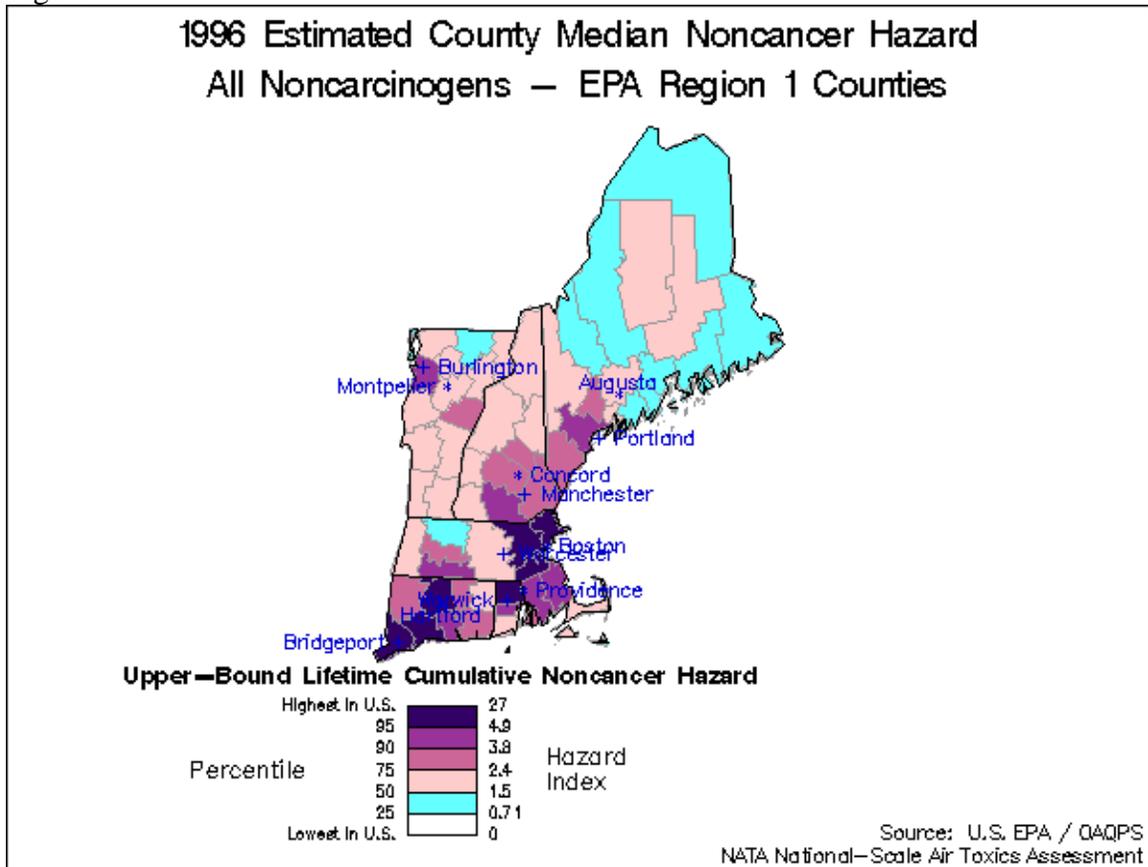
Figure 3 provides the 1996 NATA estimated “upper-bound” median cancer risk associated with cumulative exposure to HAPs throughout New England. Figure 4 shows the same data for non-carcinogens. While this modeling shows that cumulative risk associated with modeled exposure to all HAPs in Maine is significantly less than modeled exposure in the southern New England States, the predicted risk could be greater than prescribed by the Maine Ambient Air Guidelines. The ATAC finds that the NATA results must be used for their intended purposes and as stated by EPA, “these modeling results should not be used to draw conclusions about local exposure concentrations or risk. The results are most meaningful when viewed at the state or national level; for smaller areas, the modeling becomes less certain.” The NATA results are based on “upper-bound unit risk estimates for each pollutant”, meaning that they represent a plausible upper limit of lifetime ... risk to a person with typical exposure and as such the risk estimates are “conservative (err on the side of protecting public health), but not worst-case”.³

Figure 3



³ US EPA’s Website: Technology Transfer Network, National Air Toxics Assessment (<http://www.epa.gov/ttn/atw/nata/ur.html>)

Figure 4



However, NATA provides the only basis for characterizing risk. Therefore, ATAC concludes that it is an appropriate **screening** tool with any results used or communicated with similarly appropriate cautionary statements. Again, the ATAC finds that it is appropriate to continue to the next phase of the MATI process to evaluate options for further reductions in exposure to air toxics.

The Inventory and Benchmarking Subcommittees found that there were some significant flaws and missing data in the 1996 emissions inventory used in the NATA modeling. The Subcommittees worked together to develop a screening approach to project potential risk from the NATA modeling which included correcting emissions from various source categories and accounting for changes in emissions between 1996 and the early 2000s. These reductions have occurred as a result of improvement in inventory estimations, NESHAPS and MACT standards, federal motor vehicle emission control program, Maine’s air emission licensing and ozone State Implementation Plan as well as a significant change in Maine’s industrial profile resulting in many fewer industrial point sources since 1996. The process used to update the NATA Inventory, described in detail in Section 5 of the draft ATPL Background Document, simplistically applied the ratio of current emissions and the 1996 emissions to the 1996 risk to obtain a **rough estimate** of current risk. The ATAC finds this screening-level approach is a reasonable first step to help focus further action but that it should not be considered as providing definitive estimates of actual risk.

The results of the benchmarking calculations demonstrated that the predicted risk from each air toxic compound was lower than the long-standing Maine Ambient Air Guideline (MAAG) for that compound. It should be noted that MAAG for non-carcinogens are established at a Hazard Index (HI) of one, that a MAAG for Acrolein has not been established, but that the rough estimate of risk indicated that Acrolein exceed a HI of one in one county. The ATAC, however, concludes that achieving the MAAG for individual air toxics based on average county-wide exposure is not a true reflection of the potential risk attributed to air toxics. As specifically delineated in the recommendations, the ATAC finds that further analysis must account for the effect of cumulative exposure to multiple air toxic compounds, the hazard analysis must consider higher than average exposure for individuals located near sources of emissions (hot spots), and the analysis must consider other factors such as bioaccumulation, transport/background concentrations and environmental persistence. Similarly, using the 1996 NATA results means that risk projections can be made for only the 31 NATA compounds; therefore, this procedure misses some air toxics that were high on the toxicity-weighted inventory list.

As presented in section 7 of the draft ATPL Background Document, the ATAC compared the NATA modeling results to the various ambient air monitoring programs. While the IMPROVE monitoring data suggests that NATA under-predicted ambient air concentrations for metals at many sites, and the Rumford monitoring seemed to validate the NATA background value for carbon tetrachloride, the monitoring is supportive of the conclusions derived from the NATA modeling. The BEAM data and other local sampling programs demonstrate the need for consideration of exposure to HAPs at the local level. That is while the county-wide risk to the “typically” exposed person may be below Maine’s Ambient Air Guideline⁴ value, exposure to HAPs in the vicinity of a heavily trafficked roadway, a major point source or an aggregation of area sources is a concern that requires additional evaluation.

4.2 Conclusion

In conclusion, this evaluation pointed out that further evaluation of potential hot spots should be undertaken, either in the vicinity of major roadways, point sources or concentrations of area sources. Further, most of the current air toxic emissions stem from combustion rather than manufacturing processes.

5. ATAC RECOMMENDATIONS FOR THE NEXT STEPS IN THE MATI PROCESS

The ATAC concludes that significant quantities of a wide range of air toxic compounds are emitted by point, area and mobile sources in Maine. Yet there remains a considerable degree of uncertainty in many source categories resulting from imprecise emission factors and/or limited data on the activity level of some source categories. Nevertheless,

⁴ Maine Bureau of Health Ambient Air Guidelines, April, 2004, **Prepared** by: Environmental Health Unit Bureau of Health Department of Health and Human Services (11 SHS, Augusta, ME 04333-0011) <http://www.maine.gov/dhhs/ehu/air/AAGProc.pdf>.

the ATAC finds it is appropriate to move to the next phase defined in the MATI Scope of Work, while continuously improving the emission estimates by updating data as technically supported new information becomes available. According to the Scope of Work, the next step is to appoint subcommittees to develop appropriate early actions and identify a long-term targeted strategy, with clear implementation goals and timeframes that will reduce Air Toxics to acceptable levels. These strategies could include economic incentives, targeted pollution prevention programs, voluntary programs, enhancement of existing regulatory programs, new legislation at the state level, partnering with regional agencies to resolve interstate issues, or no action. The goal will be for a consensus recommendation from each subcommittee, or failing that, options for the ATAC to consider. In addition, the subcommittees used to develop the ATPL should be combined and undertake further research to verify, refine, and update the ATPL. The ATAC subcommittee recommendations and assignments are discussed below.

5.1 Science Advisory Subcommittee and Charges

The ATAC recommends that the Inventory, Toxicity and Benchmarking Subcommittees should be combined and expanded to include ambient air monitoring and data evaluation. This subcommittee should explore the following:

1. The Subcommittee should be assigned to evaluate monitoring results and recommend additional monitoring and analysis to explore the issue of localized areas of high impacts. High priority areas should include the state's larger urban areas, near roadways with high traffic density, downwind of major point sources and some residential areas characterized by limited dispersion. MEDEP should conduct a screening analysis on where these areas might be, based on the census tract level data in the 1999 NATA, and other available information. This screening assessment would be used to prioritize where focused inventories, modeling, risk assessments and/or monitoring should be conducted.
2. As shown in Table 10 of the draft ATPL Background Document, estimated background concentrations represent greater than 50% of the exposure to all the listed carcinogenic air toxics (except for POM and 1,3 Butadiene in Cumberland County) and virtually all of the exposure for four compounds in every county; those four compounds are carbon tetrachloride, chloroform, ethylene dibromide, and ethylene dichloride. The Subcommittee should develop a plan to expand ambient air monitoring at DEP monitoring sites to include those compounds predicted by NATA to have background concentrations very close to the level of the MAAG: carbon tetrachloride, chloroform, ethylene dibromide and ethylene dichloride.
3. The subcommittee should also develop a plan to analyze particulate samples collected near roadways for heavy metals. The State of Delaware Air Toxics Study identified one significant category of source that has not yet been included in the MATI process; that source was re-suspended road dust which was found to have high concentrations of various heavy metals. Therefore, the ATAC

recommends that the Subcommittee work with the MEDEP to establish a sampling program for heavy metals in particulate/fine particulate samples collected in the vicinity of roadways for the purpose of determining heavy metals resulting from re-entrained road dust.

4. The Air Toxics impacts in Maine from Quebec Forest Fires should be evaluated using available data.
5. There remains a high degree of uncertainty concerning the emission estimate for acrolein from all sources at all temperatures, particularly large wood fired boilers. The data for heavy metals in fuel is also uncertain. The emission factors for metals and acrolein from combustion boilers should be refined. The subcommittee should work with the MEDEP to identify incentives to expedite stack testing for acrolein and/or metals from large wood fired boilers. (Note that while the MEDEP has authority to require stack tests under specific circumstances, testing for an unregulated compound to validate an emission factor is not one of the reasons). Simultaneously the Subcommittee should seek and evaluate new data from other tests reported in the literature or through EPA. These efforts should focus on representative sources that comprise the top 80% of toxicity weighted emissions in the toxicity-weighted inventory.
6. Some compounds and source categories that are ranked lower on the toxicity-weighted inventory list were not thoroughly evaluated; therefore, the ATAC recommends the following continuing assignment for the Science Advisory Subcommittee. Therefore, the ATAC recommends the following continuing assignment for the Science Advisory Subcommittee: refine the inventory to reduce the uncertainty of emission estimates and otherwise characterizing the relative degrees of uncertainty between individual air toxic compounds.
7. The subcommittee will make further attempts to quantify emissions where missing emission data currently exist.
8. 2,4-Toluene Diisocyanate ranked in the top 10 compounds in terms of toxicity weighted emissions (Table 7 of the draft ATPL Background Document); however, the emission factors and activity data for several sources were not specifically reviewed by the Inventory Subcommittee. Therefore, the Science Assessment Subcommittee should verify all significant emission sources of 2,4-Toluene Diisocyanate.
9. The ATAC recognizes the importance of clearly and objectively presenting findings related to risk to the public. The MEDEP should, therefore, develop a carefully planned public information program, supported by the Science Advisory Subcommittee, which accurately conveys scientific facts without causing undue fear by the public. Risk should be characterized in the context of existing levels of risk associated with everyday activities, but recognizing the

difference between voluntary and involuntary risk. The plan should consider available risk communication guidance published by EPA and other sources.

10. The Science Advisory Subcommittee should evaluate potential “hot spots” through, as appropriate, the development of detailed local emission inventories, modeling, and monitoring.
11. The Inventory Subcommittee identified a study by the Olympia, Washington Clean Air Agency which found that national inventories under-predicted the emissions from residential wood burning stoves by as much as 4 – 5 times. DOE estimates of the amount of wood burned may be a significant portion of this under prediction. Since the second highest ranking compound on the priority list is the class of polycyclic organic matter (POM) and the largest emission source for this class of compounds is residential wood burning, the Subcommittee should work with the MEDEP to verify the activity data for residential wood burning through a Maine specific wood use survey. This information would then be used to verify or update the estimated emissions from this important source category. The Subcommittee should evaluate the rate of growth of residential wood burning as a function of heating oil cost in order to project potential significant increases in emissions from this category. The subcommittee should evaluate the additional risk posed by outdoor wood boilers, which are exempt from all EPA emission standards.
12. The accuracy of the point source emission estimates depends on data supplied by sources required to provide reports of air toxic emissions under Chapter 137; the next update of which is due on July 1, 2006 for emissions from calendar year 2005. Historically, the MEDEP has provided inconsistent guidance requiring the need to include HAP emission estimates from fuel burning sources. The SAS should assist the MEDEP to develop clear and timely guidance for the air toxics reports for 2005, specifying that emission estimates must include fuel combustion, and the hierarchy of preferred methods for estimating emissions (perhaps to the point of supplying de-default emission factors if the facility has no better information). One issue that must be resolved will be to determine if and when, and what factors to use, for the purpose of back-filling estimates for source categories for which there is not an AP-42 emission factor but for which a substitute factor has been applied in the development of the MATI inventory.
13. MEDEP should adopt the improvements in inventory development that were identified by the ATAC Inventory subcommittee and recommend appropriate improvements to EPA for the national inventory program.
14. The toxicity factor is very important in determining the total toxicity-weighted emission value used in the priority ranking system. As with emission estimates, there is an unquantified range of uncertainty surrounding these toxicity factors. In some cases the toxicity for a class of compounds is based on one of the forms in which the compound may exist as with heavy metals, diesel particulate matter

and polycyclic organic matter (POMs). The ATAC finds that additional analysis concerning the form of compounds and the health consequence of exposure to multiple air toxics requires further evaluation. Specifically the ATAC recommends that the Science Advisory Subcommittee conduct further evaluation concerning:

- a. Review the DHHS and Toxicity Subcommittee's evaluation of the various toxicity factors for various forms within classes of compounds and determine if any changes are warranted.
 - b. Develop recommendations for addressing the issue of simultaneous exposure to multiple air toxic compounds
 - c. The reliability of data used to develop the RSEI factor for acrolein and develop a confidence level to characterize the range of uncertainty of its toxicity factor;
 - d. Request that the Maine DHHS review the Maine Ambient Air Guidelines, develop an MAAG for Acrolein and ATs commonly monitored for in Maine, and propose recommendations for addressing the issue of simultaneous exposure to multiple air toxic compounds.
 - e. Request that the Maine DHHS review the RSEI toxicity factors used in the priority ranking to assure that the factors consider the potential of impacts to children, pregnant women and those with already existing health concerns such as asthma, etc.
15. The Science Advisory Subcommittee should propose revisions to the October 7, 2005 revision of the Air Toxics Priority List and Basis Statement to reflect the opinions in this document, as amended and adopted by the full ATAC at the November 18, 2005 meeting.
16. The subcommittee should develop criteria for evaluating previously unknown air toxics. Further, the subcommittee should evaluate whether any previously unknown air toxics should be added to the ATPL.

5.2 Control Options Subcommittees and Charges

The ATAC appointed two new subcommittees to explore short and long-term reduction strategies for pollutants on the Air Toxics Priority List, focusing on ways to reduce the most theoretical risk from emissions for the least cost. These subcommittees will develop recommendation reports for full ATAC review. The two subcommittees are the Stationary Sources Subcommittee, and the Mobile Sources Subcommittee.

5.2.1 Stationary Sources Subcommittee:

This subcommittee will explore air toxics reductions at Electric Generating Units, co-generation facilities, waste-to-energy facilities, industrial boilers, other stationary

combustion sources, industrial processes, manufacturing processes, household products use, and other stationary sources. The subcommittee will undertake the assessment required under **LD 1408** (HP 972), *Resolve, Directing the Air Toxics Advisory Committee to Review the Status of Toxic Emissions from Waste-to-Energy Facilities in the State and Recommend Actions Aimed at Reducing and Monitoring These Emissions*, June 3, 2005. (<http://janus.state.me.us/legis/LawMakerWeb/summary.asp?LD=1408>).

5.2.2 Mobile Sources Subcommittee

This subcommittee will explore air toxics reductions for mobile sources, including the on-road and non-road sector. Also, the subcommittee will consider how development is handled in the state, its impact on transportation and air toxics emissions.

5.2.3 Additional Charges of the Two Control Options Subcommittees

Specifically, the ATAC directed the two control options subcommittees to undertake the following:

1. Work with the Science Advisory Subcommittee to quantify a timeline of emission reductions, and corresponding theoretical risk reductions expected to be achieved by existing programs within the next ten years. Programs explored should include the MACT standards program, consumer products standards, architectural coating standards, new diesel engine performance standards, new diesel fuel specifications and changing composition of motor vehicle fleet that could affect emissions of air toxic compounds.
2. Review the list of priority toxics and identify common sources and potential no-cost options for control. Then identify no-cost, low cost and co-benefit solutions to reduce emissions from highest risk toxics. The cost and effectiveness in reducing actual risks must be considered in the evaluations of costly risk reduction strategies.
3. Work with the Science Advisory Subcommittee to determine the rate of replacement of existing residential wood stoves with new EPA certified stoves in order to quantify the potential theoretical risk reduction in air toxic compounds associated with such replacements. The subcommittee should review the effectiveness of EPA programs in other areas which provide an economic incentive for early replacement of old stoves with EPA certified models, and the most effective way for MEDEP to partner with EPA on these initiatives.
4. Review MEDEP efforts to enforce the prohibition of “back yard” burning of household trash, identify public information or options to increase the rate of compliance with the prohibition, and determine if the theoretical risk reduction from these programs warrants the effort.
5. Report back to the full ATAC around Mid-May of 2006. The subcommittee reports should be in similar formats.

5.3 Subcommittee Communications and Decision Making Authority

Under this proposed strategy, there will be refinement and additional priority list improvements concurrent with reduction strategy development. The subcommittee chairs will need to ensure that there is good communication between the subcommittees, so that the controls options subcommittees do not conduct extensive work on reductions for a particular air toxic, only to find that work by the Science Assessment Subcommittee has found that the Air Toxic is no longer of concern. The ATAC's directive for each subcommittee must be clear as we move forward so that the committees stay on track and focus on their objectives; relying on the full ATAC to make decisions affecting important issues.

5.4 Subcommittee membership and logistics

Subcommittees will first meet in January of 2006, and at that time will elect chairs. The following subcommittees have the following members:

Table 2: Members of the Science Advisory Subcommittee

Name	Organization ⁵
Brian Phinney	Biddeford CEO - Environmental
David Dixon	Dirigo Environmental
Susan Lancey	EPA Region I – Air Toxics Program
Pam Person	League of Women Voters
David Wright	MEDEP – Air Toxics & Emission Inventory
Marc Cone	MEDEP – Major Source Licensing
Rich Greves	MEDEP – Air Toxics & Emission Inventory
Abel Russ	MEDHHS – CDC
Karen Morrison	Morrison Environmental
Scott Reed	NewPage Corp
Carlo White	Penobscot Energy Recovery Co
David Adams	Physicians for Social Responsibility
Dixon Pike	Pierce Atwood
Myra Karstadt	Retired, USEPA toxics division.

⁵ Norm Anderson (Maine Lung Association), Jon Hinck (Natural Resources Council of Maine), Mike Belliveau (Environmental Health Strategies Center), and Wil Everett (Toxics Action Center), were invited to participate on the subcommittee, but declined due to a lack of available resources.

Table 3: Stationary Sources Subcommittee

Name	Organization
Patrick O. Gwinn	AMEC Earth & Environmental, Inc
Brian Phinney	Biddeford CEO – Environmental
Jenna Shue	Citizen
David Dixon	Dirigo Environmental
Al Wiley	Florida Power and Light
Scott Belanger	General Dynamics
Donna J Dion	Healthy Coastal Communities
Dave Wilby	Independent Energy Producers of Maine
Chris Hall	Maine Chamber of Commerce
Pattie Aho / Jamie Py	Maine Oil Dealers Association
Mike Barden	Maine Pulp & Paper Association
David Wright	MEDEP – Air Toxics & Emission Inventory
Marc Cone	MEDEP - Major Source Licensing
Mark Roberts	MEDEP - Major Source Licensing
Jon Voisine	MEDEP - Major Source Licensing
Lisa Higgins	MEDEP – Air Toxics & Emissions Inventory
Rich Greves	MEDEP – Air Toxics & Emissions Inventory
Karen Morrison	Morrison Environmental
David Laflamme	New Page Corp
Carlo White	Penobscot Energy Recovery Co
David Adams	Physicians for Social Responsibility
Dixon Pike	Pierce Atwood
Susan Lancey	USEPA-Region 1
Beth Nagusky	Maine Energy Independence & Security Office

Table 4: Mobile Sources Subcommittee

Name	Organization ⁶
Don Craig	Androscoggin Regional Transportation Commission
Jonathan Rubin / Caroline Noblet	Chase Smith Policy Center
Steve Henchman	Conservation Law Foundation
David Dixon	Dirigo Environmental
John Dow	DOT
Steve Linnell or alternative	Greater Portland Council of Government

⁶ Dan Mitchell (Maine Alliance Trail Vehicles of Maine), Coralie Cooper (Northeastern States for Coordinated Air Use Management), Norm Anderson (Maine Lung Association), Dale Hanington (Maine Motor Transportation Association), Maria Fuentes (Maine Better Transportation), were invited to join the subcommittee, but did not choose to participate

Name	Organization ⁶
Pam Person	League of Women Voters
Tom Brown / Ginger Davis	Maine Auto Dealers Association
Anne "Andy" Bert	Maine Council of Churches
Pattie Aho / Jamie Py	Maine Oil Dealers Assoc
Bob Meyers	Maine Snowmobile Association
David Wright	MEDEP
Ron Severance	MEDEP
Lynne Cayting	MEDEP
Bill Hine	River Valley Healthy Communities Coalition
Bob Judge	USEPA – Region I

Note: Some members of the subcommittees were not at the November 18, 2005 meeting when the subcommittees were developed. They were invited to join the subcommittees to ensure that the interests of the major stake-holders are represented on the subcommittees.

-End-

Appendix 1: Maine Sources of Air Toxic Emissions based upon the MATI 2005 Estimated Toxicity-Weighted Inventory

<i>Source Type Category</i>	<i>Pollutant-Category</i>	<i>Toxicity-Weighted Emissions (Unitless)</i>	<i>% of Toxicity Weighted Inventory</i>
Industrial Combustion	Wood (industrial) Boiler	6,412,455,181	26%
	Electric Generation	108,378,125	0.4%
	Misc. Fuel (industrial) - Small	76,834,387	0.3%
	Residual Oil (industrial)	37,547,461	0.2%
	Distillate Oil (industrial) Boilers	9,190,940	0.037%
	<i>Natural Gas (industrial) Boilers</i>	<i>1,771,176</i>	<i>0.007%</i>
Industrial Combustion Total		6,646,177,269	27%
Manufacturing	Pulp & Paper Industry	3,338,871,341	13%
	Oriented Strand Board	1,561,392,712	6%
	Wood Products	32,751,956	0.1%
	Metal Fabrication	24,083,520	0.097%
	Brick & Concrete Manufacturing	19,689,635	0.080%
	Plastics Manufacturing	18,644,354	0.075%
	Aerospace Industry	17,627,438	0.071%
	Food Processing	7,634,076	0.031%
	Tannery	7,059,003	0.029%
	Asphalt Concrete-Rotary Dryer: Conventional Plant	6,009,760	0.024%
	Electronics	4,821,316	0.019%
	Printing Press	3,726,474	0.015%
	Concrete, Gypsum, Plaster Products	2,864,570	0.012%
	Textiles	2,649,381	0.011%
	Paint & Chemical Manufacturing	1,667,956	0.007%
	Asphalt Application (com)-All Solvent Types	1,283,549	0.005%
	Metal Working-Anodizing	1,167,880	0.005%
	Metal Working-Electroplating	1,103,380	0.004%
	Metal Working-Other	759,791	0.003%
	Shoe Manufacturing	510,150	0.002%
	Chemical Manufacturing-Other	463,565	0.002%

<i>Source Type Category</i>	<i>Pollutant-Category</i>	<i>Toxicity-Weighted Emissions (Unitless)</i>	<i>% of Toxicity Weighted Inventory</i>
	Foam Production	460,866	0.002%
	Brick & Cement Manufacturing	431,586	0.002%
	Boat Manufacturing	395,592	0.002%
	Other	307,362	0.001%
	Boat/Ship Building & Repair	261,654	0.001%
	Metal Working-Primary Metal Production Processes	160,296	0.001%
	Reactor (Polyurethane)-Plastics Production	126,352	0.001%
	Metal Working-Plating: Metal Deposition	115,630	0.000%
	Thermometer Manufacture	49,627	0.000%
	Analytical Laboratory	38,246	0.000%
	Dental Alloy (Mercury Amalgams) Production	38,149	0.000%
	Rubber Manufacturing	37,788	0.000%
	Metal Working-Electroplating Chrome	35,260	0.000%
	Fiberglass	9,013	0.000%
	<i>Light bulb Manufacturing</i>	23	0.000%
Manufacturing Total		5,057,249,250	20%
On-Road Mobile	Light Duty Gas Vehicles	2,744,872,848	11%
	Heavy Duty Diesel Vehicle	937,160,261	4%
	Heavy Duty Gas Vehicles	677,741,243	3%
	Light Duty Gas Truck	502,232,625	2%
	Light Duty Diesel Vehicle	130,914,716	0.5%
	Motorcycle	37,197,315	0.150%
	<i>Light Duty Diesel Truck</i>	2,917,440	0.012%
On-Road Mobile Total		5,033,036,449	20%
Off-Road Mobile	Gas 2-Stroke	1,675,624,869	7%
	Diesel (off-road vehicle)	895,666,432	4%
	<i>Gas 4-stroke</i>	500,357,045	2%
Off-Road Mobile Total		3,071,648,347	12%
Residential Combustion	Wood (residential) heating	1,158,173,323	5%
	Distillate Oil (residential) Heating	144,532,046	0.6%
	Coal (residential) Heating	2,763,328	0.011%
	<i>Natural Gas (residential) Heating</i>	1,073,051	0.004%

<i>Source Type Category</i>	<i>Pollutant-Category</i>	<i>Toxicity-Weighted Emissions (Unitless)</i>	<i>% of Toxicity Weighted Inventory</i>
Residential Combustion Total		1,306,541,749	5%
Open Burning	Structure Fires	694,932,258	3%
	Forest Wildfires	374,681,296	2%
	Open Burning-Brush Species Unspecified	11,919	0.000%
	Open Burning-Leaf Species Unspecified	11,919	0.000%
	<i>Open Burning-Land Clearing Debris</i>	192	0.000%
Open Burning Total		1,069,637,584	4%
Commercial Combustion	Wood (com) Boilers	679,386,193	3%
	Residual Oil (Com) Boilers	40,645,349	0.164%
	Distillate Oil (com) Boilers	39,859,239	0.161%
	Coal (Com) All Boiler Types	287,023	0.001%
	<i>Natural Gas (Commercial) Boilers</i>	281,548	0.001%
Commercial Combustion Total		760,459,353	3%
Commercial Solvent Use	Graphic Arts-All Solvent Types	557,550,946	2%
	Automobile Repair & Refinishing	10,583,907	0.043%
	Dry Cleaning-Perchloroethylene	5,855,137	0.024%
	All Automotive Aftermarket Products	4,649,074	0.019%
	Degreasing-All Solvent Types	3,707,723	0.015%
	All Adhesives and Sealants	2,741,133	0.011%
	Traffic Markings	730,828	0.003%
	Paint Stripper User	586,704	0.002%
	Household Products-Methylene Chloride Processes	541,076	0.002%
	Dry Cleaning-All Solvent Types	117,486	0.000%
	Misc. Products (consumer/com)-All Solvent Types	80,086	0.000%
	<i>Laboratory Fugitive Emissions-Hospitals</i>	35,321	0.000%

<i>Source Type Category</i>	<i>Pollutant-Category</i>	<i>Toxicity-Weighted Emissions (Unitless)</i>	<i>% of Toxicity Weighted Inventory</i>
Commercial Solvent Use Total		587,179,422	2%
Household Products	All FIFRA Related Products	489,217,068	2%
	All Household Products	1,205,437	0.005%
	All Personal Care Product	22,696	0.000%
	Fluorescent Lamp Breakage	66,236	0.000%
	<i>Swimming Pools</i>	8,599,881	0.035%
Household Products Total		499,111,319	2%
Aviation Fuel combustion	Aviation	315,387,288	1%
	<i>Diesel</i>	12,953,520	0.052%
Aviation Fuel combustion Total		328,340,808	1.3%
Commercial Marine Fuel combustion	Diesel (CMV)	153,827,036	0.6%
	<i>Residual (CMV)</i>	52,459,917	0.2%
Commercial Marine Fuel combustion Total		206,286,953	0.8%
Fuel Distribution	Gas Service Stations-Stage 1	46,918,959	0.2%
	Aviation Gasoline Distribution: Stage I	23,154,943	0.094%
	Gas Service Stations-Stage 1: Balanced Submerged F	7,639,778	0.031%
	Gas Service Stations-Stage 2	3,917,215	0.016%
	Gas (Bulk Stations/Terminals: Breathing Loss)	3,061,394	0.012%
	Aviation Gasoline Distribution: Stage II	1,601,789	0.006%
	Oil Terminal	409,054	0.002%
	<i>Natural Gas: Withdrawal Loss-Fuel Storage - Pressure</i>	35,232	0.000%
Fuel Distribution Total		86,738,364	0.4%
Waste Handling	Sewage Treatment-Entire Plant	24,965,422	0.1%
	Large Municipal Waste Incinerator	13,901,611	0.056%
	Human Cremation	6,792,422	0.027%
	Backyard Burning - Household Waste	2,492,880	0.010%

<i>Source Type Category</i>	<i>Pollutant-Category</i>	<i>Toxicity-Weighted Emissions (Unitless)</i>	<i>% of Toxicity Weighted Inventory</i>
	All Catastrophic/Accidental Releases	2,260,642	0.009%
	Landfill	612,073	0.002%
	<i>Animal Cremation</i>	<i>182,725</i>	<i>0.001%</i>
Waste Handling Total		51,207,775	0.2%
Surface Coating	Industrial Maintenance Coatings	25,135,142	0.1%
	Architectural Coatings	11,283,783	0.046%
	All Coatings and Related Products	3,428,967	0.014%
	<i>Surface Coating-NEC</i>	<i>2,815</i>	<i>0.000%</i>
Surface Coating Total		39,850,707	0.2%
Grand Total		24,743,465,347	100%

Appendix 2: Ranking of Air Toxic's based solely on Toxicity-Weighted Emissions

Toxicity-Weighted Rank	Pollutant-Category	Toxicity-Weighted Emissions (unitless)	% of Total Tox -Weight
1	Acrolein	16,361,357,067	66%
2	POM	1,614,157,699	7%
3	Manganese	1,168,475,039	5%
4	Formaldehyde	986,993,386	4%
5	Nickel	956,885,478	4%
6	1,3-Butadiene	760,650,004	3%
7	Diesel PM	692,367,120	3%
8	2,4-Toluene Diisocyanate	552,769,351	2%
9	Sulfuric Acid	315,805,000	1%
10	Benzene	174,286,869	0.7%
11	Acetaldehyde	132,014,898	0.5%
12	Lead	124,323,868	0.5%
13	Cadmium	110,647,841	0.4%
14	Methyl Bromide	100,173,587	0.4%
15	Chlorine	90,942,800	0.4%
16	Hydrochloric Acid	89,637,039	0.4%
17	Chlorine Dioxide	80,424,000	0.3%
18	Toluene	58,657,863	0.2%
19	Dioxins	54,531,144	0.2%
20	Chromium	41,391,854	0.2%
21	Cyanide & Compounds	36,710,735	0.1%
22	Arsenic	32,780,141	0.1%
23	Glycol Ethers	26,018,401	0.1%
24	Hydrogen Fluoride	22,240,551	0.09%
25	Ammonia	18,902,531	0.08%
26	1,3-Dichloropropene	18,043,801	0.07%
27	Hexane	16,894,581	0.07%
28	Xylenes (Mixture of o, m, and p Isomers)	16,780,316	0.07%
29	Chloroform	14,182,195	0.06%
30	Selenium	10,643,039	0.04%
31	Tetrachloroethylene	10,589,465	0.04%
32	Cobalt	6,628,084	0.03%
33	Beryllium	4,471,590	0.02%
34	4,4'-Methylenediphenyl Diisocyanate	3,831,399	0.02%
35	Ethylene Glycol	3,740,673	0.02%
36	Hydrogen Sulfide	3,379,310	0.01%
37	Ethyl Benzene	2,843,039	0.01%
38	Methyl Ethyl Ketone	2,687,438	0.01%
39	2,2,4-Trimethylpentane	2,523,168	0.01%
40	Mercury	2,519,927	0.01%
41	Methyl Isobutyl Ketone	2,431,850	0.01%
42	Methylene Chloride	2,038,792	0.01%
43	Trichloroethylene	1,622,606	0.01%

Toxicity-Weighted Rank	Pollutant-Category	Toxicity-Weighted Emissions (unitless)	% of Total Tox -Weight
44	Propionaldehyde	1,510,355	0.01%
45	Methyl Tert-Butyl Ether	1,455,147	0.01%
46	Methanol	1,327,959	0.01%
47	Butyl Cellosolve	1,280,759	0.01%
48	Methyl Chloroform	940,823	0.004%
49	Styrene	818,361	0.003%
50	N,N-Dimethylformamide	806,865	0.003%
51	Phenol	779,124	0.003%
52	1,4-Dichlorobenzene	776,278	0.003%
53	Acrylonitrile	566,840	0.002%
54	Propylene Oxide	393,244	0.002%
55	Maleic Anhydride	380,568	0.002%
56	Acrylic Acid	358,093	0.001%
57	Methyl Chloride	321,554	0.001%
58	1,2,4-Trichlorobenzene	317,414	0.001%
59	Triethylamine	273,305	0.001%
60	Cumene	249,529	0.001%
61	Barium	206,475	0.001%
62	Biphenyl	195,255	0.001%
63	Chlorobenzene	162,117	0.001%
64	Antimony	154,240	0.001%
65	Cresol	137,219	0.001%
66	Carbon Tetrachloride	103,334	0.0004%
67	Ethylene Oxide	85,528	0.0003%
68	Aniline	80,333	0.0003%
69	Ethylene Dichloride	75,688	0.0003%
70	2-Nitropropane	69,551	0.0003%
71	1,2,4-Trimethylbenzene	52,000	0.0002%
72	Chloroprene	47,564	0.0002%
73	N,N-Dimethylaniline	46,636	0.0002%
74	Chloromethyl Methyl Ether	43,026	0.0002%
75	Methyl Methacrylate	37,931	0.0002%
76	Phosphorus & Compounds	37,056	0.0001%
77	Cellosolve Solvent	29,600	0.0001%
78	Allyl Chloride	24,755	0.0001%
79	Catechol	21,667	0.0001%
80	Carbon Disulfide	20,808	0.0001%
81	2,4,6-Trichlorophenol	20,680	0.0001%
82	Diethanolamine	19,828	0.0001%
83	2,4-Dinitrotoluene	19,160	0.0001%
84	Vinylidene Chloride	16,601	0.0001%
85	Propylene Dichloride	16,404	0.0001%
86	Carbonyl Sulfide	15,912	0.0001%
87	Phosphorus	13,574	0.0001%
88	PCBs	13,350	0.0001%
89	Epichlorohydrin	12,309	0.0000%

Toxicity-Weighted Rank	Pollutant-Category	Toxicity-Weighted Emissions (unitless)	% of Total Tox -Weight
90	Vinyl Chloride	10,308	0.0000%
91	Cellosolve Acetate	10,246	0.0000%
92	Ethylene Dibromide	9,314	0.0000%
93	1,1,2,2-Tetrachloroethane	9,255	0.0000%
94	Vinyl Acetate	8,488	0.0000%
95	ZINC	8,467	0.0000%
96	Hydrazine	7,895	0.0000%
97	Acetonitrile	6,266	0.0000%
98	Isophorone	5,799	0.0000%
99	Nitrobenzene	5,623	0.0000%
100	Bis(2-Ethylhexyl)Phthalate	5,580	0.0000%
101	Bis(Chloromethyl)Ether	4,811	0.0000%
102	Hexachlorocyclopentadiene	4,738	0.0000%
103	Acrylamide	4,461	0.0000%
104	Dibutyl Phthalate	3,539	0.0000%
105	Quinoline	3,230	0.0000%
106	Ethyl Acrylate	3,204	0.0000%
107	Titanium Tetrachloride	3,145	0.0000%
108	Acetophenone	2,759	0.0000%
109	Ethyl Chloride	2,172	0.0000%
110	Benzyl Chloride	1,886	0.0000%
111	o-Anisidine	1,842	0.0000%
112	Benzotrichloride	1,775	0.0000%
113	p-Dioxane	1,654	0.0000%
114	1,2-Propylenimine	1,398	0.0000%
115	Dimethyl Sulfate	1,226	0.0000%
116	Ethylidene Dichloride	1,009	0.0000%
117	Xylene	942	0.0000%
118	Phthalic Anhydride	818	0.0000%
119	Quinone	637	0.0000%
120	o-Toluidine	523	0.0000%
121	Methyl Isocyanate	513	0.0000%
122	Methyl Iodide	435	0.0000%
123	Hexachlorobenzene	239	0.0000%
124	4,4'-Methylenedianiline	221	0.0000%
125	Diethyl Sulfate	160	0.0000%
126	Phosgene	127	0.0000%
127	1,1,2-Trichloroethane	41	0.0000%
128	Hydroquinone	40	0.0000%
129	Pentachlorophenol	39	0.0000%
130	Dichloroethyl Ether	24	0.0000%
131	Chloroacetic Acid	23	0.0000%
132	Vinyl Bromide	22	0.0000%
133	Acetamide	21	0.0000%
134	Dichlorvos	19	0.0000%
135	1,1-Dimethyl Hydrazine	18	0.0000%

Toxicity-Weighted Rank	Pollutant-Category	Toxicity-Weighted Emissions (unitless)	% of Total Tox -Weight
136	Hexachlorobutadiene	7	0.0000%
137	4,6-Dinitro-o-Cresol	6	0.0000%
138	Dibenzofuran	6	0.0000%
139	4-Nitrophenol	4	0.0000%
140	Heptachlor	3	0.0000%
141	Pentachloronitrobenzene	3	0.0000%
142	Chlordane	2	0.0000%
143	Methylhydrazine	1	0.0000%
144	Captan	0.4	0.0000%
145	3,3'-Dichlorobenzidene	0.3	0.0000%
146	2,4-Dichlorophenoxy Acetic Acid	0.3	0.0000%
147	p-Phenylenediamine	0.2	0.0000%
148	Carbaryl	0.1	0.0000%
149	2,4-Dinitrophenol	0.01	0.0000%
150	Dimethyl Phthalate	0.003	0.0000%
151	Trifluralin	0.003	0.0000%
152	Hexachloroethane	0.001	0.0000%
153	Styrene Oxide	0.0001	0.0000%
	Grand Total	24,743,465,347	100%

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