2006
Status Report
Maine Air Toxics Initiative

Prepared for: The Joint Standing Committee on Natural Resources

Prepared by: The Maine Department of Environmental Protection
Bureau of Air Quality
17 State House Station
Augusta, ME 04333-0017
(207) 287-2437

Revisions of March 20, 2006

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1. PURPOSE

The Maine Department of Environmental Protection (MEDEP) prepared this report for the Joint Standing Committee on Natural Resources pursuant to PL Ch 84, *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 ("the Resolve"). A copy of this Resolve is included as Appendix 1. The Resolve directed the MEDEP to:

- Provide emissions data to the Maine Air Toxics Advisory Committee (ATAC), including emissions from Waste-to-Energy Facilities;
- Form a subcommittee of the ATAC to consider the emissions from Waste-to-Energy Facilities;
- Provide this report "...on the recommendations made by the Air Toxics Advisory Committee regarding toxic air emissions and the Department of Environmental Protection's next steps planned to address toxic air emissions."

2. THE MAINE AIR TOXICS INITIATIVE (MATI)

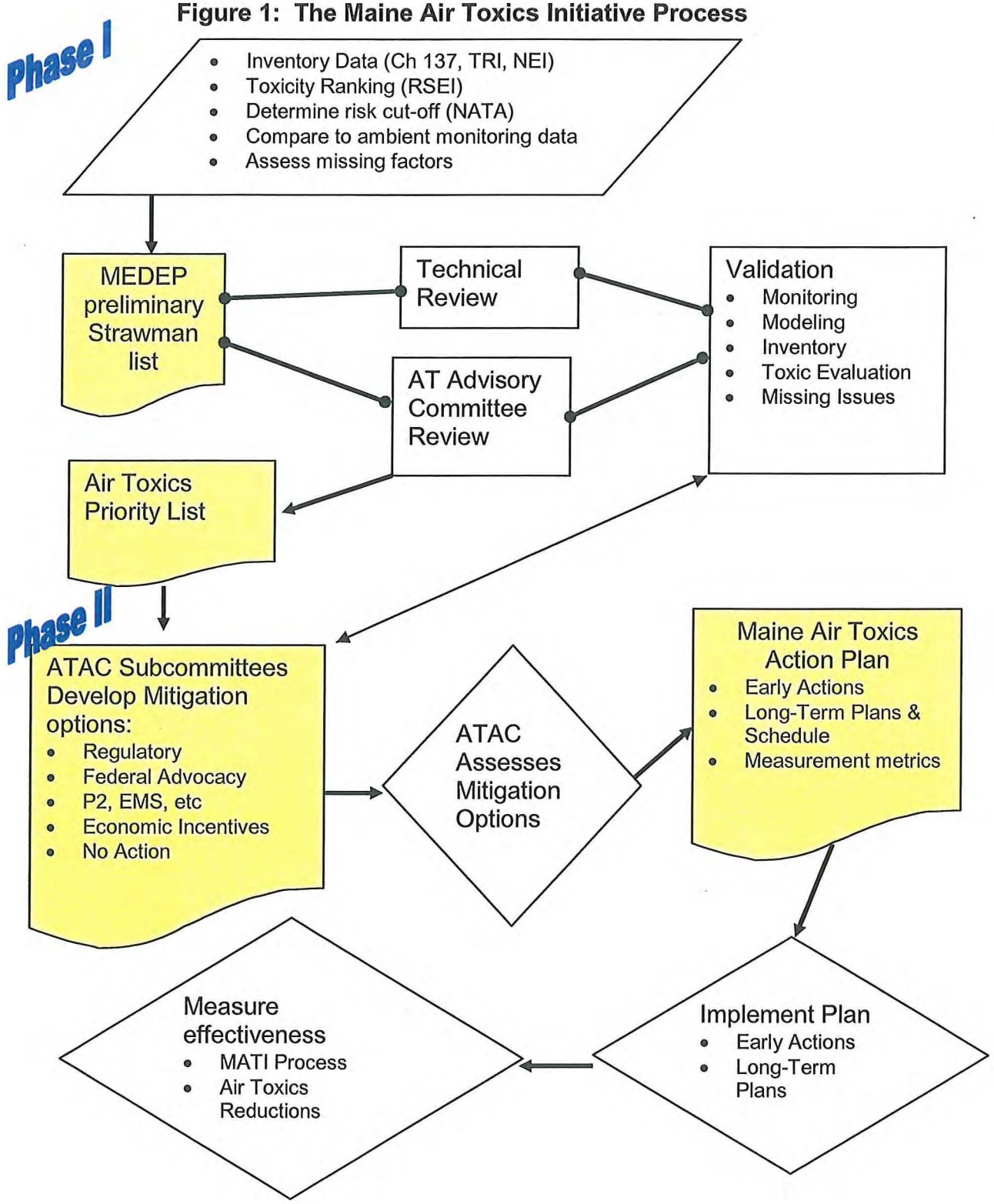
2.1 Initiation of the MATI Process

Various federal programs have significantly reduced the exposure of Maine people to air toxics. However, two National Air Toxics Assessments (NATA), conducted by the U.S. Environmental Protection Agency (EPA) using 1996 and 1999 emissions data, suggested that some Maine citizens face unacceptable exposure to air toxics (see Appendix 2.)

In response to this potential risk, the Maine Department of Environmental Protection undertook the Maine Air Toxics Initiative (MATI). MATI is a facilitated stakeholder process aimed at verifying whether or not the NATA results seem reasonable, and if so, identification of which air toxics are the most responsible for creating health risks, the source of those pollutants, and creation of cost effective solutions to reduce the risk. This holistic assessment of air toxics risks will enable Maine to target available resources for maximum risk reduction. The ultimate goal of this project is to reduce exposure of all Maine citizens to acceptable levels of air toxics.

A flowchart of the process being used in the Maine Air Toxics Initiative is shown in Figure 1.

Figure 1: The Maine Air Toxics Initiative Process



2.2 MATI Participants

In 2003, Maine DEP convened the Air Toxics Advisory Committee (ATAC). The ATAC is composed of community organizations, government organizations (local, state and federal), industrial organizations and environmental organizations having an interest in air toxics. Jonathan Reitman, an independent, outside facilitator is facilitating the project. EPA awarded Maine DEP with a Healthy Communities Grant to help fund the Maine Air Toxics Initiative.

2.3 MATI Results to date

The ATAC met on several occasions from 2003 to 2005 to conclude Phase I in the MATI process, which was to develop an Air Toxics Priority List for Maine. The Final Air Toxics Priority List was agreed to on November 18, 2005, and is shown in Table 1.

Table 1: Final Maine Air Toxics Priority List (2005)

	Pollutant Category
1	Acrolein
2	Polycyclic Organic Matter
3	Manganese
4	Formaldehyde
5	Nickel
6	1,3-Butadiene
7	Diesel Particulate Matter (PM)
8	2,4-Toluene Diisocyanate
9	Sulfuric Acid
10	Benzene
11	Lead
12	Cadmium
13	Dioxins
14	Chromium
15	Arsenic
16	Cyanide and Cyanide Compounds
17	Mercury
18	Brominated Flame Retardants
19	Particulate Matter from Nano-Technology
20	Acetaldehyde

	Pollutant Category
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

The priority list is based on the ATAC's evaluation of existing data from ambient air monitoring programs, emissions inventories, chemical toxicity databases, and national air modeling. A schematic of the process used to develop the list can be seen in Figure 2. A summary description of the Air Toxics Priority List (ATPL) development process can be found in the ATAC's Consensus Report[1] , while a detailed explanation is contained in the ATPL Background Documents[2], all of which can be found on the MATI website (http://www.maine.gov/dep/air/toxics/mati.htm).

In addition to adopting the air toxics priority list, the ATAC concluded that significant quantities of a wide range of air toxics are emitted by point, area and mobile sources in Maine, as shown in Figure 3 and Figure 4. The ATAC found that most of the current air toxic emissions stem from combustion rather than manufacturing processes. The ATAC also found that 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. The greatest uncertainty is related to the emission factors used for acrolein. Using alternative factors could reduce or increase the relative significance of acrolein; however, it would remain at or near the top of the priority list. Despite this uncertainty, the ATAC found it appropriate to move to Phase II of MATI: an evaluation of air toxic mitigation strategies, while continuing to verify and improve the emission estimates and other science behind the Air Toxics Priority List. With respect to emission estimates for WTE facilities, the MEDEP has higher confidence in the emission estimates used by ATAC than for many other source categories.

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[1] 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 (Air Toxics Program, Maine DEP, 17 SHS, Augusta, ME 04333-0017, or from http://www.maine.gov/dep/air/toxics/mati.htm)

[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)

Figure 2: Schematic of the process used to develop the Maine Air Toxics Priority List

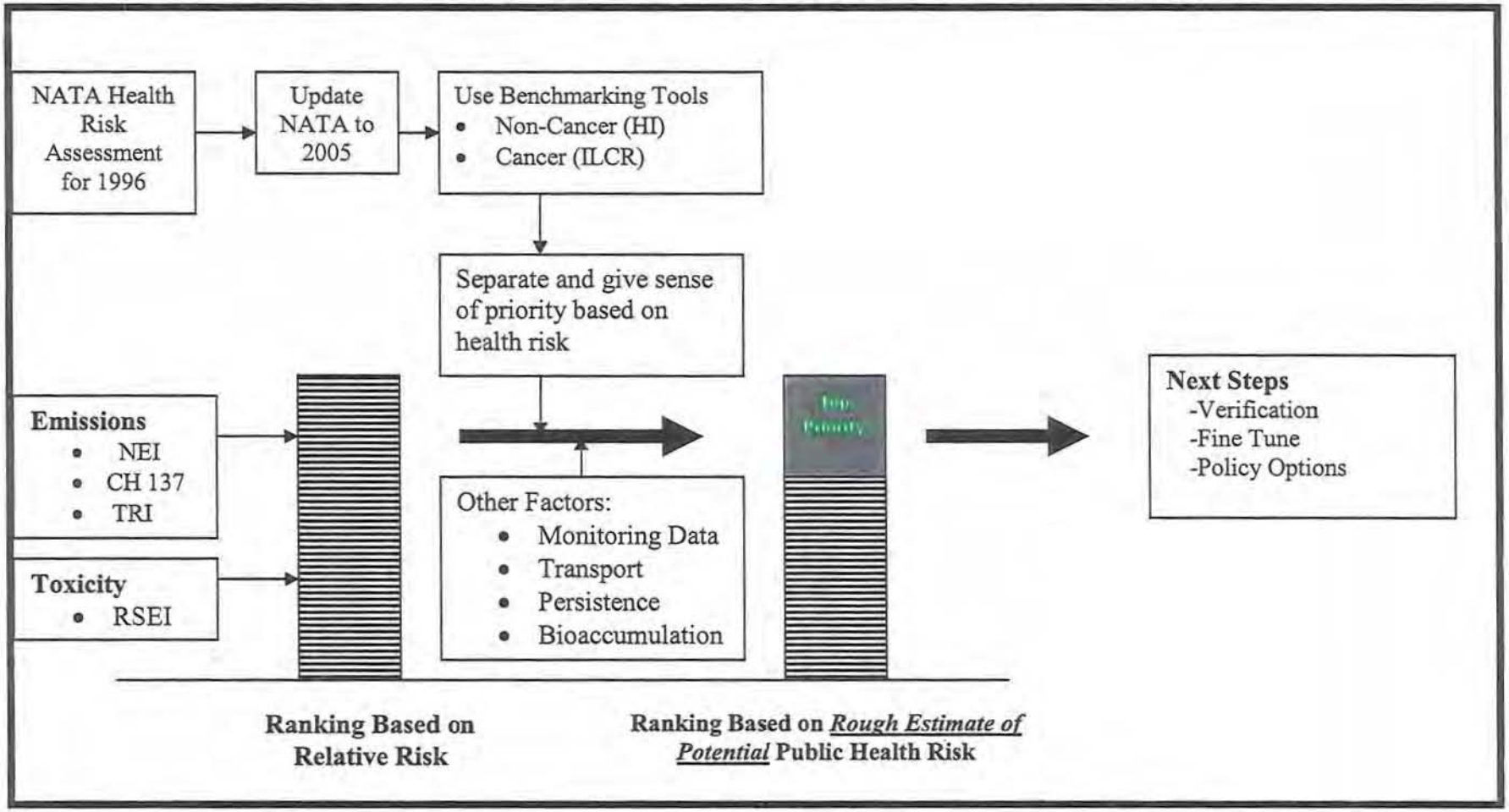


Figure 3: Pollutant Ranks (Based on 2005 Maine Estimated Toxicity-Weighted Emissions (unitless))

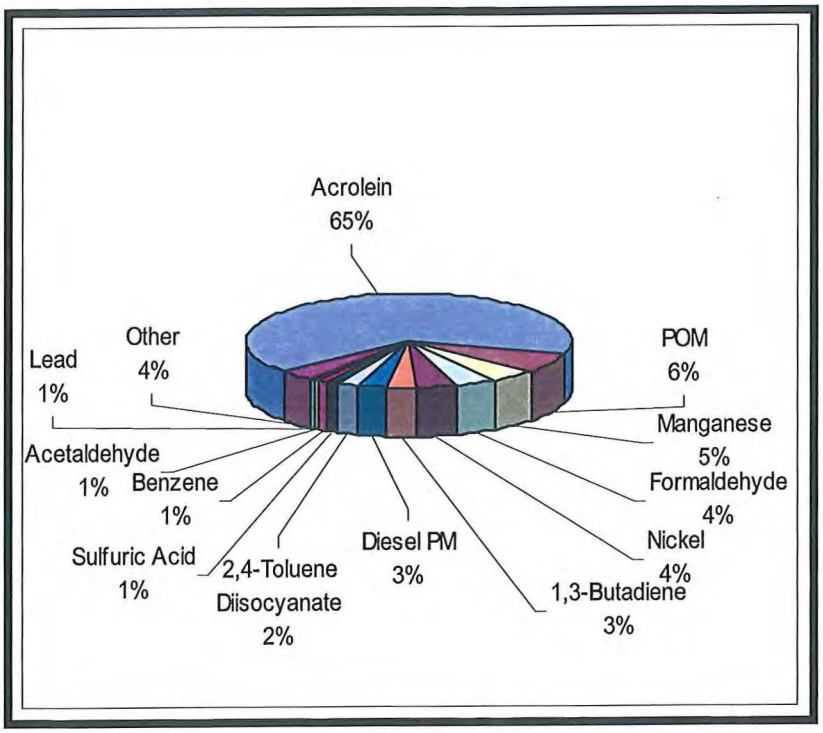
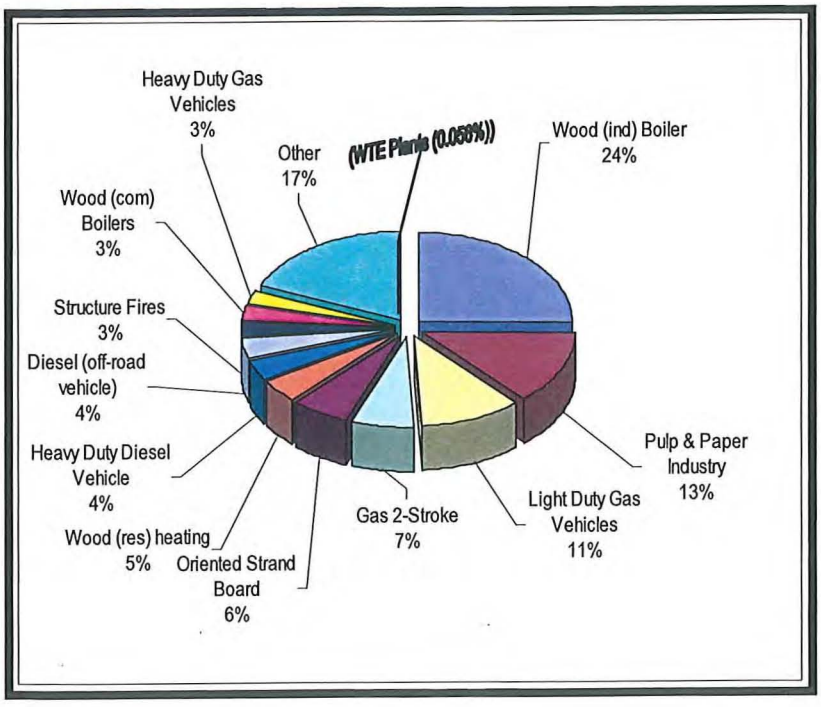


Figure 4: Major Sources of Emissions (Based on 2005 Maine Estimated Toxicity-Weighted Emissions (unitless))



What is Toxicity-Weighting?

In the toxicity-weighted emission approach, release mass is multiplied times a toxicity factor. This allows for an "apples to apples" comparison between emissions of pollutants that are highly toxic (e.g. Dioxins), and pollutants that are much less toxic (e.g. Toluene).

However, these toxicity-weighted emissions do not take into account the longevity of pollutants (persistence) or whether a pollutant is easily removed from the body (bioaccumulation).

Bioaccumulation and persistence were accounted for later in the Air Toxics ranking process. Likewise, while toxicity-weighting is a useful tool for comparing emissions, it does not provide a measurement of actual risk (see Figure 2).

2.4 Air Monitoring and Hot Spots

The ATAC also reviewed the available ambient air monitoring data in Maine as part of Phase I. The ATAC found that Maine's ambient air monitoring programs indicate that risks posed by air toxics are not widespread, but that localized areas warrant further consideration. That is, while the county-wide risk to the "typically" exposed person may be below Maine's Ambient Air Guideline (MAAG)[3] 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. The ATAC will assess and evaluate potential hot spots throughout the state in Phase II.

3. NEXT STEPS IN MATI

For phase II of the MATI, the ATAC established three (3) new subcommittees to verify the science behind the Air Toxics Priority List, and to develop appropriate air toxic reduction strategies. The strategies will include early actions and long-term plans targeted at pollutants creating the most risk. The strategies will have implementation goals and timeframes to 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 is a consensus recommendation from each subcommittee, or failing that, options for the ATAC to consider. The ATAC will then recommend to the MEDEP's Commissioner its recommendations for an Air Toxics Mitigation Strategy. Based on these recommendations, the Commissioner will then develop and implement a final Air Toxics Strategy for Maine.

At this time the subcommittees are focusing on no-cost, low cost, and co-benefit solutions that will reduce emissions from the highest risk categories. The subcommittees are scheduled to report back to the full ATAC with their progress in May of 2006.

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[3] MAAG values are set at Incremental Lifetime Cancer Risks of 1 in 100,000 and a Health Index of one. See: Maine Center for Disease Control's 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.

3.1 Stationary Sources Subcommittee

The Stationary Sources Subcommittee (S3) is exploring strategies to reduce air toxic impacts from stationary emission sources, both large and small. S3 will focus on ways to reduce the most risk for the least cost at facilities that emit air toxics from processes or as a by-product of combustion. The types of facilities that will be evaluated include electric generating units; co-generation facilities; waste-to-energy facilities; industrial, institutional, and commercial boilers; industrial and manufacturing processes; residential heating, household product use; etc.

S3 serves a dual role as the WTE evaluation subcommittee specified in the Resolve. The ATAC and MEDEP believe that it makes sense for S3 to evaluate WTE emissions, rather than a separate subcommittee, for many reasons. Combining subcommittees will eliminate redundant evaluations, bring a wider range of perspectives and experience to the review of WTE facilities, provide context to the WTE impacts, and through the stakeholder process, build support for recommended actions.

3.2 Mobile Sources Subcommittee

Similar to the S3 subcommittee, the Mobile Sources Subcommittee (MoSS) is exploring cost-effective air toxic reduction strategies, but for mobile sources. This subcommittee is considering air toxics reductions for both the on-road and non-road sector. Also, this subcommittee is evaluating how community development is handled in the state, its impact on transportation, and the resultant air toxics emissions.

3.3 Science Advisory Subcommittee

The Science Advisory Subcommittee (SAS) will assist other subcommittees with an evaluation of technical issues associated with air toxics reduction options. Additionally, during development of the Air Toxics Priority List, the ATAC identified more than a dozen scientific issues that need further evaluation and refinement by SAS. The specific tasks are listed in the Consensus Report, and include:

- **Inventory**: SAS will refine emission estimates, focusing on the areas of highest uncertainty. The subcommittee will make sure that inventory improvements identified in Phase I of the project are institutionalized at MEDEP. SAS will also help evaluate any localized inventory efforts that may be needed to assess hot-spot impacts. The lessons learned from this subcommittee's work will be transmitted by MEDEP to the federal EPA to aid in the national inventory improvement program.

- **Modeling:** SAS will review the 1999 NATA results and other modeling information, in order to find any localized regions of the state where air

toxics are of particular concern. SAS will also assess where further modeling should be undertaken.

- **Monitoring:** SAS will also perform a further assessment of existing ambient air monitoring data and make recommendations for changes to Maine's monitoring program, including the extent to which localized areas of high impact (hot spots) are adequately monitored.

3.4 Air Toxic Reduction Plan

The ATAC subcommittees are just beginning to evaluate appropriate mitigation options for air toxics. These recommendations will be forwarded to the Maine DEP after review and approval by the full Air Toxics Advisory Committee. The Commissioner will then develop and implement an air toxics plan. The subcommittees are scheduled to report on their progress to the full ATAC in mid-May.

4. AN ASSESSMENT OF WASTE-TO-ENERGY FACILITIES BY THE ATAC

4.1 Introduction

The resolve directing MEDEP to develop this report ("Resolve" – see Appendix 1) originally stemmed from questions that citizens had regarding the health impacts of emissions from waste-to energy (WTE) facilities. The Air Toxics Advisory Committee was already evaluating air toxic impacts from all of the sources in Maine including WTE facilities, so persons interested in the resolve were invited to join the ATAC. Below is a summary of how WTE facilities were addressed during phase I of the MATI process, and details for planned steps in phase II.

The Resolve directed the MEDEP to have an ATAC subcommittee consider the impact of air toxics "and other emissions" from waste-to-energy facilities. It should be noted that ATAC's Phase I work only involved assessment of air toxic impacts from sources. ATAC did not include a detailed review of criteria[4] pollutant emission data since ATAC's focus is on air toxics. The Stationary Sources Subcommittee, with the aid of the Science Advisory Subcommittee as needed, will expand upon the work conducted in Phase I. The Stationary Sources Subcommittee will conduct a review of WTE plants using the Phase I ATAC data and will expand the review to include criteria pollutants emissions from WTE facilities as directed by the Resolve. This review will also include evaluation of potential "hot spot", or localized impacts.

[4] Criteria Air Pollutants are compounds for which federal ambient air quality standards have been established. Most Air Bureau programs focus on the control of these 7 pollutants: carbon monoxide (CO), particulate matter (PM), sulfur dioxide (SO_2), nitrogen dioxide (NO_2), volatile organic compounds (VOC), ozone (O_3), and lead (Pb). Air toxics are all of the other chemicals that, in sufficient quantity, could pose health hazards to people breathing them.

4.2 Description of Waste-to-Energy Facilities in Maine

There are four waste-to-energy facilities in Maine (Table 2), which are all located in highest populated regions of the state. In 2003, these facilities incinerated some 500,000 tons of solid waste in the production of electricity, or about 25% of the solid waste generated in the state that year[5]. According to the State Planning Office[6], these facilities produced some 435,000 Mega-Watt hours of electricity, "enough to power over 72,000 households a year, or about 1 household in seven in Maine", saving about 30 million gallons of # 6 fuel oil.

Table 2: Waste-to-Energy Facilities in Maine

Facility Name	Location	Facility Capacity	Fuel Type	Pollution Control Equipment
Penobscot Energy Recovery Co	Orrington	720 tons / day	Refuse Derived Fuel	Spray Dryer Absorber, Fabric Filter
Maine Energy Recovery Company	Biddeford	672 tons / day	Refuse Derived Fuel	Multicyclone, Spray Dryer Absorber, Fabric Filter
Regional Waste Systems, Inc	Portland	550 tons / day	Municipal solid waste	Multi-Clone, Spray Dryer Absorber, Electro-Static Precipitator, Selective Non-Catalytic Reduction, Carbon Injection
Mid-Maine Waste Action Corporation	Auburn	210 tons / day	Municipal solid waste	Spray Dryer Absorber, Carbon Injection, Fabric Filter

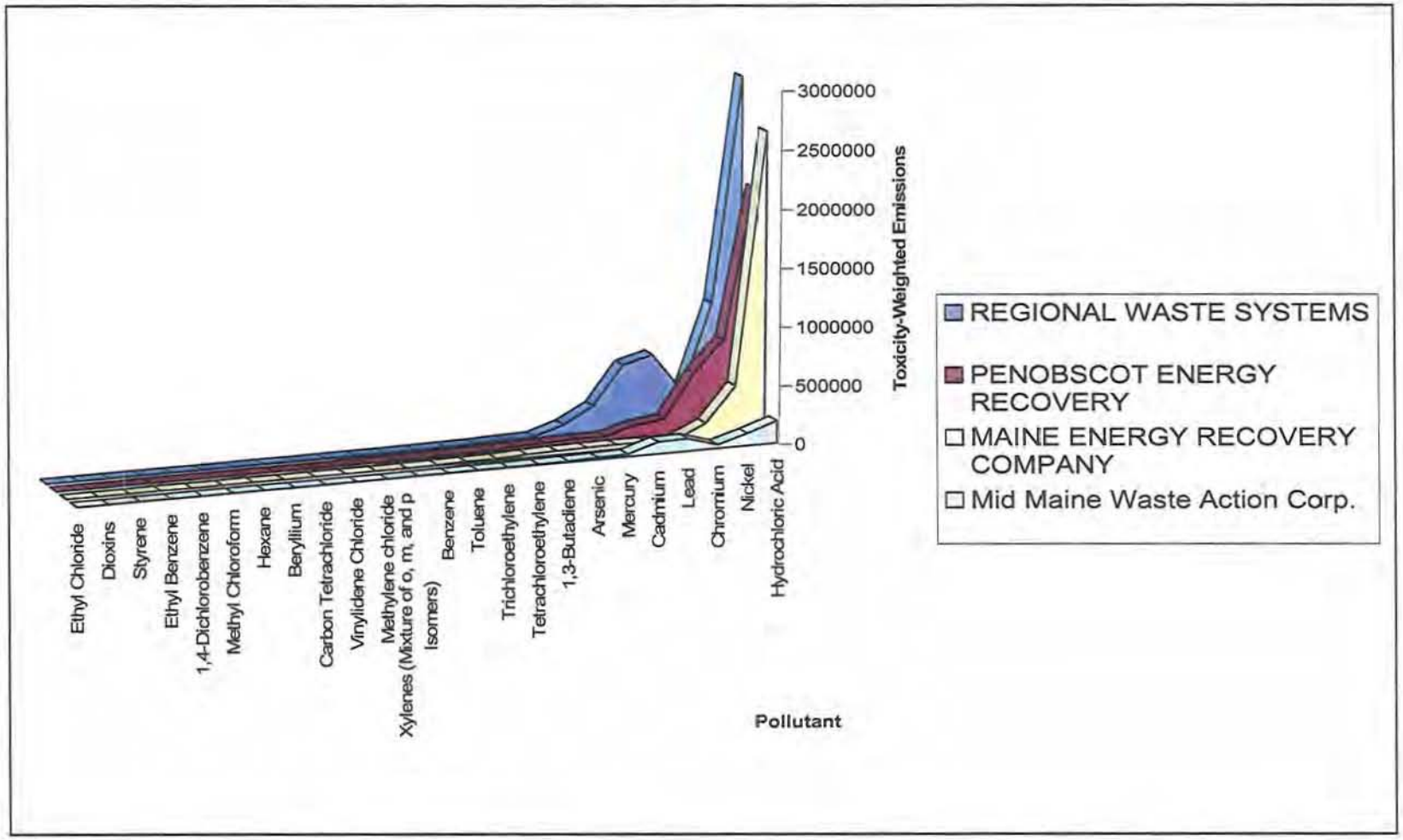
4.3 Regulation of WTE Facilities in Maine

All Maine's MWCs are subject to the federal standards of performance under 40 CFR Part 60 Subpart Cb (large facilities) and Subpart AAAA (small facilities). These standards include emission limits, operating standards, and monitoring and reporting requirements to ensure that public health is protected. Air emission licenses issued under these rules by MEDEP specify requirements for periodic stack testing and Continuous

[5] In 2003, about 160,000 tons of Maine's MSW were exported for disposal, 450,000 tons of MSW were imported, and 720,000 tons of MSW were recycled. Some 855,000 tons of solid waste were delivered to Waste-to-Energy facilities, while 355,000 tons of Front End Process Residue, Ash and By-Pass required landfilling. Solid Waste Management Statistics are from: Maine State Planning Office, Overview Fact-sheet of Municipal Solid Waste Management in Maine (Executive Office, State Planning Office, Waste Management & Recycling Program, 38 State House Station, 184 State Street, Augusta, Maine 04333-0038; (207) 287- 8934; http://mainegov-images.informe.org/spo/recycle/policy/MemoOnCurrentSWIssues.pdf). September 15, 2005.

[6] State Planning Office, 2003 Solid Waste Generation and Disposal Capacity Report to the Joint Standing Committee on Natural Resources of the 122nd Legislature (Executive Office, State Planning Office, Waste Management & Recycling Program, 38 State House Station, 184 State Street, Augusta, Maine 04333-0038; (207) 287- 8934; http://mainegov-images.informe.org/spo/recycle/docs/2003gencapreport.pdf). December 2004

Figure 5: 2005 Estimated Toxicity-Weighted Emissions from Maine's four Waste-To-Energy Facilities, by facility and pollutant



Emissions Monitoring Systems (CEMS). EPA published proposed revisions to the MWC standards and requirements in the Federal register on December 19, 2005, which may require further emission controls in the future.

4.4 Emissions from WTE Facilities

4.4.1 Air Toxics

As part of the MATI process, combustion and fugitive emissions of Air Toxics from Waste to Energy facilities were considered by the ATAC when developing the Air Toxics Priority List. Figure 5 shows the toxicity-weighted emissions of each of the 4 WTE facilities, and which air toxics contribute most to the toxicity-weighted emissions. Figure 6 shows the relative contribution of these four WTE facilities to the estimated statewide toxicity-weighted emissions from all emission sources. On a statewide basis, the toxicity-weighted emissions from WTE facilities comprised approximately 0.056% of toxicity weighted emissions. However, it is important to note that the MATI process has not evaluated hot-spot or localized impacts from emissions to date. A summary of air toxic emissions from WTE is available in Appendix 3, Appendix 4, and further details are available on the Stationary Sources Subcommittee's Working Documents section of the MATI website at: http://www.maine.gov/dep/air/toxics/mati-docs.htm.

4.4.2 Criteria Air Pollutants

Criteria Emission data will be reviewed by S3 during Phase II of MATI to see if criteria pollutant emissions exceed any applicable Ambient Air Quality Standards. For the three large MWCs, CEMs are used to monitor stack emissions of SO_2, NO_X and CO. Continuous Opacity Monitors (COMs) monitor opacity. This data is used as an indicator of ongoing HCl, dioxin, particulate and metals emissions. Annually, the CEMS data is verified by stack tests for dioxin/furan, particulate matter (PM), Cadmium (Cd), Lead (Pb), Mercury (Hg) and Hydrochloric acid (HCl). Arsenic (As), Beryllium (Be), Chromium (Cr) and Nickel (Ni) are tested every 3 years. MEDEP uses models to predict that emissions will not exceed Air Quality Standards or Ambient Air Guidelines. The results of this modeling, however, have not been routinely verified with actual air monitoring data.

4.5 WTE Monitoring Data

In evaluating potential impacts from WTE facilities, the Penobscot Energy Recovery Company (PERC) forwarded a report of an 18 month monitoring study completed in June of 1989, which looked at coarse Particulate

Matter (PM_{10}) and heavy metals in ambient air at an upwind and downwind location[7]. PERC concluded in this report that the PM_{10} concentrations at upwind sites were generally higher than the downwind locations, and that the highest observed PM_{10} and metal levels were correlated with long-range transport wind patterns. MEDEP reviewed the report, found that impacts were sufficiently below Ambient Air Quality Standards, and allowed PERC to phase out the monitoring program. This report and other available monitoring data will be reviewed by the Stationary Sources Subcommittee during Phase II of the monitoring program, as S3 evaluates the adequacy of existing monitoring programs for air toxics and criteria pollutants from WTE facilities.

4.6 Conclusion – WTE facilities and the MATI process

Due to public concern regarding potential impacts from air toxic emissions from WTE facilities, the legislature directed the MEDEP to provide emission data from WTE facilities to the ATAC with the intent of reviewing the impact of WTE facilities. Prior to the formation of a WTE subcommittee, ATAC performed a state and county-level review of air toxic emissions for all sources, including WTE facilities. This phase I data shows that WTE facilities comprise approximately 0.056% of the state-wide toxicity weighted emissions. The ATAC's Stationary Sources Subcommittee will expand upon the work conducted in Phase I to include criteria pollutant review and localized impact evaluations with regards to Maine's WTE facilities.

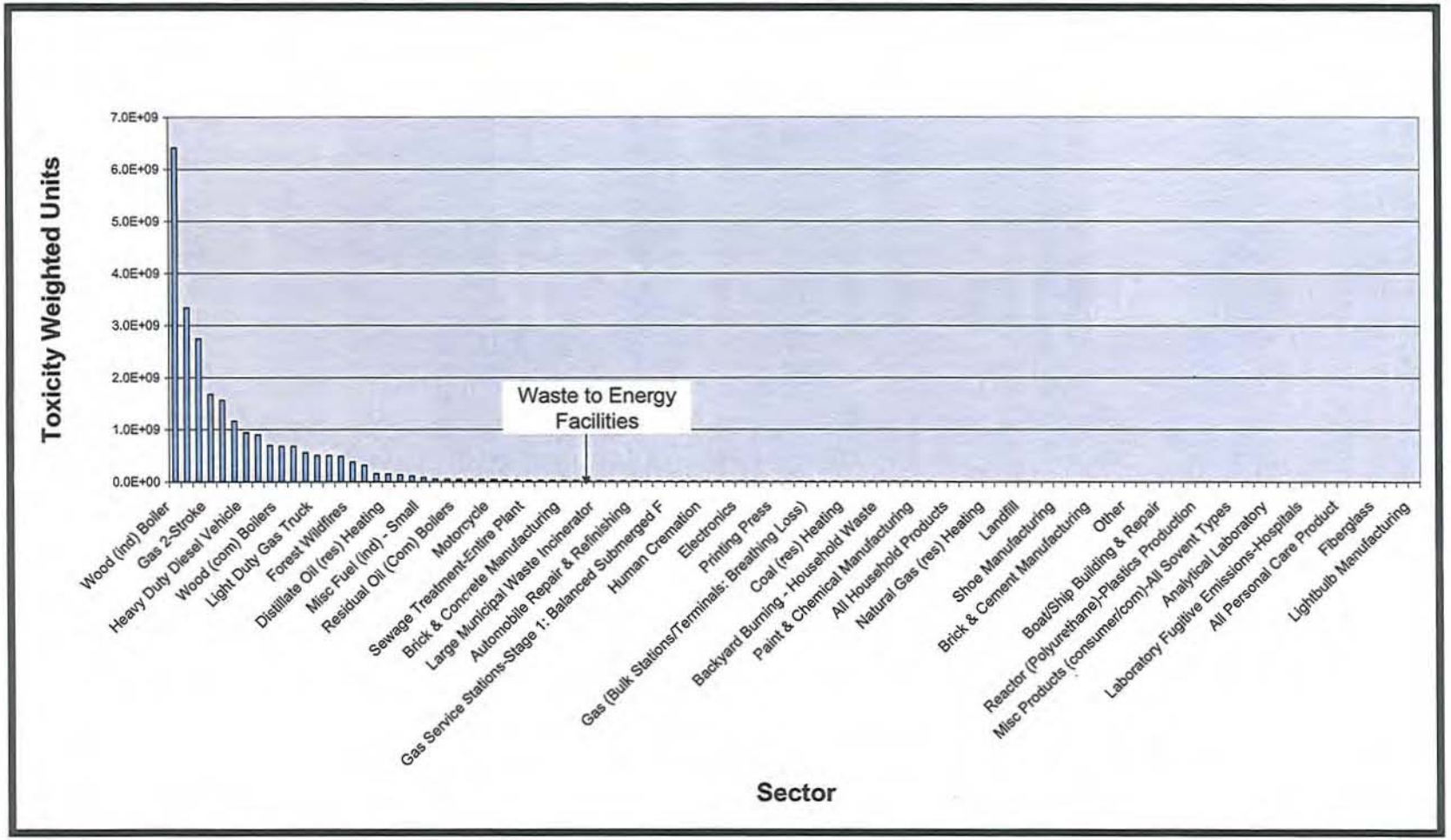
5. ADDITIONAL MATI INFORMATION

The work of the Maine Air Toxics Initiative is chronicled on the MATI website at http://www.maine.gov/dep/air/toxics/mati.htm. Readers are encouraged to visit the site to review the Consensus Report and Background Documents regarding the Air Toxics Priority List, and to view current working documents, MATI progress reports, meeting minutes, subcommittee reports, and other MATI information.

H:\AIR\Air Toxics\Maine Air Toxics Initiative\1Solutions Development\StationarySS\Leg Report\Leg_Report_MATI_MWC_v14.doc

[7] Chas. T. Maine, Inc. for Penobscot Energy Recovery Company, June 28, 1989, "Penobscot Energy Recovery Company (PERC) – Orrington-Hampden PM10 Monitoring Program Data Summary Report" (Bureau of Air Quality, Maine Department of Environmental Protection, 17 SHS, Augusta, ME 04333-0017)

Figure 6: Maine 2005 Total Statewide Toxicity-Weighted Inventory by Sector



Appendix 1: Text of Chapter 84, H.P. 972 – L.D. 1408

Approved by Governor: June 3, 2005

CHAPTER 84

H.P. 972 - L.D. 1408

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

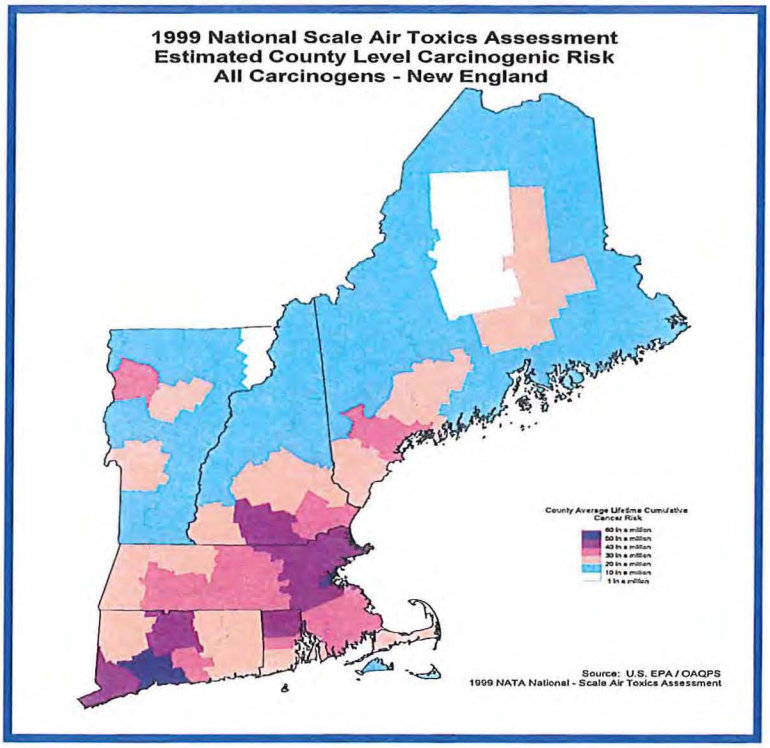
Sec. 1. Provide emissions data. Resolved: That the Department of Environmental Protection shall provide emissions data to the Air Toxics Advisory Committee that include information on emissions of hazardous air pollutants from Maine's 4 waste-to-energy facilities; and be it further

Sec. 2. Subcommittee formed. Resolved: That the Department of Environmental Protection shall form a subcommittee of the Air Toxics Advisory Committee to consider the toxic and other emissions from waste-to-energy facilities. The subcommittee must be composed of representatives of differing viewpoints on the State's policy regarding waste-to-energy facilities; and be it further

Sec. 3. Funding. Resolved: That the Department of Environmental Protection may also receive funds from other sources to assist in funding the costs of the subcommittee; and be it further

Sec. 4. Reporting date established. Resolved: That the Commissioner of Environmental Protection shall report to the Joint Standing Committee on Natural Resources by February 15, 2006 on the recommendations made by the Air Toxics Advisory Committee regarding toxic air emissions and the Department of Environmental Protection's next steps planned to address toxic air emissions.

Appendix 2: New England Results from the 1999 National Air Toxic Assessment (NATA) prepared by USEPA Region



♦ This cancer risk map represents the summation of inhalation risks of carcinogens. It does not include all pollutants or exposure estimates from other pathways.

♦ EPA also assessed public health risks for other health effects, such as asthma, that may result from exposure to these hazardous air pollutants.

♦ New England continues to be a region impacted by air toxic emissions generated by mobile sources, local area sources, as well as industrial and natural sources.

♦ The NATA modeling of ambient air concentrations typically estimates lower concentrations than actual monitoring results.

Air Toxic Pollutants of Greatest Concern in New England

♦ State average risk values of eight chemicals exceed health benchmarks in every state in New England: acetaldehyde, acrolein, benzene, 1,3-butadiene, carbon tetrachloride, ethylene dibromide, bis 2-ethylhexylphthalate and 1,1,2,2-tetrachloroethane. Although there is no EPA established cancer health benchmark for diesel exhaust, people are also exposed to high concentrations of diesel emissions so it is also an air toxic of greatest concern.

♦ Mobile sources represent the major emission category for 5 of these air toxics: acetaldehyde, acrolein, benzene, 1,3-butadiene, and diesel particulate.

♦ Background sources, such as natural or historic sources, represent the major emission estimates for 4 air toxics: carbon tetrachloride, ethylene dibromide, bis 2-ethylhexylphthalate and 1,1,2,2-tetrachloroethane.

♦ There are other chemicals, such as perchloroethylene and naphthalene, for which average risk values exceed health benchmarks in at least one state in New England or at the county level. These pollutants may be more of a health concern at the local level rather than the regional level. Area source emissions (such as drycleaners and common household products, like mothballs) are the major contributors of the air toxics perchloroethylene and naphthalene.

New and Continuing Actions to Reduce Risks

EPA New England and the states are:

- implementing stationary source air toxic standards;
- improving monitoring and emission inventories;
- requiring cleaner gasoline and tightening tailpipe standards;
- assisting communities in comprehensive risk reduction projects;
- promoting funding opportunities for communities such as Community Action for a Renewed environment (CARE);
- expanding diesel reduction initiatives; and
- providing pollution prevention assistance to significant emitters.

More Information is available at: http://www.epa.gov/region1/eco/airtox/index.html

Appendix 3: Toxicity-Weighted (unitless) Air Toxic Emissions in 2005 (Estimated) from Maine's Four Waste-to-Energy Facilities

Pollutant-Category	REGIONAL WASTE SYSTEMS	PENOBSCOT ENERGY RECOVERY	MAINE ENERGY RECOVERY COMPANY	MID MAINE WASTE ACTION CORP.	Grand Total
Hydrochloric Acid	2,960,568	2,065,641	2,601,848	191,677	7,819,734
Nickel	1,038,960	781,776	450,720	106,560	2,378,016
Chromium	310,465	519,104	153,203	32,337	1,015,109
Lead	641,608	150,454	35,992	107,800	935,854
Cadmium	573,300	119,340	36,900	102,600	832,140
Mercury	246,000	44,124	39,000	21,180	350,304
Arsenic	106,640	49,011	37,200	17,360	210,211
1,3-Butadiene	26,460	35,960	32,000	9,900	104,320
Tetrachloroethylene	21,317	28,979	25,788	7,984	84,068
Trichloroethylene	10,624	14,442	12,852	3,979	41,897
Toluene	10,371	14,098	12,546	3,884	40,900
Benzene	5,601	7,614	6,776	2,098	22,089
Xylenes (Mixture of o, m, and p Isomers)	3,727	5,066	4,508	1,396	14,697
Methylene chloride	2,633	3,580	3,186	986	10,386
Vinylidene Chloride	2,053	2,791	2,484	769	8,098
Carbon Tetrachloride	1,910	2,596	2,310	715	7,531
Beryllium	3,570	1,904	--	1,020	6,494
Hexane	1,599	2,174	1,935	599	6,308
Methyl Chloroform	1,220	1,659	1,476	457	4,812
1,4-Dichlorobenzene	1,071	1,456	1,296	401	4,224
Ethyl Benzene	644	876	779	241	2,541
Styrene	475	646	575	178	1,874
Dioxins	0.3	0.1	2	0.4	3
Ethyl Chloride	1	1	1	0.2	2
Grand Total	5,970,818	3,853,294	3,463,377	614,122	13,901,611

Appendix 4: Pounds Air Toxic Emissions in 2005 (Estimated) from Maine's Four Waste-to-Energy Facilities

Pollutant-Category	REGIONAL WASTE SYSTEMS	PENOBSCOT ENERGY RECOVERY	MAINE ENERGY RECOVERY COMPANY	Mid Maine Waste Action Corp.	Grand Total
Hydrochloric Acid	32,895	22,952	28,909	2,130	86,886
Nickel	29	22	13	3	66
Chromium	19	32	9	2	62
Lead	73	17	4	12	106
Cadmium	6	1	0.4	1	9
Mercury	41	7	7	4	58
Arsenic	3	2	1	1	7
1,3-Butadiene	13	18	16	5	52
Tetrachloroethylene	508	690	614	190	2,002
Trichloroethylene	759	1,032	918	284	2,993
Toluene	2,305	3,133	2,788	863	9,089
Benzene	100	136	121	37	394
Xylenes (Mixture of o, m, and p Isomers)	1,433	1,949	1,734	537	5,653
Methylene chloride	775	1,053	937	290	3,055
Vinylidene Chloride	57	78	69	21	225
Carbon Tetrachloride	17	24	21	7	68
Beryllium	0.2	0.1	--	0.1	0.4
Hexane	178	242	215	67	701
Methyl Chloroform	678	921	820	254	2,673
1,4-Dichlorobenzene	136	184	164	51	535
Ethyl Benzene	358	487	433	134	1,412
Styrene	190	258	230	71	750
Dioxins	1.7E-08	4.8E-09	6.2E-08	1.8E-08	0.0000001
Ethyl Chloride	3	4	4	1.2	13