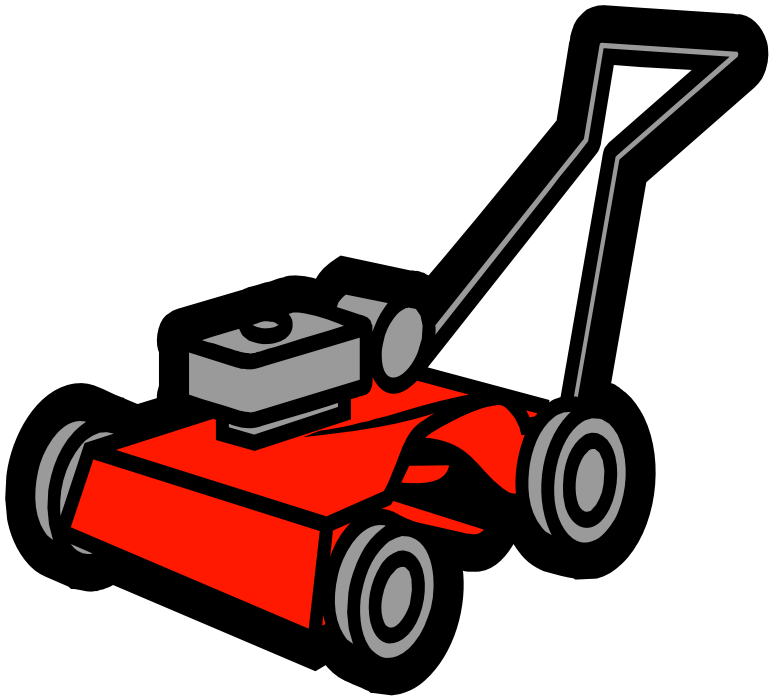
A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey



Prepared By
The Non-Automotive Gasoline Engines Workgroup

October 31, 2005

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Acronyms

APOA	Aircraft Owners and Pilots Association
CARB	California Air Resources Board
CNG	Compressed Natural Gas
CO	Carbon Monoxide
EJ	Environmental Justice
FAA	Federal Aviation Administration
LPG	Liquefied Petroleum Gas
MOU	Memorandum of Understanding
MTA/NJ	Marine Trade Association of New Jersey
NAAQS	National Ambient Air Quality Standards
NAES	Naval Air Engineering Station
NJDEP	New Jersey Department of Environmental Protection
NJDMAVA	New Jersey Department of Military and Veteran's Affairs
NJDOT	New Jersey Department of Transportation
NJMVC	New Jersey Motor Vehicle Commission
NJNLA	New Jersey Nursery & Landscape Association
NMMA	National Marine Manufacturers Association
NO_x	Oxides of Nitrogen
OPEI	Outdoor Power Equipment Institute
PM	Particulate Matter
$PM_{2.5}$	Particulate Matter less than 2.5 microns in aerodynamic diameter
PPD	Pounds per Day
PPY	Pounds per Year
RVP	Reid Vapor Pressure
SCC	Source Classification Code
SEP	Supplemental Environmental Projects
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
STPD	Summer Tons per Day
TPD	Tons per Day
TPY	Tons per Year
USEPA	United States Environmental Protection Agency
USG	Unhealthy for Sensitive Groups
VOC	Volatile Organic Compounds

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Executive Summary:

The Non-Automotive Gasoline Engines workgroup was charged with recommending potential ways to control and/or reduce VOC, NO_x and PM emissions from off-road "spark-ignited" engines. Spark-ignited engines are typically fueled by gasoline, liquefied petroleum gas (LPG) or compressed natural gas (CNG). Because the New Jersey Department of Environmental Protection (NJDEP) is preempted under federal law from requiring engine modifications, the recommendations of the workgroup were limited in scope. Also, the workgroup did not consider emissions from commercial marine vessels because the majority are powered by diesel engines.

The workgroup held a series of meetings and brainstorming sessions throughout the summer months of 2005 to generate and review strategies for further consideration by the NJDEP that may help control the emissions from these sources. Various ideas and strategies were contributed and reviewed by the members. This workgroup membership consisted of representatives from industry, environmental groups, the general public, other state agencies and the NJDEP. The ideas recommended by this group were afterwards grouped into five categories: accelerated equipment turnover programs, modification of activities/operations, educational programs, best management practices for fuel handling, and Other.

While the workgroup generally believes that most of these measures are viable and promising for reducing ambient ozone and fine particles, it most strongly recommends the development of educational programs. However, all measures were reviewed and ranked based on criteria such as environmental and social benefits, technical, economic and implementation feasibility, and others.

The most promising measures include:

1. **Accelerated equipment turnover programs**
- Voluntary boat engine replacement program
- Commercial landscape equipment replacement programs (Voluntary)
- Replacement of residential gas-powered chainsaws with newer technology ones (Voluntary)
- State agencies to purchase equipment that meet the cleanest emission standards (Mandatory)
- "Star" type recognition programs for landscaping operations using cleaner equipment and practices (Voluntary)

2. **Modification of activities/operations**
- Restricting government landscaping equipment activities on ozone and/or PM action days[1] (Mandatory)

[1] Days on which ozone and/or PM concentrations are forecast to reach the unhealthy for sensitive groups (USG) category.

- Restricting use of certain equipment (leaf blowers, trimmers, etc…) on ozone and/or PM action days (Mandatory)

3. Educational programs
- Public education on Best Management Practices to reduce emissions (Voluntary)
- Public education on alternative, low maintenance landscapes (Voluntary)
- Public education on reducing large lawn areas (Voluntary)

4. Best management practices for fuel handling
- Vapor recovery fueling compatibility for boats that are filled at automobile gas stations (Mandatory)
- Vapor recovery for refueling gasoline-powered aircraft (Mandatory)
- Proper fuel disposal after aircraft “pre-flight” checks (Mandatory)

5. Other
- Evaluate feasibility of low-emitting forklift program when finalized in California.

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I. Introduction:

New Jersey has seen a significant improvement in its air quality in the last 35 years. This improvement is attributed to federal and state laws and efforts from business and industry. The National Ambient Air Quality Standards (NAAQS) are designed to be protective of public health against the threats of identified air pollutants. While the state has met the health-based NAAQS standards for carbon monoxide, sulfur dioxide and lead and has made significant progress in cleaning up other air pollutants, ozone still continues to exceed health-based standards in the state. Also, New Jersey's ambient air does not meet the new federal standards for fine particles.

Based on the draft 2002 New Jersey Emission Inventory, Off-road spark-ignited engines emit about 201 tons per summer day VOC (15 percent of State), 232 tons per summer day NO_x (5.4 percent of State) and 2,150 ton per year $PM_{2.5}$ (7.4 percent of State) emissions. Statewide, the types of equipment that use these engines are among the top emitters for VOC and NO_x (precursors for ozone and $PM_{2.5}$), and direct $PM_{2.5}$. (Figures 1 - 3).

In order to address the health threats from ozone and fine particles, and to develop plans to attain new federal standards for these pollutants, the State of New Jersey has to identify and implement measures to control air pollution. These measures would be in addition to federal control measures.

NJDEP has worked together with the public, representatives from local businesses, industry, environmental groups and other state representatives to address the problems of air pollution. This collaborative effort commenced at a public workshop on Wednesday, June 29, 2005 at the Trenton War Memorial.

The Non-Automotive Gasoline Engine workgroup was among the six workgroups that were formed at the workshop to focus on the key sources of emissions resulting in non-attainment of federal air quality standards and to recommend promising potential control strategies that will be further evaluated to reduce these emissions. The goal of this workgroup is to recommend potential measures for NJDEP to further consider to control and/or reduce VOC, NO_x and PM emissions from off-road "spark-ignited" engines which include lawn care, watercraft, aircraft and ground support equipment, railroads, construction, and mining equipment. Spark-ignited engines are typically fueled by gasoline, liquefied petroleum gas (LPG) or compressed natural gas (CNG). NJDEP is precluded under federal law from requiring engine modifications, which limited the scope of the recommendations of this workgroup. Also, the workgroup did not consider emissions from commercial marine because the majority are powered by diesel engines.

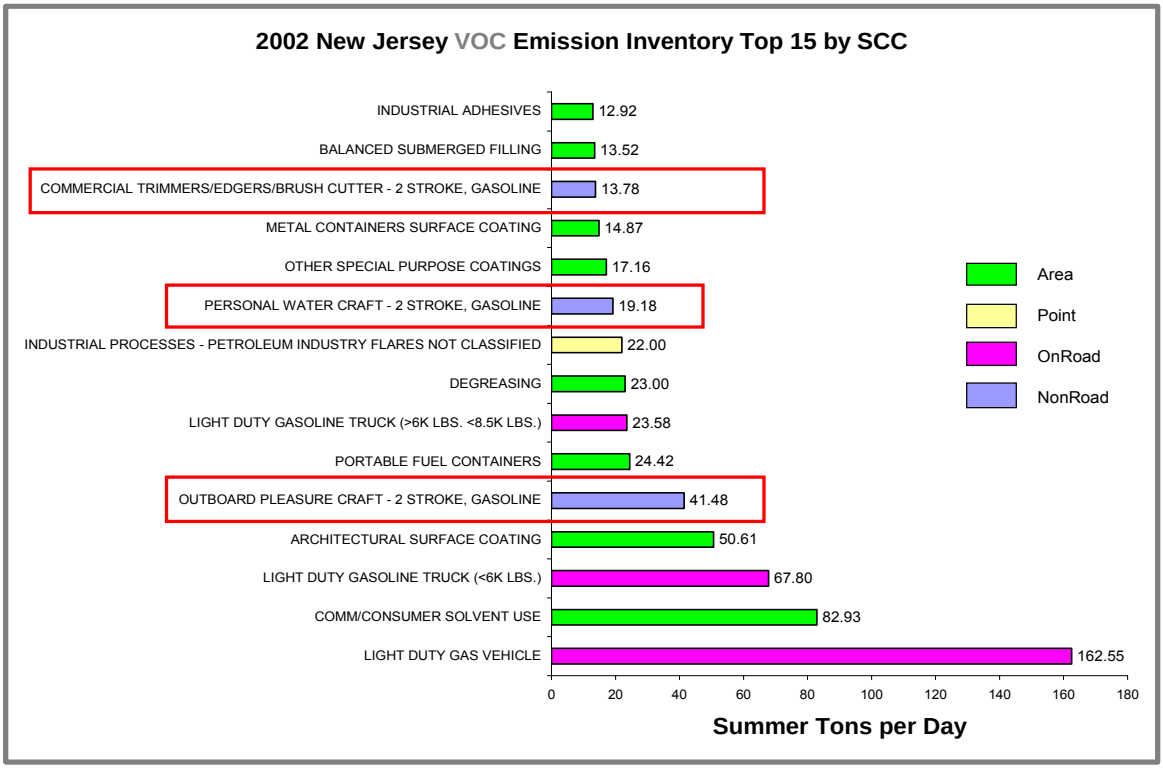


Figure 1: VOC Top Emitting Source Categories Covered by the Non-Automotive Gasoline Engines Workgroup

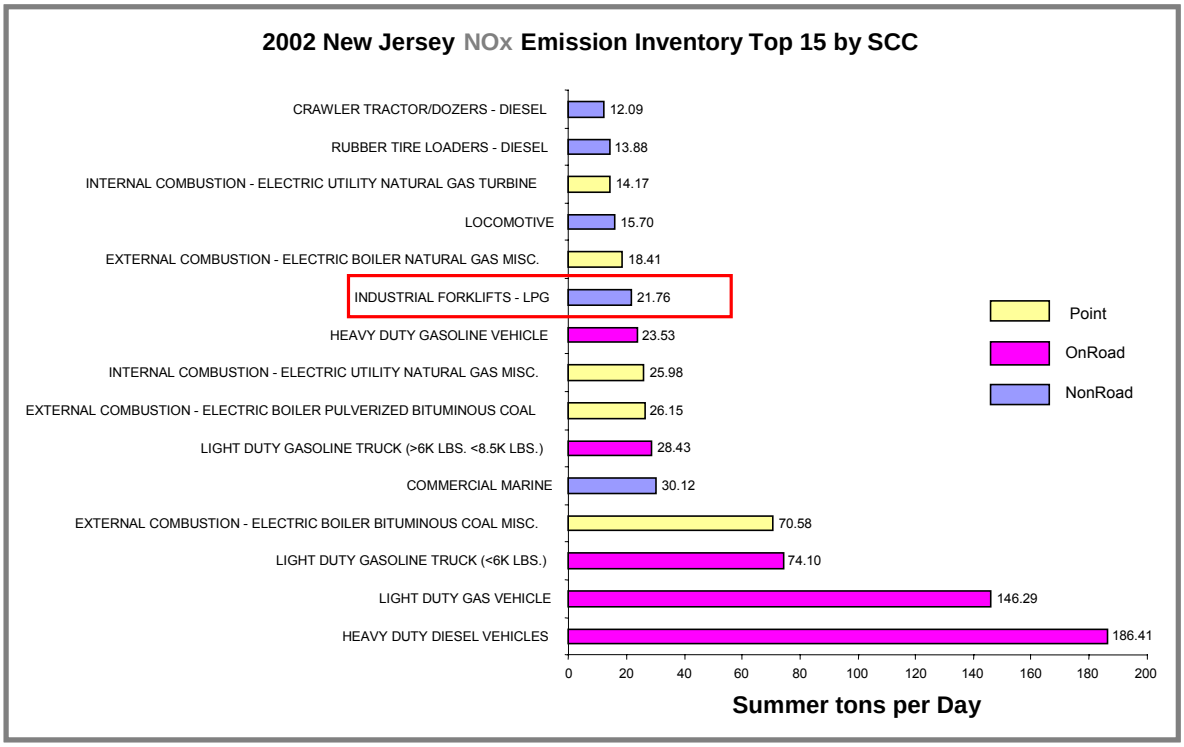


Figure 2: NO_x Top Emitting Source Categories Covered by the Non-Automotive Gasoline Engines Workgroup

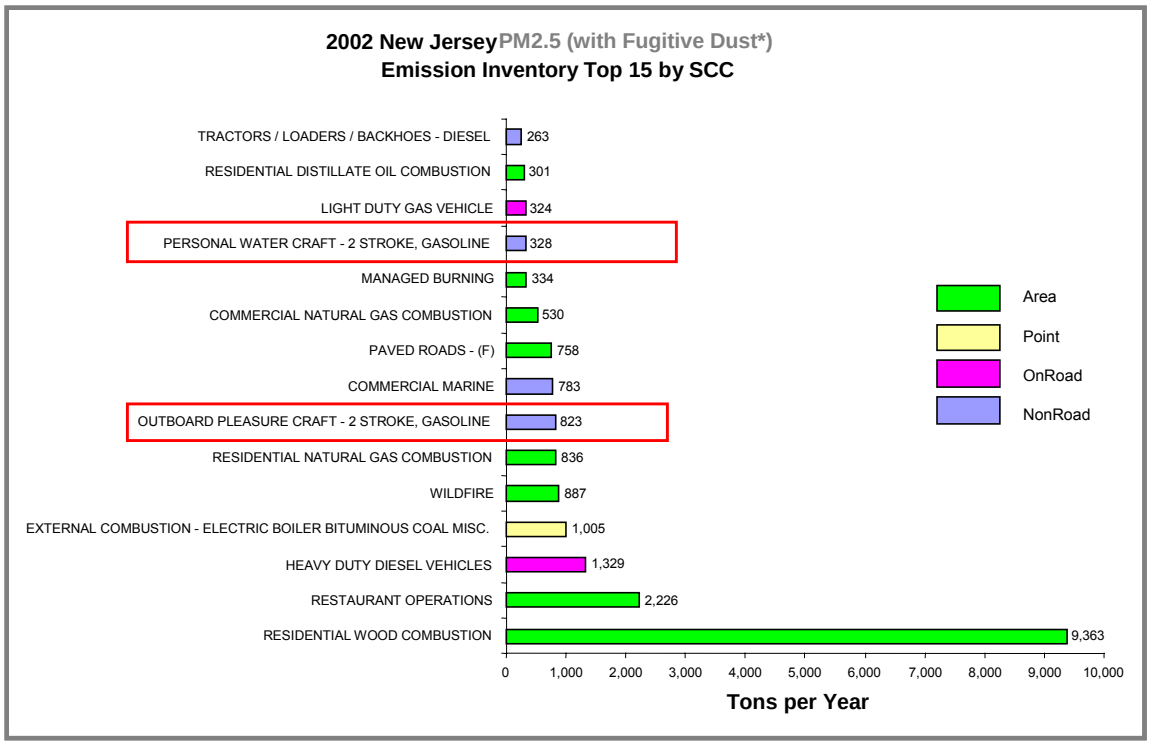


Figure 3: $PM_{2.5}$ Top Emitting Source Categories Covered by the Non-Automotive Gasoline Engines Workgroup

The workgroup characterized the positive and negative issues associated with each recommended measure. The proposed recommendations are the result of deliberations, ranking and voting amongst the workgroup participants. Accordingly, some recommended strategies received dissenting votes from participants. Workgroup participants were encouraged to submit "white papers" on specific measures to assist the NJDEP in its subsequent deliberations on measures to include in the SIP. Letters from the National Marine Manufacturers Association (NMMA) and the Marine Trades Association of New Jersey (MTA/NJ) and the New Jersey Department of Transportation (NJDOT) are included in Appendix D.

The activities of this workgroup are part of an early step in the development of the ozone and $PM_{2.5}$ SIPs for New Jersey. There will be additional processes to select and refine measures for inclusion in the SIP beyond this exercise. The NJDEP also believes that many workgroup members may be involved in future stakeholder processes.

II. Workgroup Prioritization of Measures for Further Consideration:

The workgroup's effort was focused on strategies that will reduce the emissions from off-road engines among the NJ 2002 inventory top emitting sources. Based on various criteria, including environmental and social benefits, technical,

economic and implementation feasibility, among other factors, the workgroup resolved that the following strategies are the most promising in order of priority.

High Priority

- Boat engine replacement program (Voluntary)
- Commercial landscape equipment replacement program (Voluntary)
- Replacement of residential gas-powered chainsaws with newer technology ones (Voluntary)
- State agencies to purchase equipment that meet the cleanest emission standards (Mandatory)
- "Star" type recognition programs for landscaping operations using cleaner equipment and practices (Voluntary)
- Restrict government landscaping equipment activities on ozone and/or PM action days (Mandatory)
- Restrict use of certain equipment (leaf blower, trimmers, etc…) on ozone and/or PM action days (Mandatory)
- Public education on best management practices to reduce emissions (Voluntary)
- Public education on alternative, low maintenance landscapes (Voluntary)
- Public education on reducing large lawn areas (Voluntary)
- Vapor recovery fueling compatibility for boats that are filled at automobile gas stations (Mandatory)
- Vapor recovery for refueling gasoline-powered aircraft (Mandatory)
- Proper fuel disposal after aircraft "pre-flight" checks (Mandatory)
- Evaluate feasibility of low-emitting forklift program when finalized in California

Medium Priority

- Residential buy back program for mowers (Voluntary)

Low Priority

- Reduce hours of operating lawn and garden equipment for commercial businesses on ozone and/or PM action days (Mandatory)
- Regulate portable fuel tanks for boats (< 7 gallons) (Mandatory)
- Use of low-emitting portable fuel containers (Mandatory)
- Golf courses golf cart electrification (Mandatory)

III. Structure of Workgroup:

The Non-Automotive Gasoline Engine workgroup was a relatively small group, obviating the need to form subgroups. The members consist of representatives from the regulated industry (marine and landscaping), an educational institution representative, and state representatives from the Motor Vehicle Commission, the Department of Transportation, the Department of Military and Veteran's

Affairs and the NJDEP. Tony Iavarone served as a substitute workgroup leader as needed.

IV. Summary of Meetings/Conference Calls/Data Reviewed:

The Non-Automotive Gasoline Engines Workgroup held a series of meetings throughout the summer of 2005 to brainstorm ideas that may help control New Jersey's air pollution issues. The meeting minutes from these meetings are attached in Appendix A. A brief summary of each of these meetings is as follows:

1. June 29, 2005

This was the inaugural meeting of the workgroup. Members of the workgroup were introduced and the working dynamics and goals of the workgroup were discussed.

2. July 19, 2005

The purpose of this meeting was to brainstorm control measure ideas to reduce VOC, NO_x, and PM emissions from recreational marine engines, lawn and garden equipment, and aircraft. The pros and cons associated with each strategy were also reviewed. The National Marine Manufacturers Association presented their efforts to date for controlling emissions from marine engines with the workgroup.

3. August 16, 2005

This meeting was held to review measures to reduce emissions from landscaping equipment and industrial forklifts.

4. September 13, 2005

This was the final meeting of the workgroup. Suggested measures were reviewed and ranked and a draft of the workgroup report was reviewed.

Data Reviewed

The workgroup reviewed the inventory data and developed estimated emissions benefits of utilizing equipment designed to meet the current and upcoming emissions standards. This allowed for easy comparison of equipment turnover programs. Data reviewed during these meetings are attached in Appendix B.

V. Initial Workgroup Control Measure Considerations:

A. How the workgroup focused its analysis

The workgroup's main focus was on measures that target the 2002 New Jersey Emission Inventory top emitting source categories. These source categories include recreational marine engines, lawn and garden equipment and industrial forklifts (See figures 1 – 3). Suggested measures that would impact each of these sources were reviewed such as equipment turnover programs, educational programs, and activity reductions on ozone and/or PM action days.

B. Discussion of the Control Measure Evaluation Process

All control strategies suggested by workgroup members were listed in a table. The following elements were considered in the discussion of each strategy:

- Environmental Benefits
- Technical Feasibility
- Economic Feasibility
- Implementation Feasibility
- Social Benefits/Environmental Justice (EJ)
- Enforceability

Pros and cons were listed for each measure based on the above criteria. The measures were then grouped into five main categories: Accelerated equipment turnover program, Modification of activities/operations, Educational programs, Best Management Practices on fuel handling and Other. Each workgroup member ranked each measure in order of priority with A = High priority, AB = Medium priority, B = Low Priority and No = Not suggested for further evaluation. The strategies were also ranked to determine if the measure should be voluntary or mandatory. Finally, the strategies were evaluated for short, medium and long-term benefit. All scores were averaged to represent the workgroup's recommendations.

C. All control measures evaluated based on Section V, B

A table containing all the measures evaluated by the workgroup is located in Appendix C.

VI. Detailed Review of Promising Control Measures

The following is a detailed review of control strategies that the Non-Automotive Gasoline Engines workgroup recommend to be the most promising for implementation to improve the air quality in New Jersey.

ACCELERATED EQUIPMENT TURNOVER PROGRAMS

1. Voluntary boat engine replacement program

This measure is for a voluntary program whereby older outboard boat engines and personal watercraft are retired and replaced with units that meet the 2006 model year USEPA or CARB emission standards. The NJDEP could partner with USEPA Region 2 to encourage the use of cleaner engines and by developing public education materials to raise public consciousness about the benefits of turning over their old boat engines. This program would need funding to provide incentives to boat owners to replace their engines.

A similar program exists in the New England Clean Marine Program. This program incorporates promoting the purchase of currently available marine engines that meet 2006 USEPA emissions standards. It is a collaborative effort between USEPA Region 1 and a broad base of marine retailers, manufacturers, trade associations and state and federal environmental associations. The program claims to have accomplished elevating sale of the cleaner engines to nearly eighty-percent of the market during the three years preceding June 2005.

This segment of non-automotive gasoline engines are estimated to emit nearly 41 summer tons per day (tpd) VOC and are believed to undergo heavy use on warm sunny days that are also associated with high ground level ozone formation. There are approximately 370,000 outboard engines and personal watercraft in the state. Many newer units already meet upcoming stringent CARB and EPA Tier 2 emissions standards as these types of units have been commercially available since model year 2000. They offer attractive benefits to the consumer which includes fuel economy, not requiring mixing of oil and gas, less noise, etc., and 75-90% lower VOC emissions. However, due to the high cost of new engines and the exceptional durability of in-use marine engines, boaters often choose to maintain existing equipment resulting in low equipment turnover and slow in-use phase-in of more stringent emissions standards. Assuming an average remaining useful life of ten years, it is estimated that the cost effectiveness based upon a cost subsidy of $25 per every one rated horsepower to retired an engine and replace it with a “new engine” would yield a VOC benefit of $4500 per ton.

2. Commercial landscape equipment replacement program

This voluntary measure targets high-use older landscaping equipment that does not meet the most stringent emissions standards by using incentive-based initiatives to accelerate retirement and replacement with equipment meeting the most stringent standards. Commercial landscaping, including golf courses are estimated to emit 68 summer tpd VOC, 10 summer tpd NO_x, 528 tpy $PM_{2.5}$ and 224,000 tpy CO. Smaller handheld equipment used in this industry, using mostly two-stroke engines, emits more than half of the daily VOC emissions while

mowers emit another ten percent. There are approximately 130,000 two-stroke engine-powered leaf blowers, string trimmers and chainsaws used in commercial operations in the state. The handheld equipment tends to have a relatively low-cost when new, as compared to commercial mowers that can easily cost thousands of dollars.

It is important to note that handheld equipment undergoing heavy use typically is expected to have a relatively short service life. Estimates using the USEPA NONROAD model show that the bulk of the statewide benefit of newer emissions standards effecting handheld commercial landscaping equipment will occur by 2008 due to normal equipment turnover, thereby eclipsing some benefit of a large scale accelerated replacement program. This does not reflect individual use patterns where significant gains may occur by targeting operations that make heavy use of older equipment. The NONROAD model does not distinguish differences between individual operations; thus the greater benefits are not apparent within this methodology.

Table 1: Comparative VOC emissions from commercial landscape equipment (NONROAD model)

Equipment	2002 VOC STPD	2008 VOC STPD	2008 All New VOC STPD	Additional Benefit STPD
Chain Saws	11.9	5.5	3.9	1.6
Leaf Blowers 2-stroke	12.7	4.4	4.4	0
Trimmers/Edgers 2-stroke	13.8	4.3	3.4	0.9

A hypothetical “typical landscape trailer” mobile lawn care contractor scenario that would utilize 2 mowers, 3 blowers and 3 trimmers that are typical technology during 2002, if exchanged completely under the principals of this recommendation, would result in a daily VOC benefit of 1.4 pounds per day (ppd).

3. Replacement of residential gas-powered chainsaws with newer technology ones

This measure targets replacing gasoline powered chainsaws with newer technology, either electric chainsaws or cleaner technology. The workgroup suggests that this measure be implemented through a voluntary coupon/scrap program. The emission benefits associated with the implementation of this measure are a reduction of VOC and CO. The 2002 Inventory shows that this equipment emits 913 tpy VOC and 1475 tpy CO. While it may not be practical for a large portion of residential use chain saws to be replaced with electric-powered units, each occurrence would be beneficial at 10 pounds per year (ppy) of VOC

and 16 ppy of CO. An additional benefit associated with this measure is noise reduction benefits.

Table 2: 2002 Annual savings levels from replacing gas-powered chainsaws with newer technology

VOC Pounds Per Unit	Tons Per Year Per 1000	CO Pounds Per Unit	Tons Per Year Per 1000
10	5	16	8

Although coupon/scrap programs have been successful, for example the Bay Area Air Quality Management District's Lawnmower Buy Back Program, this recommendation could be expensive. The potential implementation issues for the measure appear to be from advertising and scrappage costs. The success of the measure appears to be directly related to the amount of advertising that was done to promote the program. In addition, significant administrative oversight is required for implementation of the program. If this measure is implemented, there may be impacts to secondary markets due to the reduction of available equipment.

4. State agencies to purchase equipment that meet the cleanest emission standards

This recommended control measure would modify existing state purchasing contract language to ensure that equipment purchased using a State contract meet the lowest emissions standards available in the State. This recommendation would accelerate the introduction of lower emitting equipment into operations that purchase lawn and grounds maintenance equipment using the State contracting system. Such operations include, State government agencies and authorities. County and municipal government agencies often purchase through the existing State contracts.

Current State purchase contract language for lawn and ground maintenance equipment (T-0086) requires that the equipment specified in the bidder's proposal should be new and of the latest design and in current production. This measure would take the language a step further and require that lower emitting equipment should be supplied as it becomes available during the life of the contract. This language would be useful for three reasons:

1) The current language does not prohibit a vendor from supplying equipment that met emissions standards at the time of bidding but has become obsolete when the product line has become lower emitting during the life of the contract.
2) It is normal practice for the USEPA to phase–in emissions standards over a period of a few years by requiring a portion of the manufacturer's production to meet the new standards with increasing portion in each year until full compliance is achieved, and

3) USEPA is developing the next generation "Phase 3" emissions standards for small spark-ignited engines. Using the contract language strategy can help accelerate introduction of lower emitting equipment when this longer-term emissions reduction strategy takes effect during phase-in of cleaner emission standards.

Price increases in bidding proposals are not expected to be high as most of the equipment associated with this contract is either small handheld equipment or the engine and emission control cost is only a small fraction of the total cost of the equipment.

5. "Star" type recognition programs for landscaping operations using cleaner equipment and practices

Similar to the "Energy Star" labeling of appliances that meet energy consumption thresholds, this recommendation would give special recognition to landscaping operations that voluntarily use low emitting equipment, minimize engine use and engage in practices that align with the Department's goals. This information could be included in an attachment to customer contracts.
Examples would include:

- Using equipment that meets Phase 2 EPA emissions standards for small off-road spark-ignited engines. Equipment meeting Phase 3 standards could be required when available;
- Language in customer contract could specify committing to minimizing or eliminating use of trimmers and leaf blowers on ozone and/or PM action days and minimizing use on other days;
- Using non-powered or electrically operated equipment (cannot use generator);
- Single-pass turf mowing only (doesn't give that nice checker pattern, but cuts mowing emissions in half);
- Anti-idling clauses.

Additional benefits would include reducing entrained dust and pollen normally caused by turf maintenance. The volunteering contractor may experience an economic impact if equipment upgrades are necessary. Additionally, high ozone days would yield decreased emissions because of eliminating the use of trimmers and leaf blowers. Decreased use of this equipment is expected to have varying impacts on cost and labor, whereby it is envisioned that some contractors will offer options to continue activities on high ozone or particulate days by using manual or electric-powered equipment, while others may offer the option to discontinue on applicable days. These cost shifts would likely be passed on to the consumer. This type of program may become popular especially if it is developed in conjunction with recommendation numbers 9 (Public education on alternative, low maintenance landscapes) and 10 (Public education on reducing large lawn areas).

Estimated pollution benefits from using newer equipment are expected to be similar to those from the commercial replacement program discussed in recommendation 2, yielding a benefit of one to two pounds per day of VOC for a typical lawn care crew operation. More substantial benefit will occur from the use of electric or non-powered equipment.

Modification of Activities/ Operations

6. Restrict government landscaping equipment activities on ozone and/or PM action days

This measure targets emissions from landscaping equipment used by the public sector by prohibiting their use on days with ozone and/or PM action days. The best way to lead is by example. By implementing this measure, government agencies will be passing a worthy message to the general public as well as reducing VOC, NO_x and CO emissions. This measure should also apply to contractors on state contracts and can be implemented through a rule, policy or an executive order.

Although this strategy might affect the time it takes to complete work assignments in some agencies that already have restrictions that curtail landscaping operations, which may affect public safety and create operational difficulties, the workgroup believes that this measure has potential benefits. It does not only reduce VOC and CO emissions but has some diesel benefits and can improve traffic flow. It can also be used in conjunction with a highway diesel rule for more emission benefits.

Assuming that state landscaping equipment contributes 5% of the VOC emissions in the inventory, this measure will reduce VOC emissions by 4.5 tpd in the summer.

7. Restrict use of certain equipment (leaf blowers, trimmers, etc…) on ozone and/or PM action days

This measure targets emissions from landscaping equipment like leaf blowers and trimmers by restricting their use on ozone and/or PM action days. In 2002, leaf blowers and trimmers contributed about 35.5 tpd and 7,966.7 tpy VOC and 309.4 tpy $PM_{2.5}$ emissions. Alternative methods like manually operated (brooms, rakes, clippers, etc.) or electric-powered equipment (if household electricity is available i.e. portable generators are not allowed) may be used on these unhealthy days. The measure has emission benefits for VOC, NO_x, $PM_{2.5}$, and CO as well as some noise benefits. A rule will be required to implement it.

This strategy may have an economic impact on the lawn care industry and may be difficult to enforce but the majority of the workgroup members believe that this

measure has potential benefits and should be recommended for further consideration.

There were strong objections to this measure by the landscaping industry.

Educational Programs

8. Public education on best management practices to reduce emissions

This measure addresses educating the public through the use of Best Management Practices to reduce emissions from gasoline engines. It can be utilized in both the landscape and marine industries. The purpose of this measure is to provide the public with a greater awareness of the impact of individual practices. The workgroup recommended that this measure be implemented as a voluntary program. Public education measures can include developing flyers, posters and pamphlets to distribute to the public at locations frequented by those using non-automotive gas engines. Also, updating websites or developing new websites to include Best Management Practices can be included in this measure. In addition, updating current programs to include an air component is recommended. For instance, an air component can be added to NJDEP's current Clean Marina Program and the "Grass – Cut it and leave it" brochure. The potential implementation issues for this measure appear to be funding issues for developing materials, media outreach and staff participation. There does not appear to be any economic impact to the landscape industry or marine industry from this measure.

9. Public education on alternative, low maintenance landscapes

This measure addresses educating the public regarding the emission benefits of using alternative landscapes. These alternative landscapes include low-growing ground covers, tree planting and low height turf grasses. The purpose of this measure is to reduce the amount of lawn mowing by replacing grass with alternative landscapes. The workgroup recommended that this measure be implemented as a voluntary measure. The emission benefits associated with the implementation of this measure are a reduction in VOC and CO. In addition, other benefits may include a reduction in watering, in the use of fertilizers, herbicides, and pesticides. The potential implementation issues may be funding issues for developing materials, media outreach and staff participation. This measure may have an initial positive impact on the landscaping industry, by increasing sales of certain types of plant material in the short-term, but may have a negative economic impact because alternative landscapes can reduce the amount of lawn that would require mowing.

10. Public education on reducing large lawn areas

This measure addresses educating corporate park owners and developers in New Jersey about the emission benefits associated with reducing large lawn areas. The purpose of this measure is to provide the public with a greater awareness of the impact of individual practices. The workgroup recommended that this program be implemented as a voluntary measure. The emission benefits associated with the implementation of this measure are a reduction in VOC and CO. In addition, other benefits may include a reduction in watering, the use of fertilizers, herbicides, and pesticides. The potential implementation issues may be funding issues for developing materials, media outreach and staff participation. This measure may negatively impact the landscaping industry, since the amount of lawn that would require mowing would be reduced.

Best Management Practices on Fuel Handling

11. Vapor recovery compatibility for boats that are filled at automobile gas stations

This measure would prohibit refueling a boat at a gas station equipped with stage II vapor recovery vapor-balance type system unless the boat fuel filler neck is compatible with the fuel pump interface. It is designed to apply to boats filled at automobile gas stations with vapor-balance type vapor recovery systems. The measure would allow existing vapor recovery systems to collect fueling vapors where currently the vapors mostly escape into the atmosphere. The measure would place the burden upon the owner of an incompatible boat to acquire and utilize an adapter on the boat's fuel tank filler neck. Alternatively, the gasoline retailer could provide an appropriate mechanism. A few appropriately sized thick flexible o-rings kept at the gas station may be all that is necessary. This measure would only affect boats with permanent gasoline fuel tanks since the portable "red jerry can" type fuel tanks are believed to be compatible with the bellows type fuel pump dispenser nozzle interface. Boaters who trailer their boats often will purchase fuel at automotive gas stations due to the comparatively lower fuel prices versus marina fuel retailing facilities. Fuelling at marinas may also be inconvenient to boat ramps, thus requiring a special trip by boat for refueling.

Evaporative emissions associated with refueling gasoline powered personal watercraft and outboard engine-powered boats is 155 tpy VOC in 2008. The Department is unaware of any existing data that would allow determination of the amount of refueling that occurs at automotive gasoline stations. Vapor collection efficiency of the stage II vapor recovery vapor-balance type system is not expected to be as efficient in vapor collection when compared to the collection efficiency associated with automobile refueling. This is due to the open-vented nature of the fuel tanks, which is a United States Coast Guard design requirement intended to maintain the tank vapor space below the lower explosive limit of combustibility during refueling. Thus some fuel vapors would likely

escape from the vent instead of being captured by the stage II vapor recovery system, diminishing the systems emissions control effectiveness. Therefore, the emissions benefits of implementing this control measure not have been calculated and the control efficiency of the vapor collection system would need to be examined.

An additional consideration in developing this measure will be to ensure that adaptation mechanisms are available for boaters or automotive gasoline retailers to ensure compatibility. The workgroup is unaware of adapters that are specifically designed to this purpose. It is likewise unclear what boat filler necks are incompatible with the stage II systems. The workgroup did not believe it is technologically prohibitive to develop this mechanism. It may only necessitate maintaining a few appropriately sized thick flexible o-rings at the gas station. Due to the early implementation of stage II vapor recovery in New Jersey, most of the systems are of the vapor-balance type. Most other states with stage II have a predominance of the more modern vacuum assist types, which do not require a seal between the pump and the fuel filler neck. Therefore, it is believed that if New Jersey were to institute this measure, most of the full cost of developing adaptation mechanisms would be borne by New Jersey boaters or gasoline retailers as the mechanisms would have less utility in other states.

There were strong objections to this strategy by the marine industry.

12. Vapor recovery for refueling gasoline-powered aircraft

This recommended control measure is a mandate that would subject aircraft refueling operations to Stage II vapor recovery requirements as are currently applied to automobile refueling. This would require higher volume airports servicing piston-engined aircraft to install stage II systems on fuel tanks if their throughput exceeds thresholds established in Subchapters 8 and 16 of the New Jersey Air Pollution Control Codes. Considerations to note are:

- Aircraft gasoline has been characterized as having a comparatively lower volatility, or Reid Vapor Pressure (RVP), than automotive gasoline. This is necessary to prevent vaporization (vapor lock) of the fuel in the aircraft fuel system when operating at higher altitudes. Vaporization in the fuel system can result in in-flight engine failure. Thus the VOC reductions realized from requiring installation of stage II vapor recovery systems on aircraft gasoline-dispensing facilities is likely to be comparatively lower than stage II vapor recovery in automotive gasoline dispensing systems.
- Aircraft fuel filler receiver designs are not required to meet a standard configuration that would allow a reliable interface for passive vapor-balance vapor recovery systems. It is expected that active vacuum assisted vapor recovery system would be necessary.

13. Insure proper fuel disposal after aircraft "pre-flight" checks

This recommendation is a mandatory measure that would require aircraft pilots to properly dispose of fuel samples accumulated during daily pre-flight checks required by the Federal Aviation Administration (FAA). Daily pre-flight routines include drawing fuel samples, each 3-4 fluid ounces, from the bottom of each fuel tank and the lowest point in the fuel system for examination of the presence of water. It is said by at least one pilot to be common observed practice to dispose of the fuel onto the tarmac where it is left to evaporate, generating VOC emissions and surface water contamination issues. The explanation for this is that climbing upon the wings is necessary to return the fuel to the fuel tank once the check is completed. FAA does not disallow the action of returning the fuel to the aircraft's fuel tanks provided that water is not present in the sample. The workgroup (and the mentioned pilot) believe that there are other more environmentally friendly means of disposing the fuel. Further, airport facilities often have solvent disposal mechanisms in place whereby the unwanted fuel could be deposited in a receptacle. It can also be returned to the aircraft's fuel tank or used in other appropriate power equipment.

Other

14. Evaluate feasibility of low-emitting forklift program when finalized in California.

California has a program that requires fleet wide averaging emission reductions for forklifts. Manufacturers are required to have retrofit kits available and new forklifts are required to meet more stringent emission standards. Implementation has been delayed due to the huge impact on the agricultural industry in California.

This strategy will impact emissions from industrial forklifts through a forklift program. The workgroup also recommends that NJDEP consider implementing the California Low-emitting Forklift program when it is finalized. Industrial forklifts contributed about 2,021 tpy VOC, 7,643.7 tpy $NO_{x,}$ and 35.8 tpy $PM_{2.5}$ emissions in New Jersey in 2002.

Emission benefits associated with this measure include a reduction in VOC, NO_x, CO and $PM_{2.5}$ as well as fuel savings. Implementation issues include the fact that the California program is not available as the rules are delayed. Thus the measure has not yet been implemented and there may be funding issues associated with the retrofit program. The workgroup suggests that NJDEP continue to follow up with the California program.

VII. Summary of "Parking Lot" and Crossover Issues

The Non-Automotive Gasoline Engines workgroup did not have any measures under this category.

VIII. White Papers Submitted from Individual Members of the Workgroup.

The National Marine Manufacturers Association (NMMA) and the Marine Trades Association of New Jersey (MTA/NJ) submitted a letter to the workgroup supporting their opposition to any program that would require mandatory engine bans or boating bans on ozone action days.

The New Jersey Department of Transportation (NJDOT) also submitted a letter stating their opposition to any measure that would prohibit any landscaping activities for government agencies on ozone action days.

Copies of these letters are attached in Appendix D.

IX. References

1. "Developing Air Emission Control Strategies: A Collaborative Effort." Reducing Air Pollution Together, New Jersey Department of Environmental Protection. July 19, 2005. http://www.nj.gov/dep/airworkgroups/index.html (August 9, 2005).
2. "Non-Automotive Gasoline Engines." Workgroup Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.nj.gov/airworkgroups/docs/offroad_workgroup _presentation.pdf (August 9, 2005)
3. "8-Hour Ozone." Workshop Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.nj.gov/dep/airworkgroups/docs/ozone_sip_presentation.pdf (August 9, 2005).
4. "Fine Particulate Matter and Regional Haze." Workshop Presentations, Reducing Air Pollution Together, New Jersey Department of Environmental Protection. June 29, 2005. http://www.nj.gov/dep/airworkgroups/docs/pm2.5_ sip_presentation.pdf (August 9, 2005)
5. "Non-Automotive Gasoline Engines Workgroup." Reducing Air Pollution together, New Jersey Department of Environmental Protection. August 9, 2005. http:www.nj.gov/dep/airworkgroups/offroad_workgroup.html (August 9, 2005).
6. New Jersey Clean Marina Program www.njcleanmarina.org

Non-Automobile Gasoline Engines Workgroup

Sandy Krietzman, New Jersey Department of Environmental Protection (NJDEP)
Workgroup Leader

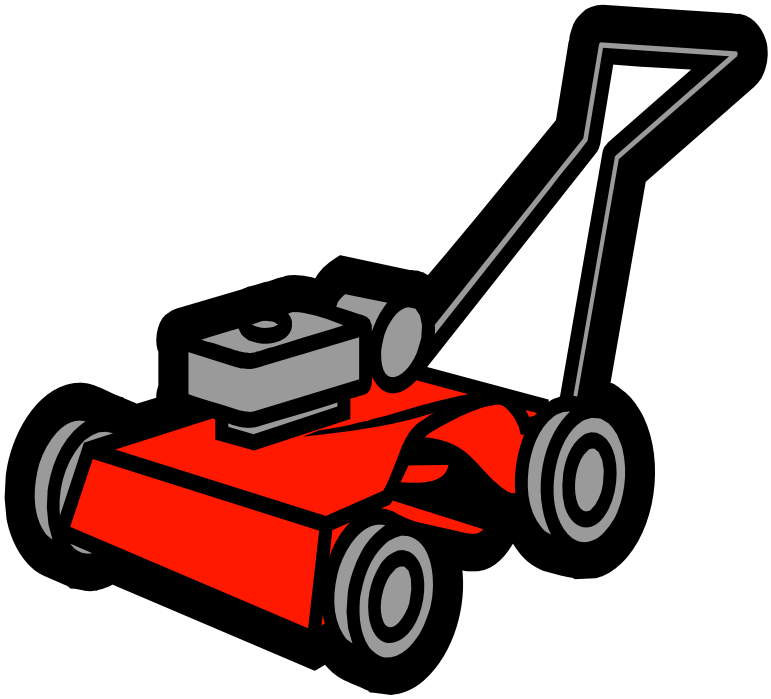
Workgroup Non-State Team Members:

1. Dennis Blazak, Naval Air Engineering Station (NAES)
2. Melissa Danko, Marine Trade Association of New Jersey (MTA/NJ)
3. Roger Gault, Engine Manufacturers Association (EMA)
4. Richard Kolb, Volvo Penta
5. Michael Kon, Naval Air Engineering Station (NAES)
6. John McKnight, National Marine Manufacturers Association (NMMA)
7. Gabriela Munoz, New York Academy of Sciences
8. Carl Nordstrom, New Jersey Nursery and Landscape Association (NJNLA)

Workgroup State Team Members:

1. Jim Arose, New Jersey Motor Vehicle Commission (NJMVC)
2. Ken Erick, New Jersey Department of Transportation (NJDOT)
3. Tony Iavarone, NJDEP
4. Rich Janiak, NJDEP
5. Scott Long, NJDEP
6. Bill McBride, New Jersey Department of Military and Veteran's Affairs (NJDMAVA)
7. Stella Ononiwu, NJDEP – Facilitator
8. Angela Skowronek, NJDEP

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey



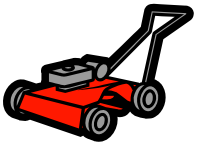
Prepared By
The Non-Automotive Gasoline Engines Workgroup

Appendix A – Minutes from the Non-Automotive Gasoline Engines Workgroup Meetings

October 31, 2005

SUMMARY

Prepared by Stella Ononiwu
On Friday, July 1, 2005



Non-Automobile Gasoline Engines Workgroup Meeting
Held on Wednesday, June 29th, 2005
Meeting Location/Address: World Memorial Building Trenton, New Jersey
Meeting called by: Sandy Krietzman
Facilitator: Stella Ononiwu

Attendees: Sandy Krietzman – NJDEP
Stella Ononiwu – NJDEP
Tony Iavarone – NJDEP
Rich Janiak – NJDEP
Angela Skowronek – NJDEP
Bill McBride – NJDMAVA

Materials: Non-Automotive Gasoline Engines Workgroup Leader Presentation
Table of the 2002 Non-Road Emission Inventory by Equipment and Pollutants

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Introduction/Announcements *[20 minutes]*
This was the inaugural meeting of the workgroup. Members introduced themselves and made known their expectations from the workgroup.

Overview *[10 minutes]*
The goal of this workgroup is to identify strategies to achieve emission reductions from gasoline engines, other than those used in cars and trucks, by recommending potential ways to control and/or reduce emissions from these sources.

Discussion *[60 minutes]*

Topic 1: Reactions to the Workshop Presentations

Discussion: Members expressed their views on the workshop presentations. Some thought that pollution from non-road equipment was getting worse.

Conclusion: The presentations were generally perceived to be very informative. The Non-Road emission numbers from the Emission Inventory are believed to be realistic.

Action Items/Person(s) responsible/Deadline: No action was required on this issue.

Topic 2: Logistics

Discussion: The working dynamics of the group, mode of communication and frequency of meetings were discussed.

Conclusion: This workgroup will meet about 3 to 4 times this summer and make their recommendation to the state by September 30th, 2005. The workgroup will communicate all workgroup-related information via email to all the members. There will be no subgroups in this workgroup because of the small number of the group. The next workgroup meeting will be on Tuesday, July 19th, 2005 at 10:00am.

Action Items/Person(s) responsible/Deadline: Stella will send the email addresses of all members to Bill by Friday, July 01, 2005.

Topic 3: Suggested Emission Reduction Areas

Discussion:
A. Pleasure Craft

B. Lawn & Garden Equipment – This includes lawn mowers, leaf blowers, weed trimmers, etc. Suggestions include:
i. Cutting grass on odd number of days during drought conditions.
ii. Requesting that Treasury include a specification on purchase orders for new equipment specifically weed trimmers.
iii. Regulating lawn tractors by putting a threshold on their daily emissions.
iv. Coupon and Scrap programs.

C. Commercial Lawn Equipment

D. Fuel tanks for boats – Suggestions include:
i. Recommending that EPA make specific requirements to manufacturers.
ii. Stage II vapor recovery to be added to marine vessels. They are currently exempt.
iii. Modification of the boat filler neck on the gas tank to make a stage II vapor recovery seal.

E. Educating the public about the impacts of their actions. This may lead to higher turn over of equipment. Literature on equipment operation on Ozone days could be provided to homeowners.

F. Aircraft – APOA

G. A Public Survey of New Jerseyans. Advertise in newspapers and television and ask the public to provide input on how to clean the air in New Jersey.

Conclusion: Members will do more research on ideas stated in discussion before the next meeting.

Action Items/Person(s) responsible/Deadline:
i. Read article on Top Dog System at http://www.topdogsystem.com/system.html before the next meeting – Tony, Sandy, Angela, Stella
ii. Check on book on painting operations, marine operations, etc. (that Rich talked about) before the next meeting – Sandy
iii. Contact John Jenks for more information on Aircraft before the next meeting – Sandy/Rich
iv. Check if we have a break out of spark-engine emissions before the next meeting – Tony

Wrap-up *[30 minutes]*

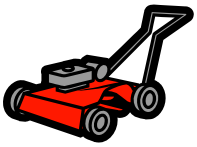
i. We need more recruits for the workgroup!
   NJDOT – Sandy will contact for recruits
   Businesses – OPEI – Sandy will reach out to OPEI for inputs
   Rutgers University of Agriculture – Sandy will contact
   Dave Johnson (NJDEP – Forestry) – Sandy will contact

ii. Members will think about more ideas and ways to implement them before the next meeting.

iii. Let's meet for another brainstorming session!
   July 19th, 10am – 12pm
   NJDMAVA Headquarters Building
   Conference Room A
   101 Eggerts Crossing Road
   Lawrenceville (near Rider University), NJ
   http://www.nj.gov/military/directions/

SUMMARY

Tuesday, July 26, 2005



Non-Automobile Gasoline Engines Workgroup Meeting
Held on Tuesday, July 19th, 2005
NJ Department of Military and Veterans Affairs (NJDMAVA) Headquarters
101 Eggerts Crossing Road, Lawrenceville, New Jersey
Meeting called by: Sandy Krietzman
Facilitator: Stella Ononiwu

Attendees:

1. Sandy Krietzman, New Jersey Department of Environmental Protection (NJDEP)
2. Stella Ononiwu, NJDEP
3. Tony Iavarone, NJDEP
4. Angela Skowronek, NJDEP
5. Rich Janiak, NJDEP
6. Jim Arose, New Jersey Motor Vehicle Commission (NJMVC)
7. Scott Long, NJDEP
8. Bill McBride, NJDMAVA
9. John McKnight, National Marine Manufacturers Association (NMMA)
10. Ken Erick, New Jersey Department of Transportation (NJDOT)
11. Melissa Danko, Marine Trade Associations of New Jersey (MTANJ)
12. Michael Kon, Naval Air Engineering Station (NAES)

Materials:

1. Non-Automotive Gasoline Engines Workgroup Leader Presentation
2. Attendance sign-in sheet
3. Minutes from June 29, 2005 meeting, pdf file available at http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html
4. 2002 New Jersey Emission Inventory Charts showing top 15 emitters for VOC, NO_x, CO, $PM_{2.5}$ and SO_2
5. Agenda, pdf file available at http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html

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Introduction/Announcements

- All participants introduced themselves.
- There was a general review of the purpose of the workshop and workgroups, agenda items, and the goals of this workgroup.
- The participants were informed of NJDEP's intention to list workgroup participants and affiliation in the final report. While some agreed, others said that they would like to see the final report before consenting to this as they are concerned that they may not agree with what is on the report.
- There was a feedback from a participant that the NJ Emissions Inventory numbers for Pleasure Craft are lower than the model says because the model does not accurately incorporate the most recent technology.

Overview

- The Non-Automobile Gasoline Engines workshop presentation was reviewed for the benefit of new members.
- There was a presentation on Recreational Marine Engines by John McKnight (NMMA) to show what is being done to control emissions from marine engines.
- The main focus for this meeting was on recommending control measures to reduce VOC, NO_x, and PM emissions and reviewing the pros and cons associated with them.

Discussion: Suggested Control Measures for Non-Automobile Gasoline Engines

Topic 1: Suggested Measures for Pleasure Crafts.

Discussion:

A. Equipment turn over for Boats through Scrappage Programs, Partnership with EPA Region 2 to encourage use of cleaner engines, and Public Education.
   - Pros
     i. Increase public awareness.
     ii. Increased use of low emission engines.
   - Cons
     i. Expensive material development for scrappage program.

B. Regulating boating on Ozone Alert Days.
   - Pros
     i. Emissions reduction on high ozone days.
   - Cons
     i. The boating industry will oppose – the high ozone days are more likely to be the days that the boaters will want to use their equipment.

C. Portable fuel tanks for boats.
   1. Replacing old tanks with new low emission ones.
      - Pros
        i. Reduces emissions.
        ii. Saves fuel.
   2. Modification of the boat filler neck.
      - Pros
        i. Reduces emissions.
        ii. Saves fuel.
      - Cons
        i. Not currently available.
   3. Stage II vapor recovery needs to be extended.
      - Pros
        i. Reduces emissions.
        ii. Boats compatible with land side.
      - Cons
        i. Exempt.

D. Regulating the move from older unregulated engines to newer Tier II engines if it will result in a substantial emission reduction.
   - Pros
     i. Reduces emissions.
   - Cons
     i. Costly to boat owners.

Conclusion: No conclusions at this time.

Action Items/Person(s) responsible/Deadline:

i. John Mcknight (NMMA) and Melissa Danko (MTANJ) will provide the group with the MOU they have with EPA before the next meeting. Please, see http://www.epa.gov/region1/pr/2005/jul/sr050707.html

Topic 2: Suggested Measures for Lawn & Garden Equipment

Discussion:

A. Emissions Cap for Commercial Landscaping: Regulated by general permits and tracked by fuel consumption or log of hours.
   - Pros
     i. Reduce emissions.
   - Cons
     i. Administrative burden.
     ii. Enforcement issue.

B. Commercial Buy Back Program for Mowers: Coupon and Scrap Program.
   - Pros
     i. Reduce emissions.
     ii. Commercial operators need to turn over equipment.
   - Cons
     i. Potential high cost.
     ii. Time consuming.

C. Residential Buy Back Program for Mowers: Coupon and Scrap Program.
   - Pros
     i. Positive community interest and participation in the program (California).
   - Cons
     i. Amount of reduction may not be economically feasible compared to commercial.
     ii. Potential high cost.
     iii. Time consuming.

D. Activity Reductions on Ozone Alert Days: Prohibit or reduce the number of hours of activities.
   - Pros
     i. Decrease emissions on worst days.
   - Cons
     i. Public compliance.

E. Treasury should ensure that new equipment purchased by State would be "emissions compliant".
   - Pros
     i. Reduce emissions.
   - Cons
     i. May increase contracting costs.

F. Public Education done by public notifications (examples include flyers, posters, and pamphlets), and web site updates (suggested websites include NJDEP, Clean Marina and MTA/NJ).
   - Pros
     i. Increase public awareness.
     ii. Reduce emissions.
   - Cons
     i. Funding.

D. Star Program: Develop a system to recognize commercial landscaping companies that turn over their equipment approximately every two years and have a Best Management Practices component.
   - Pros
     i. Raise level of awareness for both consumers and providers on emissions generated by lawn care Equipment.
     ii. Reduce emissions.
   - Cons
     i. Have administrative burden.
     ii. May affect small businesses.

H. Restrictions on secondary markets (i.e. used equipment sales).
   - Pros
     i. Reduce emissions.
   - Cons
     i. Implementation.
     ii. Effects on businesses.

Conclusion: No conclusions at this time.

Action Items/Person(s) responsible/Deadline:
i. Ken Erick (NJDOT) will check to see if there is a way to keep track of what equipment specifications go into NJDOT's fleet before the next meeting.

Topic 3: Suggested Measures for AirCrafts.

Discussion:
A. Emission reduction from Aircraft Piston Engines.
   1. Setting standards.
      - Pros
        i. Reduce emissions.
      - Cons
        i. States are pre-empted from setting emission standards.
   2. Refueling Process.
      - Pros
        i. Reduce emissions.
      - Cons
        i. Aircrafts are not covered by Stage II.

   3. Insure that after pre-flight check, fuel is returned to fuel tank.
      - Pros
        i. Reduce surface run-off.
        ii. Reduce emissions.

Conclusion: No conclusion at this time.

Action Items/Person(s) responsible/Deadline: No action was required on this topic.

Topic 4: Other suggested measures.

Discussion:

A. Portable Fuel Containers (for consumers): Replace old containers with new ones.
   - Pros
     i. Affordable.
     ii. Will be regulated under DEP rule.
   - Cons
     i. There may not be public acceptance to replace a product that is still in good condition.
     ii. Disposal issues – possible hazardous waste, may be expensive to dispose.

B. Access ideas from the public through the media (TV, radio, and newspapers).
   - Pros
     i. More ideas.
     ii. Wider public exposure.
   - Cons
     i. Time consuming.
     ii. TV and radio are expensive.

Conclusion: No conclusion at this time.

Action Items/Person(s) responsible/Deadline: No action was required on this topic.

Wrap-up

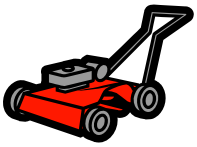
i. We still need recruits from the Landscaping industry and OPEI.
   - John Mcknight will reach out to OPEI representative before the next meeting.

ii. The next Non-Automobile Gasoline Engine Workgroup meeting:
August 16th, 2005, 1pm – 5pm
New Jersey Department of Environmental Protection (NJDEP)
33 Arctic Parkway,
Ewing, NJ
http://www.state.nj.us/dep/rpp/map.htm

iii. Conference call logistics will be posted on the Non-Automobile Gasoline Engines Workgroup website and in in the meeting agenda at:
http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html

SUMMARY

Tuesday, September 6, 2005



Non-Automobile Gasoline Engines Workgroup Meeting
Held on Tuesday, August 16th, 2005
New Jersey Department of Environmental Protection (NJDEP)
33 Arctic Parkway, Ewing, NJ
Meeting called by: Sandy Krietzman
Facilitator: Stella Ononiwu

Attendees:

1. Sandy Krietzman, NJDEP
2. Stella Ononiwu, NJDEP
3. Tony Iavarone, NJDEP
4. Angela Skowronek, NJDEP
5. Jim Arose, New Jersey Motor Vehicle Commission (NJMVC)
6. Ken Erick, New Jersey Department of Transportation (NJDOT)
7. Roger Gault, Engine Manufacturers Association (by phone)
8. Rich Kolb, Volvo Penta (by phone)
9. Gabriela Munoz, New York Academy of Sciences (by phone)
10. Carl Nordstrom, New Jersey Nursery & Landscape Association

Materials:

1. Landscaping Equipment Emissions Inventory Presentation by Tony Iavarone
2. Commercial and Residential Lawn and Garden Equipment Inventory
3. Non-Automotive Gasoline Engines Workgroup Draft Proposal table
4. Attendance sign-in sheet
5. Minutes from July 19, 2005 meeting, pdf file available at http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html
6. Agenda, pdf file available at http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html

Introduction/Announcements

- All participants introduced themselves.
- There was a review of the agenda and minutes from the July 19th, 2005 workgroup meeting.
- The participants were informed that the workgroup reports are now due to NJDEP by October 31st, 2005, but all recommendations for further consideration by the NJDEP should be in place by September 30th, 2005. As such, the group will need to start discussing how to put forth her recommendations for further consideration by the NJDEP.
- A participant was concerned about what may happen to these recommendations as the timeline is just before the elections. He was assured that the recommendations are to the NJDEP for further consideration and may not be affected by the elections.

Overview

- Tony Iavarone gave a presentation and also shared emission inventory numbers on Landscape Equipment emissions.
- The main focus for this meeting was on reviewing the measures to reduce emissions from Landscaping Equipment and Industrial Forklifts.

Discussion: Discussion on measures to reduce emissions from Landscaping Equipment and Industrial Forklifts.

Topic 1: Landscaping Equipment

Discussion:

- A participant suggested that it would be beneficial to have a representative from the landscaping industry give a presentation on the industry's efforts to reduce emissions. The landscaping industry is a $4.3 billion industry in New Jersey and may be affected adversely if certain measures are taken. NJDEP has tried to reach out to Outdoor Power Equipment Institute (OPEI), but has not had much luck. They were also contacted regarding today's meeting.
- The control measures on the draft proposal table were reviewed and the participants gave their input. Some new measures were also suggested.
- It was pointed out that some of the group's ideas may not be quantifiable, the group will have to reach a a consensus to recommend such ideas.

Conclusion: No conclusions at this time.

Action Items/Person(s) responsible/Deadline:

i. NJDEP will contact Dave Hewitt, Chief of Park Maintenance, NJDEP, for information regarding NJDEP's Parks and Forestry Landscaping Fleet, before the next meeting.
ii. NJDEP will research information on Best Management Practices before the next meeting. Suggested resources areas include Rutgers University, Cornell University and University of Florida.
iii. NJDEP will update the draft proposal table with the new suggested measures before the next meeting.
iv. Roger Gault will reach out to Bill Harley at OPEI and have him contact NJDEP.

Topic 2: Industrial Forklifts

Discussion:

- Industrial Forklifts have high NO_x emissions and contribute about 11 percent of New Jersey's Non-Road emissions.
- Retrofit technology is available for many forklift type engines. Forklift manufacturers are heavily engaged in rulemaking in California.

Conclusion: No conclusions at this time.

Action Items/Person(s) responsible/Deadline:

i. NJDEP will reach out to Mark Williams at California Air Resource Board (CARB) for more information on California's forklift program, before the next meeting.

Wrap-up

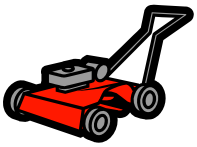
i. NJDEP will re-organize the draft proposal table and share it with the group before the next meeting.
ii. A draft format of the workgroup report will be shared at the next meeting.
iii. Submission of "White papers" to be submitted with the workgroup report was encouraged.

iv. The next Non-Automobile Gasoline Engine Workgroup meeting:
September 13th, 2005, 9.30am – 12.00pm
New Jersey Department of Environmental Protection (NJDEP)
33 Arctic Parkway,
Ewing, NJ
http://www.state.nj.us/dep/rpp/map.htm

v. Conference call logistics will be posted on the Non-Automobile Gasoline Engines Workgroup website and in in the meeting agenda at:
http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html

SUMMARY

Wednesday, September 28, 2005



Non-Automobile Gasoline Engines Workgroup Meeting
Held on Tuesday, September 13th, 2005
New Jersey Department of Environmental Protection (NJDEP)
33 Arctic Parkway, Ewing, NJ
Meeting called by: Sandy Krietzman
Facilitator: Stella Ononiwu

Attendees:

9. Sandy Krietzman, NJDEP
10. Stella Ononiwu, NJDEP
11. Tony Iavarone, NJDEP
12. Angela Skowronek, NJDEP
13. Jim Arose, New Jersey Motor Vehicle Commission (NJMVC)
14. Dennis Blazak, Naval Air Engineering Station (NAES) (by phone)
15. Melissa Danko, Marine Trade Association of New Jersey (MTANJ) (by phone)
16. Ken Erick, New Jersey Department of Transportation (NJDOT)
17. Roger Gault, Engine Manufacturers Association (by phone)
18. John McKnight, National Marine Manufacturers Association (NMMA) (by phone)

Materials:

7. Non-Automotive Gasoline Engines Workgroup Draft Proposal table
8. Attendance sign-in sheet
9. Minutes from August 16, 2005 meeting, pdf file available at http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html
10. Agenda, pdf file available at http://www.nj.gov/dep/airworkgroups/offroad_workgroup.html

Introduction/Announcements

- All participants introduced themselves.
- There was a review of the meeting agenda and minutes from the August 16th, 2005 workgroup meeting.
- There were no comments on the minutes and no key developments since the previous meeting.
- Workgroup members were reminded that the goal is to wrap up all suggested measures by September 30th, 2005 and the report completed and submitted to NJDEP by October 31st, 2005.

Overview

- This was the final in-person meeting of the workgroup. The focus of the meeting was on reviewing and ranking of all the measures suggested by the workgroup.
- A draft of the workgroup report was also reviewed.

Discussion: Review and ranking of workgroup's potential control measures

Topic 1: Accelerated Equipment Turnover Programs

Discussion:
- A participant suggested that NJDEP consider monetary incentives for replacement programs to spur engine turnover.
- A participant suggested that EPA grants be considered as a funding source as these programs carry huge administrative burden. Also, revenue from Supplemental Environmental Projects (SEP) could be used as another funding source and contractors can be hired to develop the program to ease the administrative burden.
- Some participants were concerned that engine turnover programs will incur huge disposal costs.

Conclusion: There were eight measures in this category. The workgroup ranked five as high priority and one as medium priority. The remaining two measures were believed to have more cons than pros.

Action Items/Person(s) responsible/Deadline:
i. NJDEP will update the draft proposal table with the ranking and send out to the workgroup.

Topic 2: Modification of Activities/Operations

Discussion:
- There were strong oppositions to some of the measures under this category. Participants were reminded that they could submit "white papers" on measures they feel strongly about.
- The workgroup had conflicting opinions on the language of some of the measures in this category. It was unanimously agreed that the language be modified and emailed to the members for ranking.

Conclusion: The language of some of the measures will be modified and emailed to the workgroup for ranking.

Action Items/Person(s) responsible/Deadline:
i. NJDEP will modify the language of the measures that need modification and email them to the workgroup for ranking within a week.

Topic 3: Educational Programs

Discussion:
- The workgroup supported all the measures in this category except one which was determined to be outside the scope of the workgroup's effort at this time.

Conclusion: All the measures in this category were ranked as high priority except one which was considered to be outside the scope of the workgroup's effort at this time.

Action Items/Person(s) responsible/Deadline: None.

Topic 4: Best Management Practices for Fuel Handling

Discussion:
- Measures in this category were reviewed and ranked by the workgroup.

Conclusion: There were five measures listed in this category. Three were ranked as high priority and two were ranked as low priority.

Action Items/Person(s) responsible/Deadline: None.

Topic 5: Other

Discussion:
- Measures in this category were reviewed and ranked by the workgroup.
- Some participants suggested that NJDEP review state operations of non-road equipment.

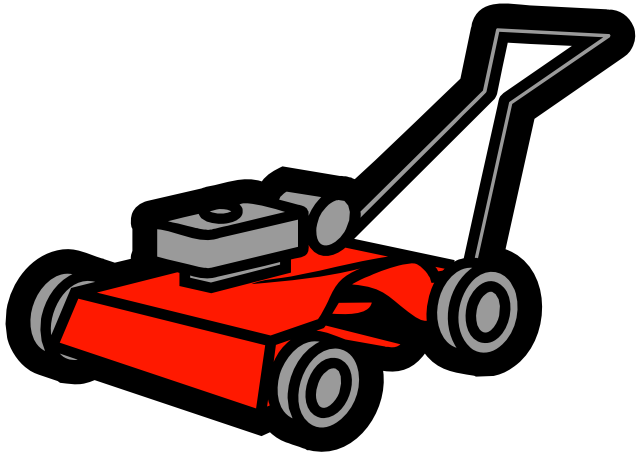
Action Items/Person(s) responsible/Deadline: None.

Wrap-up

i. NJDEP will incorporate comments from the meeting into the draft proposal table and share with the group by Tuesday, September 20th, 2005.
ii. An updated draft of the workgroup report will be shared with the group for comments.
iii. This is expected to be the final in-person meeting of the workgroup. A conference call may be scheduled if needed.
iv. Participants will send "white papers" to the workgroup to stress their positions on certain measures. The white papers will be included in the report for submission to NJDEP.

A workgroup meeting for all the workgroups will be held on November 14th, 2005 at NJDEP, 401 East State Street, Trenton, NJ. For more information, please, go to
http://www.nj.gov/dep/airworkgroups/

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey

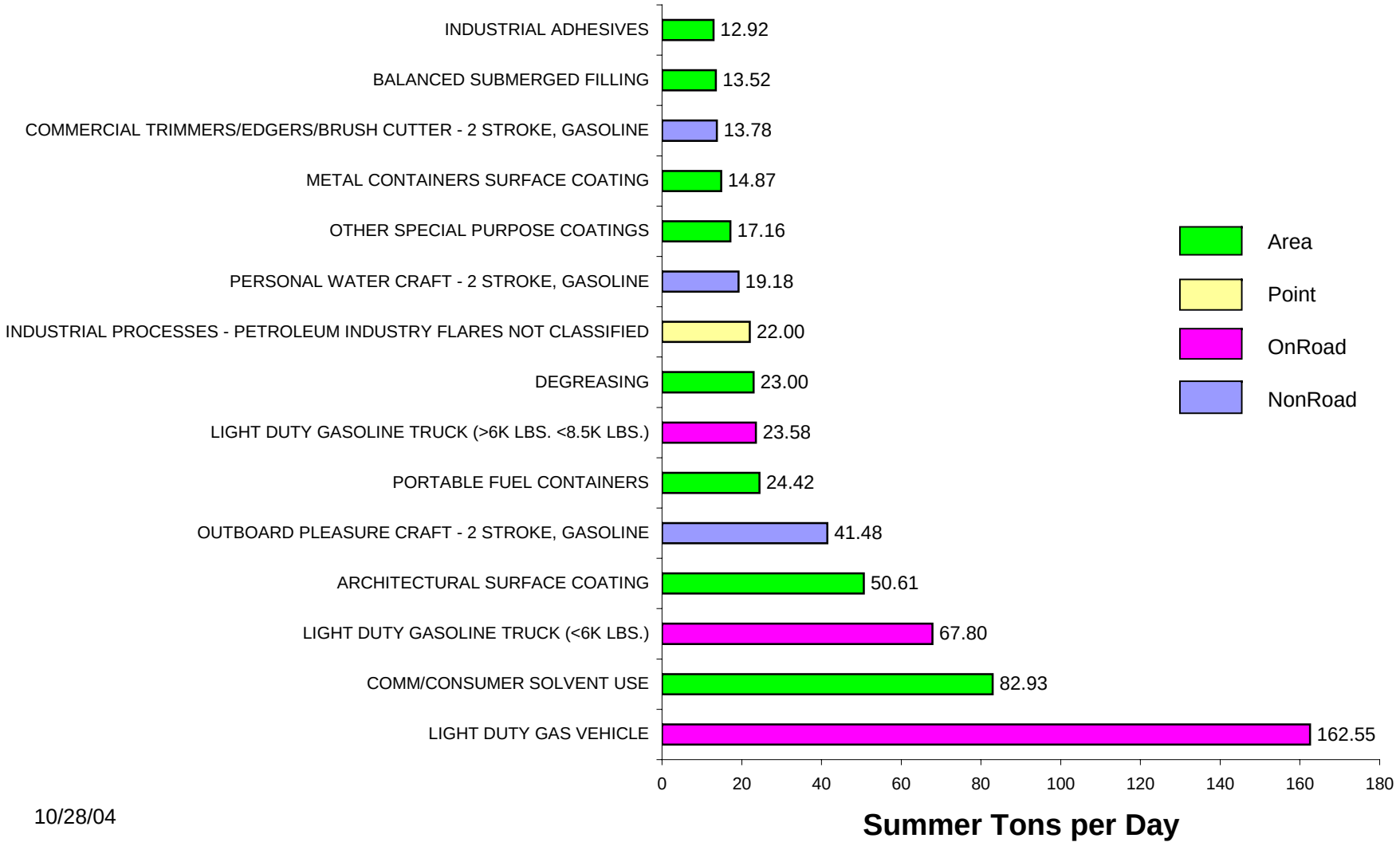


Prepared By
The Non-Automotive Gasoline Engines Workgroup

Appendix B – Data and Materials Reviewed by the Non-Automobile Gasoline Engines Workgroup

October 31, 2005

2002 New Jersey VOC Emission Inventory Top 15 by SCC



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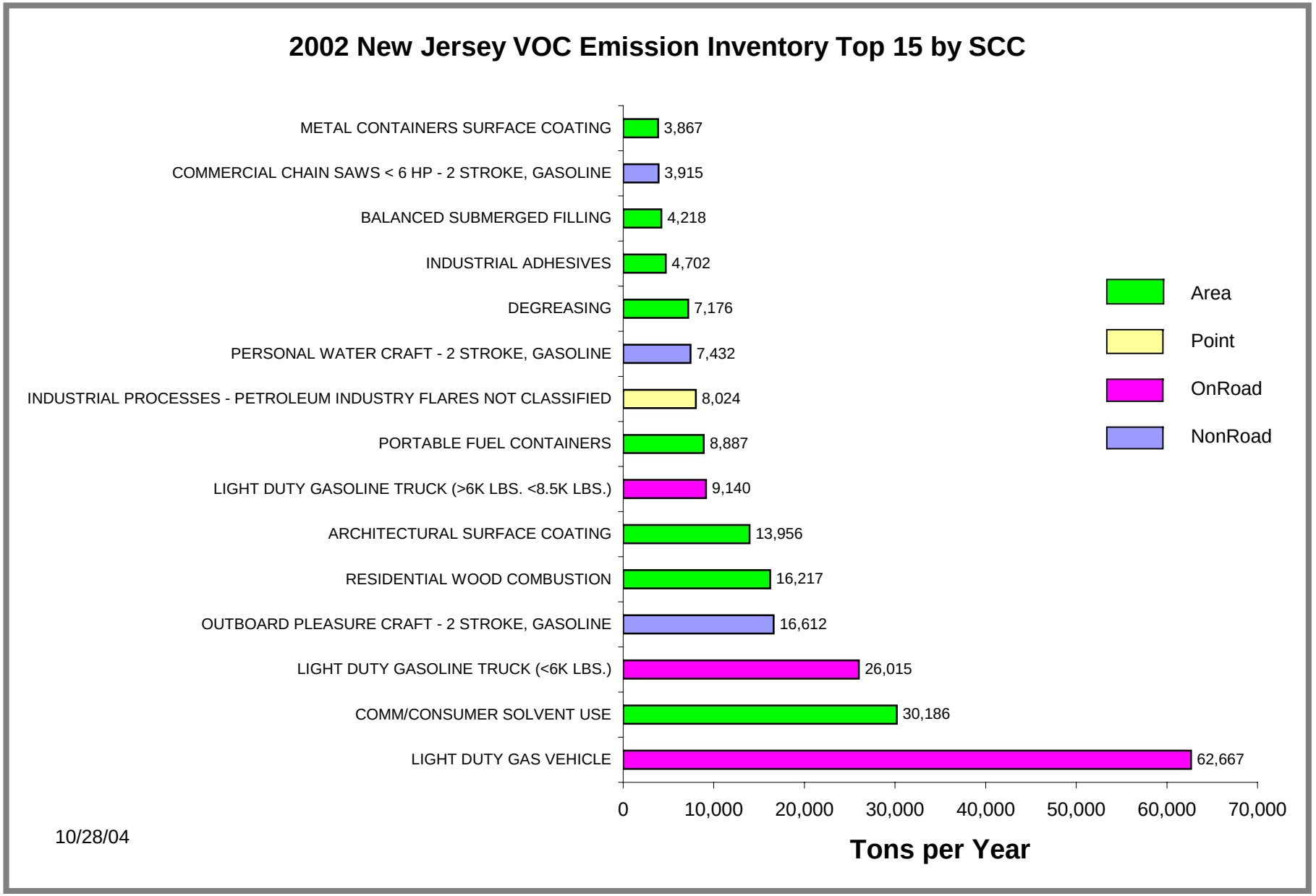
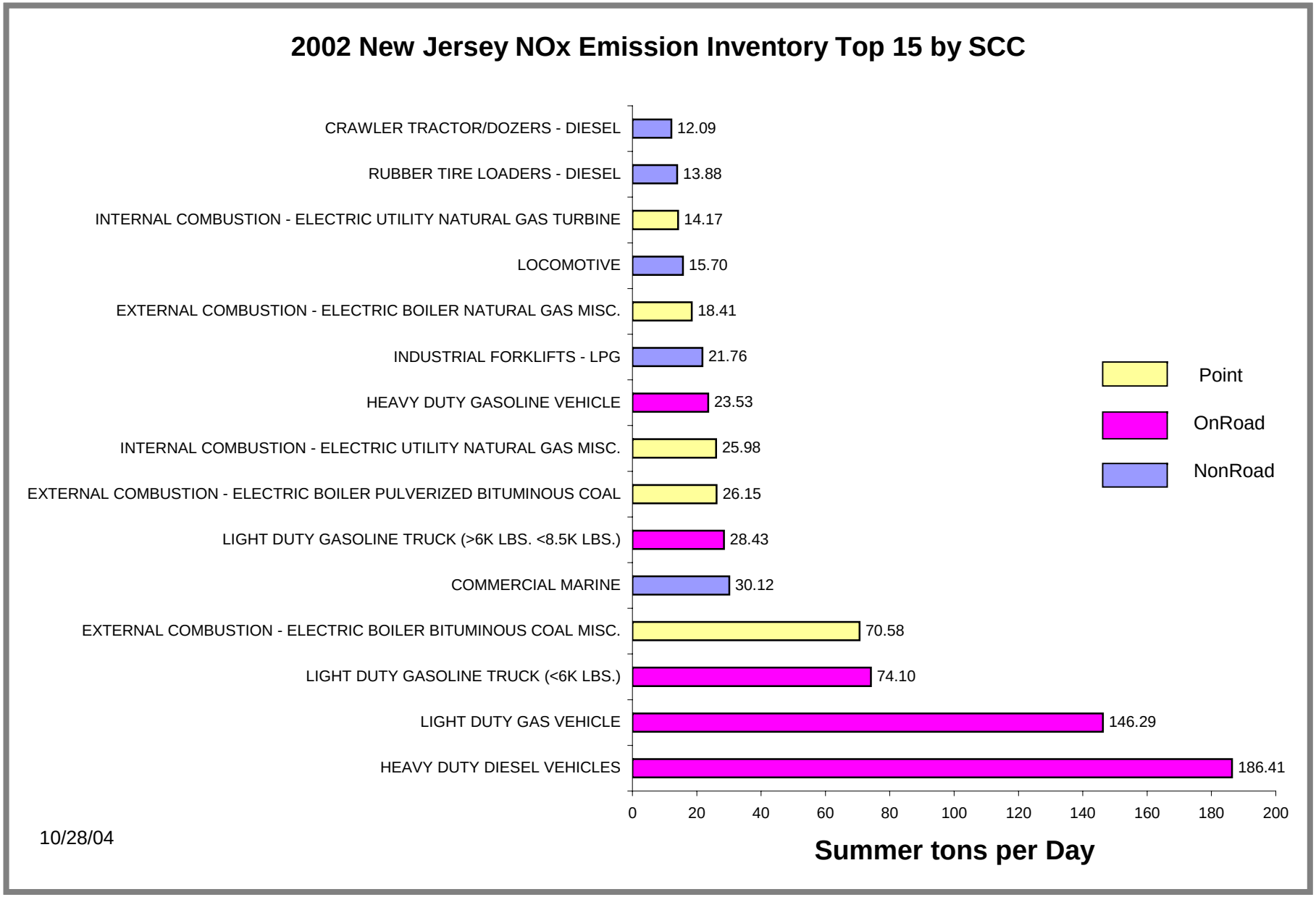
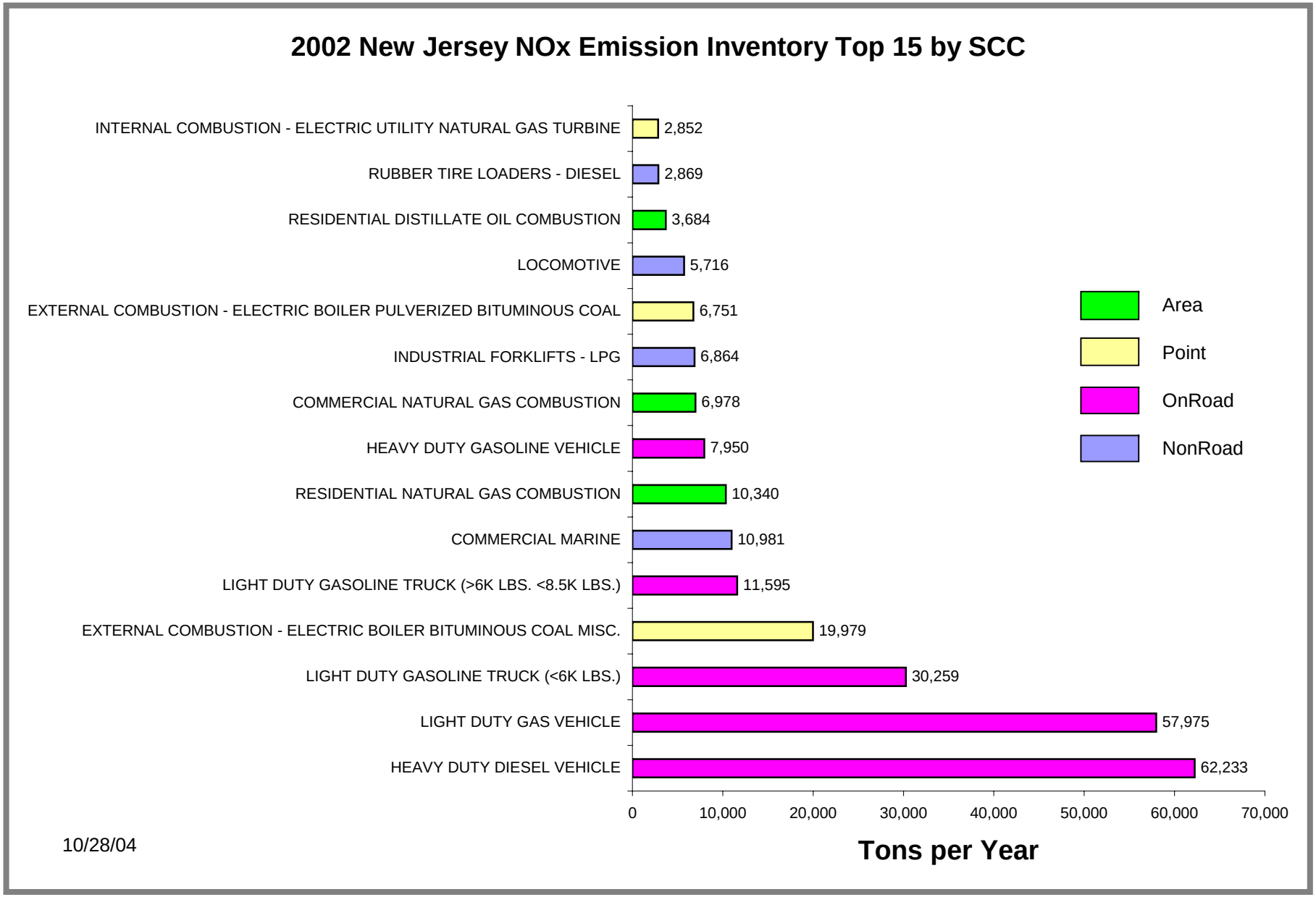
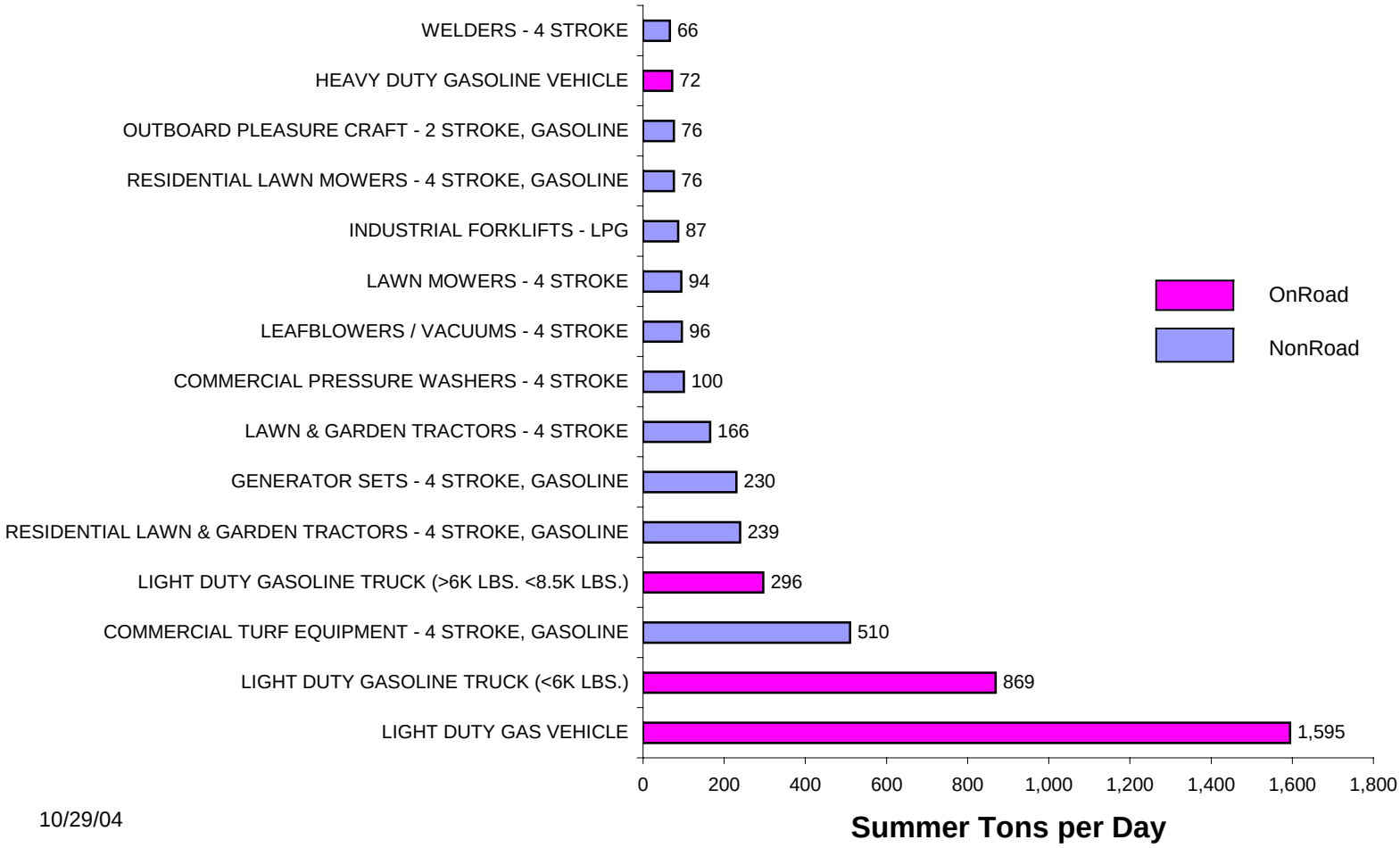

2002 New Jersey VOC Emission Inventory Top 15 by SCC
METAL CONTAINERS SURFACE COATING
3,867
COMMERCIAL CHAIN SAWS < 6 HP - 2 STROKE, GASOLINE
3,915
BALANCED SUBMERGED FILLING
4,218
INDUSTRIAL ADHESIVES
4,702
DEGREASING
7,176
PERSONAL WATER CRAFT - 2 STROKE, GASOLINE
7,432
INDUSTRIAL PROCESSES - PETROLEUM INDUSTRY FLARES NOT CLASSIFIED
8,024
PORTABLE FUEL CONTAINERS
8,887
LIGHT DUTY GASOLINE TRUCK (>6K LBS. <8.5K LBS.)
9,140
ARCHITECTURAL SURFACE COATING
13,956
RESIDENTIAL WOOD COMBUSTION
16,217
OUTBOARD PLEASURE CRAFT - 2 STROKE, GASOLINE
16,612
LIGHT DUTY GASOLINE TRUCK (<6K LBS.)
26,015
COMM/CONSUMER SOLVENT USE
30,186
LIGHT DUTY GAS VEHICLE
62,667
Area
Point
OnRoad
NonRoad
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Tons per Year
10/28/04


2002 New Jersey NOx Emission Inventory Top 15 by SCC
CRAWLER TRACTOR/DOZERS - DIESEL
12.09
RUBBER TIRE LOADERS - DIESEL
13.88
INTERNAL COMBUSTION - ELECTRIC UTILITY NATURAL GAS TURBINE
14.17
LOCOMOTIVE
15.70
EXTERNAL COMBUSTION - ELECTRIC BOILER NATURAL GAS MISC.
18.41
INDUSTRIAL FORKLIFTS - LPG
21.76
HEAVY DUTY GASOLINE VEHICLE
23.53
INTERNAL COMBUSTION - ELECTRIC UTILITY NATURAL GAS MISC.
25.98
EXTERNAL COMBUSTION - ELECTRIC BOILER PULVERIZED BITUMINOUS COAL
26.15
LIGHT DUTY GASOLINE TRUCK (>6K LBS. <8.5K LBS.)
28.43
COMMERCIAL MARINE
30.12
EXTERNAL COMBUSTION - ELECTRIC BOILER BITUMINOUS COAL MISC.
70.58
LIGHT DUTY GASOLINE TRUCK (<6K LBS.)
74.10
LIGHT DUTY GAS VEHICLE
146.29
HEAVY DUTY DIESEL VEHICLES
186.41
Point
OnRoad
NonRoad
0
20
40
60
80
100
120
140
160
180
200
Summer tons per Day
10/28/04


2002 New Jersey NOx Emission Inventory Top 15 by SCC
INTERNAL COMBUSTION - ELECTRIC UTILITY NATURAL GAS TURBINE
2,852
RUBBER TIRE LOADERS - DIESEL
2,869
RESIDENTIAL DISTILLATE OIL COMBUSTION
3,684
LOCOMOTIVE
5,716
EXTERNAL COMBUSTION - ELECTRIC BOILER PULVERIZED BITUMINOUS COAL
6,751
INDUSTRIAL FORKLIFTS - LPG
6,864
COMMERCIAL NATURAL GAS COMBUSTION
6,978
HEAVY DUTY GASOLINE VEHICLE
7,950
RESIDENTIAL NATURAL GAS COMBUSTION
10,340
COMMERCIAL MARINE
10,981
LIGHT DUTY GASOLINE TRUCK (>6K LBS. <8.5K LBS.)
11,595
EXTERNAL COMBUSTION - ELECTRIC BOILER BITUMINOUS COAL MISC.
19,979
LIGHT DUTY GASOLINE TRUCK (<6K LBS.)
30,259
LIGHT DUTY GAS VEHICLE
57,975
HEAVY DUTY DIESEL VEHICLE
62,233
Area
Point
OnRoad
NonRoad
0
10,000
20,000
30,000
40,000
50,000
60,000
70,000
Tons per Year
10/28/04

2002 New Jersey CO Emission Inventory Top 15 by SCC



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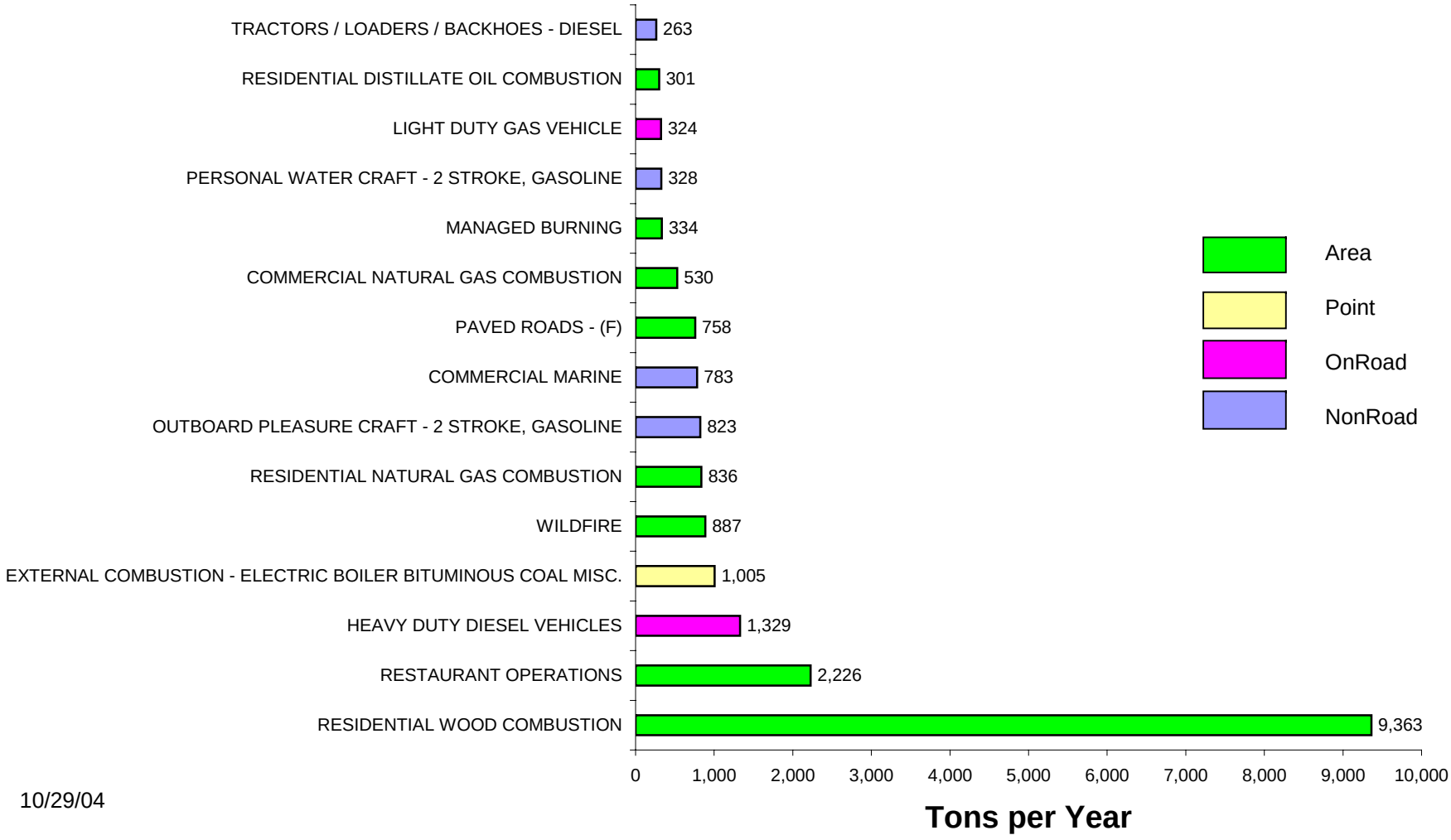
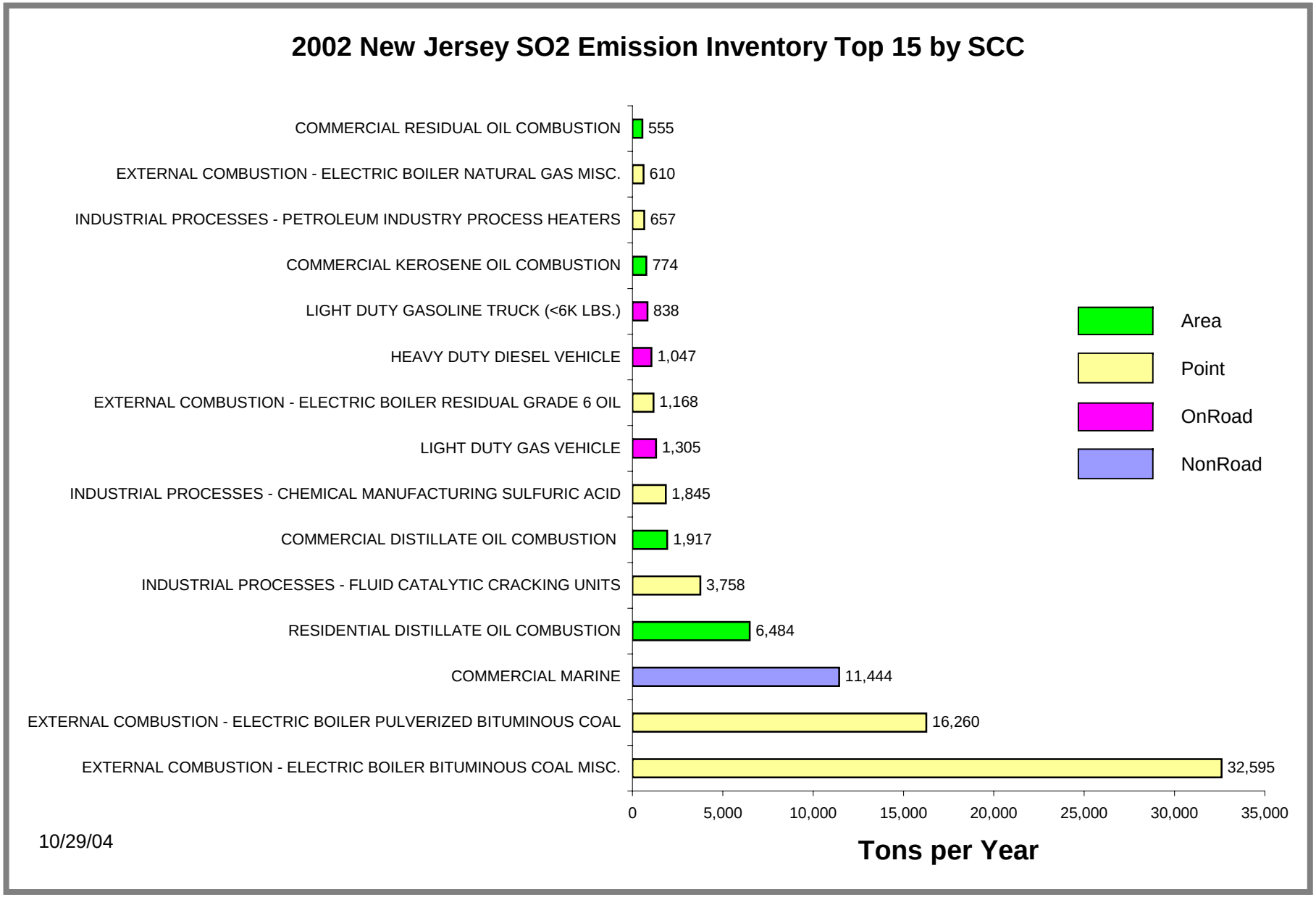
2002 New Jersey PM2.5 (with Fugitive Dust*) Emission Inventory Top 15 by SCC



10/29/04


2002 New Jersey SO2 Emission Inventory Top 15 by SCC
COMMERCIAL RESIDUAL OIL COMBUSTION
555
EXTERNAL COMBUSTION - ELECTRIC BOILER NATURAL GAS MISC.
610
INDUSTRIAL PROCESSES - PETROLEUM INDUSTRY PROCESS HEATERS
657
COMMERCIAL KEROSENE OIL COMBUSTION
774
LIGHT DUTY GASOLINE TRUCK (<6K LBS.)
838
HEAVY DUTY DIESEL VEHICLE
1,047
EXTERNAL COMBUSTION - ELECTRIC BOILER RESIDUAL GRADE 6 OIL
1,168
LIGHT DUTY GAS VEHICLE
1,305
INDUSTRIAL PROCESSES - CHEMICAL MANUFACTURING SULFURIC ACID
1,845
COMMERCIAL DISTILLATE OIL COMBUSTION
1,917
INDUSTRIAL PROCESSES - FLUID CATALYTIC CRACKING UNITS
3,758
RESIDENTIAL DISTILLATE OIL COMBUSTION
6,484
COMMERCIAL MARINE
11,444
EXTERNAL COMBUSTION - ELECTRIC BOILER PULVERIZED BITUMINOUS COAL
16,260
EXTERNAL COMBUSTION - ELECTRIC BOILER BITUMINOUS COAL MISC.
32,595
Area
Point
OnRoad
NonRoad
0
5,000
10,000
15,000
20,000
25,000
30,000
35,000
Tons per Year
10/29/04

2002 NEW JERSEY NONROAD EMISSION INVENTORY FOR SPARK-IGNITED ENGINES

AGRICULTURAL EQUIPMENT														
		VOC		NOx		CO			PM10		PM2.5		SO2	NH3
Equipment Type	Engine Type	Tons per Summer Day	Tons per Year	Tons per Summer Day	Tons per Year	Tons per Summer Day	Tons per Winter Day	Tons per Year	Tons per Winter Day	Tons per Year	Tons per Winter Day	Tons per Year	Tons per Year	Tons per Year
Sprayers	2 Stroke	0.01	1.59	0.00	0.01	0.02	0.00	3.02	0.00	0.07	0.00	0.06	0.00	0.00
Hydro Power Units	2 Stroke	0.00	0.21	0.00	0.00	0.00	0.00	0.42	0.00	0.01	0.00	0.01	0.00	0.00
2-Wheel Tractors	4 Stroke	0.00	0.19	0.00	0.10	0.06	0.01	10.74	0.00	0.00	0.00	0.00	0.00	0.00
Agricultural Tractors	4 Stroke	0.00	0.76	0.00	1.12	0.11	0.02	21.48	0.00	0.01	0.00	0.01	0.01	0.00
Combines	4 Stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Balers	4 Stroke	0.00	0.67	0.00	0.83	0.05	0.01	10.19	0.00	0.00	0.00	0.00	0.00	0.00
Agricultural Mowers	4 Stroke	0.00	0.20	0.00	0.09	0.04	0.01	8.26	0.00	0.00	0.00	0.00	0.00	0.00
Sprayers	4 Stroke	0.01	3.14	0.01	1.36	0.37	0.05	71.76	0.00	0.02	0.00	0.02	0.02	0.00
Tillers > 6 HP	4 Stroke	0.03	6.52	0.01	1.26	0.97	0.14	186.49	0.00	0.04	0.00	0.03	0.03	0.01
Swathers	4 Stroke	0.00	0.96	0.01	1.32	0.08	0.01	16.13	0.00	0.01	0.00	0.01	0.01	0.00
Hydro Power Units	4 Stroke	0.01	1.66	0.00	0.62	0.34	0.05	65.05	0.00	0.02	0.00	0.02	0.01	0.00
Other Agricultural Equipment	4 Stroke	0.01	1.35	0.01	1.59	0.17	0.03	33.19	0.00	0.01	0.00	0.01	0.01	0.00
Irrigation Sets	4 Stroke	0.01	1.53	0.01	2.37	0.16	0.02	31.78	0.00	0.01	0.00	0.01	0.01	0.00
Hydro Power Units	LPG	0.00	0.01	0.00	0.03	0.00	0.00	0.14	0.00	0.00	0.00	0.00	0.00	0.00
Other Agricultural Equipment	LPG	0.00	0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Irrigation Sets	LPG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Hydro Power Units	CNG	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Agricultural Equipment	CNG	0.00	0.00	0.00	0.01	0.00	0.00	0.06	0.00	0.00	0.00	0.00	0.00	0.00
Irrigation Sets	CNG	0.00	0.03	0.01	1.86	0.04	0.01	7.76	0.00	0.01	0.00	0.01	0.00	0.00
		0.09	18.83	0.06	12.57	2.42	0.35	466.52	0.00	0.21	0.00	0.20	0.11	0.02
AIRPORT EQUIPMENT														
Airport Ground Support Equipment	4 Stroke	2.02	793.95	3.02	1,320.94	46.96	45.55	16,861.75	0.02	7.28	0.02	6.69	7.56	1.54
Airport Ground Support Equipment	LPG	0.04	15.42	0.16	57.06	0.62	0.63	227.52	0.00	0.27	0.00	0.27	0.06	0.00
		2.07	809.37	3.17	1,377.99	47.58	46.18	17,089.27	0.02	7.54	0.02	6.96	7.62	1.54
COMMERCIAL EQUIPMENT														
Generator Sets	2 Stroke	0.38	120.51	0.00	0.60	0.75	0.78	238.32	0.02	5.55	0.02	5.10	0.05	0.02
Pumps	2 Stroke	2.76	872.83	0.01	4.61	5.48	5.68	1,741.30	0.13	40.60	0.12	37.35	0.34	0.11
Air Compressors	2 Stroke	0.00	0.32	0.00	0.00	0.00	0.00	0.65	0.00	0.02	0.00	0.01	0.00	0.00
Generator Sets	4 Stroke	6.10	2,098.08	1.93	724.19	230.13	223.23	70,830.35	0.06	18.69	0.06	17.19	12.87	2.66
Pumps	4 Stroke	2.09	704.27	0.56	211.44	53.08	51.49	16,338.03	0.02	6.05	0.02	5.57	3.02	0.64
Air Compressors	4 Stroke	0.85	286.79	0.39	146.92	26.55	25.76	8,172.82	0.01	2.77	0.01	2.54	1.65	0.34
Welders	4 Stroke	1.28	431.34	0.70	261.33	66.31	64.32	20,408.69	0.02	4.85	0.01	4.46	3.57	0.73

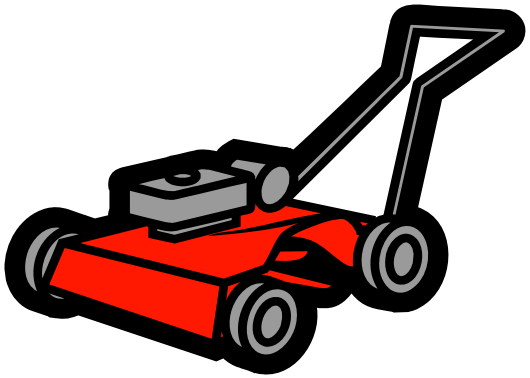
Pressure Washers	4 Stroke	3.60	1,213.95	0.83	312.71	100.36	97.35	30,888.43	0.03	10.42	0.03	9.59	5.46	1.15
Generator Sets	LPG	0.18	57.44	0.88	278.46	2.40	2.46	757.85	0.00	1.29	0.00	1.29	0.30	0.00
Pumps	LPG	0.04	14.15	0.22	68.51	0.59	0.61	186.82	0.00	0.32	0.00	0.32	0.07	0.00
Air Compressors	LPG	0.05	17.27	0.26	83.39	0.72	0.74	228.09	0.00	0.39	0.00	0.39	0.09	0.00
Welders	LPG	0.09	29.03	0.34	107.98	1.36	1.39	427.51	0.00	0.50	0.00	0.50	0.12	0.00
Pressure Washers	LPG	0.00	0.37	0.00	1.37	0.02	0.02	5.40	0.00	0.01	0.00	0.01	0.00	0.00
Generator Sets	CNG	0.00	1.19	0.31	97.56	0.84	0.86	266.30	0.00	0.45	0.00	0.45	0.09	0.00
Pumps	CNG	0.00	0.06	0.02	4.74	0.04	0.04	12.94	0.00	0.02	0.00	0.02	0.00	0.00
Air Compressors	CNG	0.00	0.09	0.02	6.96	0.06	0.06	19.08	0.00	0.03	0.00	0.03	0.01	0.00
Gas Compressors	CNG	0.01	4.23	0.77	243.06	3.45	3.52	1,087.51	0.00	1.24	0.00	1.24	0.22	0.00
		17.46	5,851.89	7.26	2,553.83	492.15	478.31	151,610.11	0.30	93.20	0.28	86.08	27.88	5.66
CONSTRUCTION AND MINING EQUIPMENT														
Tampers/Rammers	2 Stroke	0.98	204.24	0.02	3.48	2.36	0.96	491.89	0.02	12.67	0.02	11.65	0.09	0.03
Plate Compactors	2 Stroke	0.05	11.36	0.00	0.06	0.11	0.04	22.81	0.00	0.53	0.00	0.49	0.01	0.00
Paving Equipment	2 Stroke	0.06	13.43	0.00	0.07	0.13	0.05	27.27	0.00	0.64	0.00	0.59	0.01	0.00
Signal Boards/Light Plants	2 Stroke	0.00	0.10	0.00	0.00	0.00	0.00	0.20	0.00	0.00	0.00	0.00	0.00	0.00
Concrete/Industrial Saws	2 Stroke	2.69	558.05	0.04	8.34	6.34	2.59	1,322.60	0.07	34.09	0.06	31.36	0.23	0.08
Crushing/Proc. Equipment	2 Stroke	0.01	2.71	0.00	0.01	0.03	0.01	5.57	0.00	0.13	0.00	0.12	0.00	0.00
Pavers	4 Stroke	0.04	9.77	0.03	6.40	2.12	0.81	428.30	0.00	0.11	0.00	0.10	0.08	0.02
Tampers/Rammers	4 Stroke	0.00	0.08	0.00	0.04	0.02	0.01	3.37	0.00	0.00	0.00	0.00	0.00	0.00
Plate Compactors	4 Stroke	0.17	37.34	0.03	7.73	3.92	1.50	790.02	0.00	0.31	0.00	0.29	0.14	0.03
Rollers	4 Stroke	0.07	15.78	0.04	11.03	4.03	1.54	812.51	0.00	0.19	0.00	0.18	0.14	0.03
Paving Equipment	4 Stroke	0.22	50.26	0.07	16.29	7.66	2.93	1,545.78	0.00	0.47	0.00	0.43	0.28	0.06
Surfacing Equipment	4 Stroke	0.09	19.21	0.03	6.62	3.48	1.33	701.56	0.00	0.20	0.00	0.18	0.11	0.02
Signal Boards/Light Plants	4 Stroke	0.01	1.32	0.00	0.31	0.18	0.07	35.87	0.00	0.01	0.00	0.01	0.01	0.00
Trenchers	4 Stroke	0.18	39.53	0.08	19.37	6.53	2.50	1,318.29	0.00	0.40	0.00	0.36	0.24	0.05
Bore/Drill Rigs	4 Stroke	0.10	22.29	0.03	6.20	1.91	0.73	385.55	0.00	0.17	0.00	0.16	0.08	0.02
Concrete/Industrial Saws	4 Stroke	0.26	58.44	0.13	33.18	16.40	6.26	3,309.51	0.00	0.75	0.00	0.69	0.50	0.10
Cement & Mortar Mixers	4 Stroke	0.23	53.50	0.05	13.01	6.74	2.58	1,360.38	0.00	0.43	0.00	0.40	0.25	0.05
Cranes	4 Stroke	0.01	2.22	0.01	3.25	0.27	0.10	55.16	0.00	0.02	0.00	0.02	0.02	0.00
Crushing/Proc. Equipment	4 Stroke	0.02	5.14	0.01	2.13	0.94	0.36	190.19	0.00	0.05	0.00	0.05	0.03	0.01
Rough Terrain Forklifts	4 Stroke	0.02	3.41	0.02	5.58	0.36	0.14	71.80	0.00	0.03	0.00	0.03	0.03	0.01
Rubber Tire Loaders	4 Stroke	0.04	8.25	0.06	13.84	0.85	0.33	172.15	0.00	0.08	0.00	0.07	0.08	0.02
Tractors/Loaders/Backhoes	4 Stroke	0.08	18.13	0.04	10.18	5.02	1.92	1,013.16	0.00	0.23	0.00	0.21	0.17	0.03
Skid Steer Loaders	4 Stroke	0.06	13.89	0.06	14.75	2.26	0.86	455.76	0.00	0.14	0.00	0.13	0.12	0.02
Dumpers/Tenders	4 Stroke	0.03	7.17	0.01	2.13	1.05	0.40	212.10	0.00	0.06	0.00	0.05	0.04	0.01
Other Construction Equipment	4 Stroke	0.01	3.00	0.02	4.84	0.30	0.11	60.66	0.00	0.03	0.00	0.02	0.03	0.01
Pavers	LPG	0.00	0.80	0.01	2.96	0.06	0.02	11.82	0.00	0.01	0.00	0.01	0.00	0.00
Rollers	LPG	0.01	1.36	0.02	5.03	0.10	0.04	20.13	0.00	0.02	0.00	0.02	0.01	0.00
Paving Equipment	LPG	0.00	0.21	0.00	0.78	0.02	0.01	3.11	0.00	0.00	0.00	0.00	0.00	0.00
Surfacing Equipment	LPG	0.00	0.14	0.00	0.53	0.01	0.00	2.10	0.00	0.00	0.00	0.00	0.00	0.00

Trenchers	LPG	0.01	2.46	0.04	9.09	0.18	0.07	36.27	0.00	0.04	0.00	0.04	0.01	0.00
Bore/Drill Rigs	LPG	0.00	0.81	0.01	2.99	0.06	0.02	11.87	0.00	0.01	0.00	0.01	0.00	0.00
Concrete/Industrial Saws	LPG	0.01	2.36	0.04	8.65	0.17	0.07	34.97	0.00	0.04	0.00	0.04	0.01	0.00
Cranes	LPG	0.00	0.87	0.02	3.22	0.06	0.02	12.78	0.00	0.01	0.00	0.01	0.00	0.00
Crushing/Proc. Equipment	LPG	0.00	0.14	0.00	0.52	0.01	0.00	2.08	0.00	0.00	0.00	0.00	0.00	0.00
Rough Terrain Forklifts	LPG	0.01	1.56	0.03	5.76	0.11	0.04	22.96	0.00	0.03	0.00	0.03	0.01	0.00
Rubber Tire Loaders	LPG	0.02	3.89	0.07	14.37	0.28	0.11	57.44	0.00	0.07	0.00	0.07	0.02	0.00
Tractors/Loaders/Backhoes	LPG	0.00	0.41	0.01	1.51	0.03	0.01	6.06	0.00	0.01	0.00	0.01	0.00	0.00
Skid Steer Loaders	LPG	0.01	2.78	0.05	10.31	0.20	0.08	41.02	0.00	0.05	0.00	0.05	0.01	0.00
Other Construction Equipment	LPG	0.01	1.29	0.02	4.78	0.09	0.04	19.00	0.00	0.02	0.00	0.02	0.01	0.00
Other Construction Equipment	CNG	0.00	0.00	0.00	0.19	0.00	0.00	0.76	0.00	0.00	0.00	0.00	0.00	0.00
		5.54	1,177.68	1.12	259.51	74.39	28.67	15,074.85	0.10	52.08	0.09	47.94	2.76	0.60
INDUSTRIAL EQUIPMENT														
Sweepers/Scrubbers	2 Stroke	0.03	8.04	0.00	0.04	0.05	0.05	16.24	0.00	0.39	0.00	0.36	0.00	0.00
Other General Industrial Eqp	2 Stroke	0.00	0.64	0.00	0.00	0.00	0.00	1.31	0.00	0.03	0.00	0.03	0.00	0.00
Aerial Lifts	4 Stroke	0.16	54.29	0.17	64.67	4.96	4.81	1,526.27	0.00	0.52	0.00	0.48	0.46	0.09
Forklifts	4 Stroke	0.47	159.51	0.71	267.20	11.02	10.68	3,390.25	0.00	1.47	0.00	1.36	1.52	0.31
Sweepers/Scrubbers	4 Stroke	0.14	47.43	0.13	48.54	4.84	4.70	1,490.67	0.00	0.48	0.00	0.44	0.38	0.08
Other General Industrial Eqp	4 Stroke	0.49	162.62	0.11	42.61	12.36	11.99	3,804.57	0.00	1.42	0.00	1.31	0.62	0.13
Other Material Handling Eqp	4 Stroke	0.01	4.36	0.01	5.22	0.42	0.40	128.43	0.00	0.04	0.00	0.04	0.04	0.01
AC\Refrigeration	4 Stroke	0.00	1.78	0.00	0.87	0.25	0.24	89.68	0.00	0.02	0.00	0.02	0.01	0.00
Terminal Tractors	4 Stroke	0.05	16.69	0.07	27.99	1.16	1.12	356.71	0.00	0.15	0.00	0.14	0.16	0.03
Other Oil Field Equipment	4 Stroke	0.00	0.29	0.00	0.13	0.06	0.05	17.63	0.00	0.00	0.00	0.00	0.00	0.00
Aerial Lifts	LPG	0.06	20.03	0.24	74.43	0.94	0.96	295.19	0.00	0.35	0.00	0.35	0.08	0.00
Forklifts	LPG	5.88	1,853.42	21.76	6,863.94	86.67	88.60	27,338.58	0.10	32.05	0.10	32.05	7.46	0.00
Sweepers/Scrubbers	LPG	0.05	14.54	0.17	53.59	0.68	0.70	214.90	0.00	0.25	0.00	0.25	0.06	0.00
Other General Industrial Equipm	LPG	0.01	4.42	0.05	16.38	0.21	0.21	65.27	0.00	0.08	0.00	0.08	0.02	0.00
Other Material Handling Equipment	LPG	0.00	1.06	0.01	3.94	0.05	0.05	15.61	0.00	0.02	0.00	0.02	0.00	0.00
Terminal Tractors	LPG	0.03	9.04	0.11	33.33	0.42	0.43	133.50	0.00	0.16	0.00	0.16	0.04	0.00
Forklifts	CNG	0.03	8.17	1.63	512.58	6.49	6.63	2,046.01	0.01	2.40	0.01	2.40	0.47	0.00
Sweepers/Scrubbers	CNG	0.00	0.01	0.00	0.62	0.01	0.01	2.48	0.00	0.00	0.00	0.00	0.00	0.00
Other General Industrial Equipment	CNG	0.00	0.01	0.00	0.39	0.00	0.01	1.57	0.00	0.00	0.00	0.00	0.00	0.00
AC\Refrigeration	CNG	0.00	0.02	0.00	1.09	0.01	0.01	4.38	0.00	0.01	0.00	0.01	0.00	0.00
Terminal Tractors	CNG	0.00	0.04	0.01	2.34	0.03	0.03	9.40	0.00	0.01	0.00	0.01	0.00	0.00
Other Oil Field Equipment	CNG	0.00	0.01	0.00	0.44	0.01	0.00	1.82	0.00	0.00	0.00	0.00	0.00	0.00
		7.41	2,366.41	25.20	8,020.35	130.64	131.69	40,950.45	0.13	39.86	0.13	39.49	11.33	0.66
LAWN AND GARDEN EQUIPMENT (COMMERCIAL)														
Rotary Tillers < 6 HP	2 Stroke	1.44	297.48	0.01	1.11	2.63	0.41	544.50	0.01	12.07	0.01	11.10	0.12	0.04
Chain Saws < 6 HP	2 Stroke	11.90	3,915.40	0.16	50.26	24.96	25.88	8,267.78	0.66	212.17	0.61	195.19	1.45	0.48
Trimmers/Edgers/Brush Cutter	2 Stroke	13.78	2,839.86	0.08	15.54	25.93	4.04	5,377.95	0.09	123.66	0.09	113.77	1.16	0.37

Leafblowers/Vacuums	2 Stroke	12.63	2,604.28	0.12	24.25	26.39	4.11	5,471.74	0.10	132.59	0.09	121.98	1.14	0.36
Snowblowers	2 Stroke	0.00	1,001.29	0.00	1.62	0.00	23.97	1,914.77	0.43	34.95	0.40	32.15	0.17	0.09
Commercial Turf Equipment	2 Stroke	0.01	1.14	0.00	0.00	0.01	0.00	2.22	0.00	0.05	0.00	0.05	0.00	0.00
Lawn mowers	4 Stroke	6.50	1,406.35	0.72	175.75	94.23	13.75	18,910.44	0.01	9.53	0.01	8.77	3.31	0.73
Rotary Tillers < 6 HP	4 Stroke	3.33	718.28	0.37	89.84	46.42	6.77	9,315.37	0.00	4.84	0.00	4.45	1.73	0.38
Trimmers/Edgers/Brush Cutter	4 Stroke	0.14	29.52	0.02	4.41	2.37	0.35	474.82	0.00	0.18	0.00	0.17	0.08	0.02
Leafblowers/Vacuums	4 Stroke	2.42	521.83	1.18	289.66	95.52	13.93	19,169.50	0.00	4.86	0.00	4.47	3.61	0.74
Snowblowers	4 Stroke	0.01	144.07	0.00	46.13	0.00	68.04	5,622.07	0.01	1.05	0.01	0.97	1.09	0.22
Rear Engine Riding Mowers	4 Stroke	0.22	47.62	0.09	23.13	12.27	1.79	2,462.75	0.00	0.55	0.00	0.51	0.41	0.08
Front Mowers	4 Stroke	0.32	70.83	0.11	26.79	13.36	1.95	2,681.10	0.00	0.67	0.00	0.62	0.50	0.10
Shredders < 6 HP	4 Stroke	0.39	84.29	0.04	10.27	5.33	0.78	1,070.39	0.00	0.60	0.00	0.55	0.20	0.04
Lawn & Garden Tractors	4 Stroke	2.99	655.84	1.32	321.78	165.55	24.15	33,222.40	0.01	7.73	0.01	7.11	5.64	1.16
Chippers/Stump Grinders	4 Stroke	0.48	106.95	0.44	107.64	22.10	3.22	4,435.72	0.00	1.19	0.00	1.09	0.98	0.20
Commercial Turf Equipment	4 Stroke	11.15	2,452.99	4.72	1,154.38	509.89	74.38	102,324.28	0.02	25.74	0.02	23.68	17.46	3.61
Other Lawn & Garden Eqp.	4 Stroke	0.66	154.68	0.11	27.22	14.56	2.12	2,922.15	0.00	1.24	0.00	1.14	0.55	0.12
Chippers/Stump Grinders	LPG	0.10	20.23	0.36	74.79	1.45	0.22	298.57	0.00	0.35	0.00	0.35	0.08	0.00
		68.46	17,072.92	9.84	2,444.58	1,062.98	269.87	224,488.53	1.35	574.01	1.24	528.12	39.69	8.74
LAWN AND GARDEN EQUIPMENT (RESIDENTIAL)														
Rotary Tillers < 6 HP	2 Stroke	0.21	61.86	0.00	0.22	0.38	0.06	112.22	0.00	2.40	0.00	2.20	0.02	0.01
Chain Saws < 6 HP	2 Stroke	1.93	913.46	0.01	2.97	3.09	3.20	1,474.51	0.07	33.05	0.07	30.41	0.32	0.11
Trimmers/Edgers/Brush Cutter	2 Stroke	4.00	1,195.75	0.02	4.55	7.12	1.11	2,127.23	0.02	45.31	0.02	41.68	0.44	0.15
Leafblowers/Vacuums	2 Stroke	2.45	745.33	0.01	2.71	4.45	0.69	1,328.65	0.02	29.53	0.01	27.17	0.29	0.09
Snowblowers	2 Stroke	0.02	405.45	0.00	0.64	0.00	6.59	758.09	0.12	13.84	0.11	12.73	0.07	0.03
Lawn mowers	4 Stroke	5.66	1,802.61	0.60	210.90	76.21	11.12	22,022.07	0.01	11.35	0.01	10.44	4.22	0.93
Rotary Tillers < 6 HP	4 Stroke	0.51	161.48	0.05	17.94	6.43	0.94	1,857.54	0.00	0.91	0.00	0.84	0.36	0.08
Trimmers/Edgers/Brush Cutter	4 Stroke	0.04	11.01	0.00	1.20	0.43	0.06	123.32	0.00	0.06	0.00	0.06	0.02	0.01
Leafblowers/Vacuums	4 Stroke	0.06	19.07	0.01	2.30	0.82	0.12	235.78	0.00	0.12	0.00	0.11	0.04	0.01
Snowblowers	4 Stroke	0.04	77.39	0.00	18.26	0.00	18.71	2,226.15	0.00	0.42	0.00	0.38	0.43	0.09
Rear Engine Riding Mowers	4 Stroke	0.42	145.85	0.15	54.54	18.02	2.63	5,208.45	0.00	1.24	0.00	1.14	0.93	0.19
Lawn & Garden Tractors	4 Stroke	5.47	1,812.19	2.13	751.58	239.48	34.93	69,205.47	0.01	17.16	0.01	15.79	12.71	2.61
Other Lawn & Garden Eqp.	4 Stroke	0.36	120.27	0.06	20.88	7.86	1.15	2,272.05	0.00	0.96	0.00	0.89	0.43	0.09
		21.16	7,471.69	3.04	1,088.69	364.29	81.31	108,951.53	0.25	156.35	0.23	143.84	20.28	4.39
LOGGING EQUIPMENT														
Chain Saws > 6 HP	2 Stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Shredders > 6 HP	4 Stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Forest Eqp - Feller/Bunch/Skidder	4 Stroke	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
PLEASURE CRAFT														
Outboard	2 Stroke	41.48	16,611.94	1.37	516.42	75.82	2.90	29,351.16	0.09	894.29	0.08	822.75	14.66	3.69

Personal Water Craft	2 Stroke	19.18	7,432.47	0.39	146.61	33.00	1.26	12,775.07	0.03	356.43	0.03	327.91	6.38	1.66
Inboard/Sterndrive	4 Stroke	3.35	1,593.05	2.32	1,061.62	47.89	1.71	17,939.17	0.00	8.43	0.00	7.76	10.32	2.09
		64.01	25,637.45	4.08	1,724.65	156.72	5.87	60,065.41	0.12	1,259.15	0.11	1,158.42	31.36	7.44
RAILROAD EQUIPMENT														
Railway Maintenance	4 Stroke	0.01	4.77	0.01	2.03	0.63	0.61	179.98	0.00	0.05	0.00	0.05	0.03	0.01
Railway Maintenance	LPG	0.00	0.06	0.00	0.22	0.00	0.00	0.88	0.00	0.00	0.00	0.00	0.00	0.00
		0.02	4.83	0.01	2.25	0.63	0.62	180.86	0.00	0.05	0.00	0.05	0.03	0.01
RECREATIONAL EQUIPMENT														
Motorcycles: Off-Road	2 Stroke	6.01	1,734.12	0.02	5.80	5.04	1.52	1,460.02	0.07	65.25	0.06	60.03	0.46	0.18
Snowmobiles	2 Stroke	0.01	391.46	0.00	3.59	0.00	7.49	861.58	0.08	9.05	0.07	8.32	0.51	0.12
ATVs	2 Stroke	6.03	1,741.46	0.02	5.87	5.07	1.53	1,468.51	0.07	65.63	0.06	60.38	0.27	0.15
Specialty Vehicles/Carts	2 Stroke	0.11	35.53	0.04	11.29	4.06	1.23	1,178.04	0.00	0.33	0.00	0.31	0.25	0.05
Motorcycles: Off-Road	4 Stroke	0.16	49.89	0.02	8.42	2.26	0.64	634.63	0.00	0.92	0.00	0.84	0.26	0.05
ATVs	4 Stroke	1.44	450.67	0.22	76.04	20.36	5.77	5,711.65	0.01	8.26	0.01	7.60	2.47	0.51
Golf Carts	4 Stroke	0.40	124.48	0.17	57.19	26.68	7.56	7,484.97	0.00	1.63	0.00	1.50	1.05	0.22
Specialty Vehicles/Carts	4 Stroke	0.12	36.35	0.03	10.20	3.67	1.04	1,028.71	0.00	0.27	0.00	0.24	0.20	0.04
Specialty Vehicle Carts	LPG	0.00	0.77	0.01	2.85	0.04	0.01	11.38	0.00	0.01	0.00	0.01	0.00	0.00
		14.29	4,564.74	0.53	181.25	67.17	26.79	19,839.49	0.23	151.35	0.21	139.24	5.47	1.32

Non-Automotive Gasoline Engines Workgroup



Tony Iavarone

NJDEP Air Quality Planning

August 16, 2005

Workgroup Description

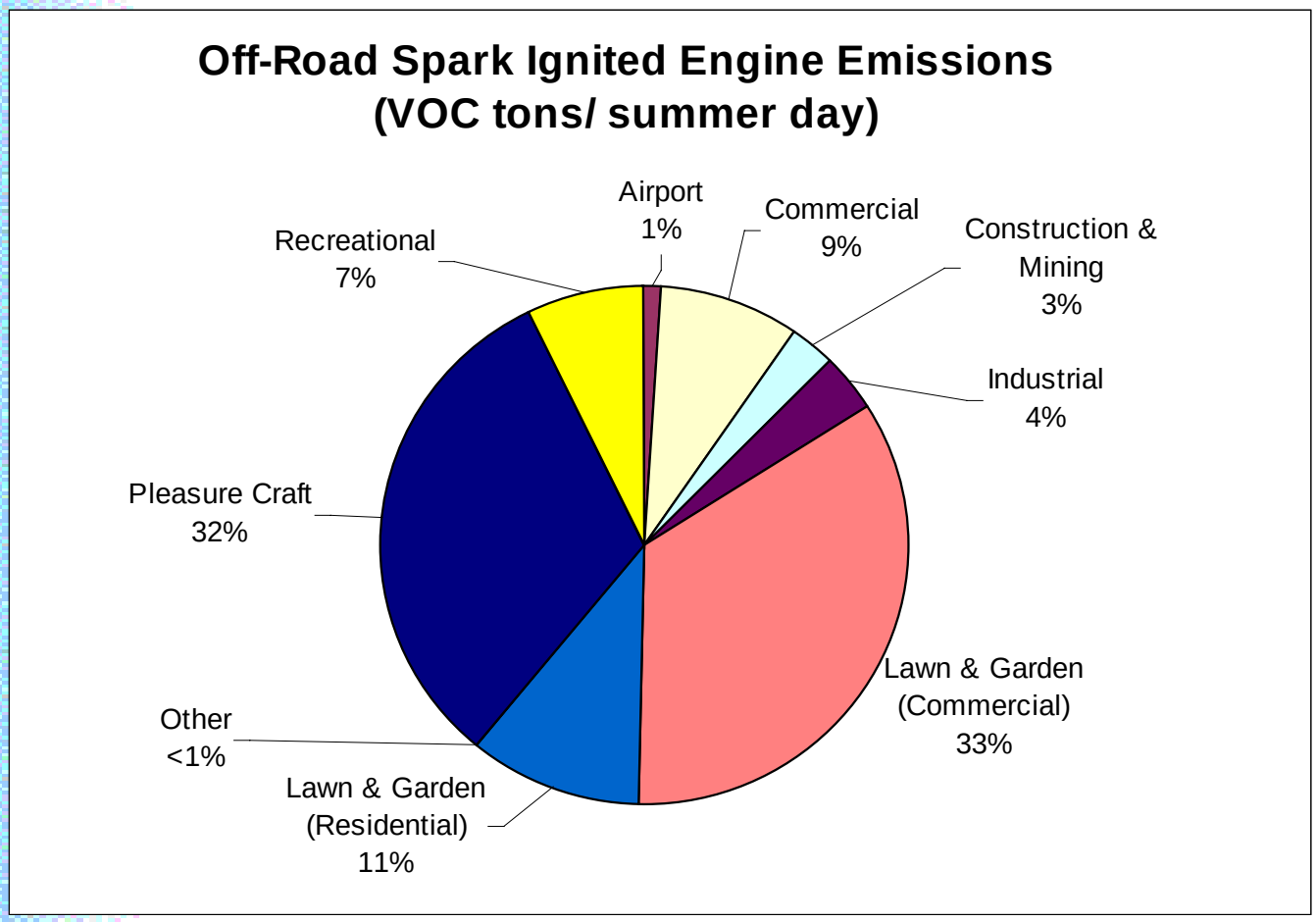
- Recommend emissions control measures for Non-Automotive Gasoline Engines
  - Mobile source category
  - Off-road equipment powered by spark-ignited two- and four-stroke engines.
  - Gasoline, Propane and Natural Gas fueled
  - Commercial, Agricultural, Industrial & Residential
    - Lawn care, Watercraft, Airport, Railroad, Construction, Mining equipment

Why is New Jersey Interested in this Category?

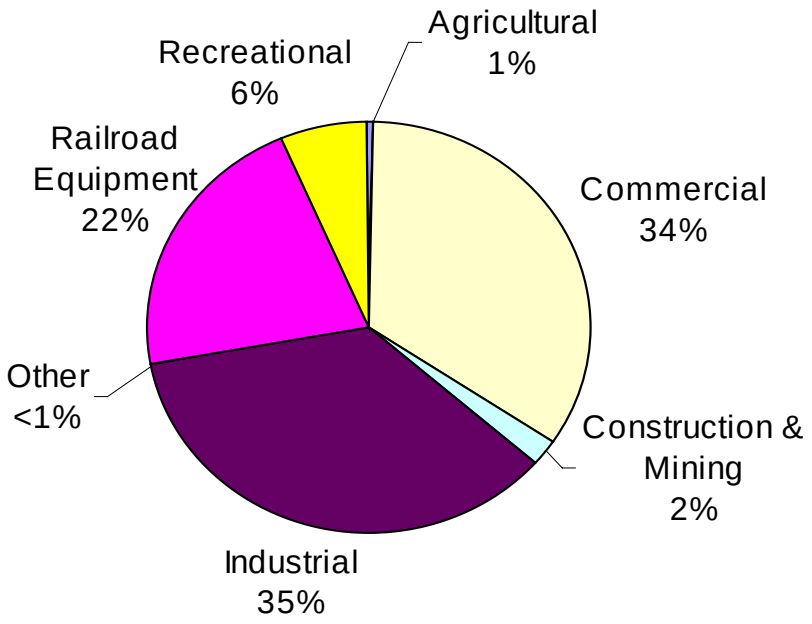
- Off-road spark-ignited engines emit
  - 201 tons per summer day VOC / 15% of State
  - 232 tons per summer day NO_x / 5.4% of State
  - 2150 tons per year $PM_{2.5}$ / 7.4% of State

Lawn and Garden Equipment

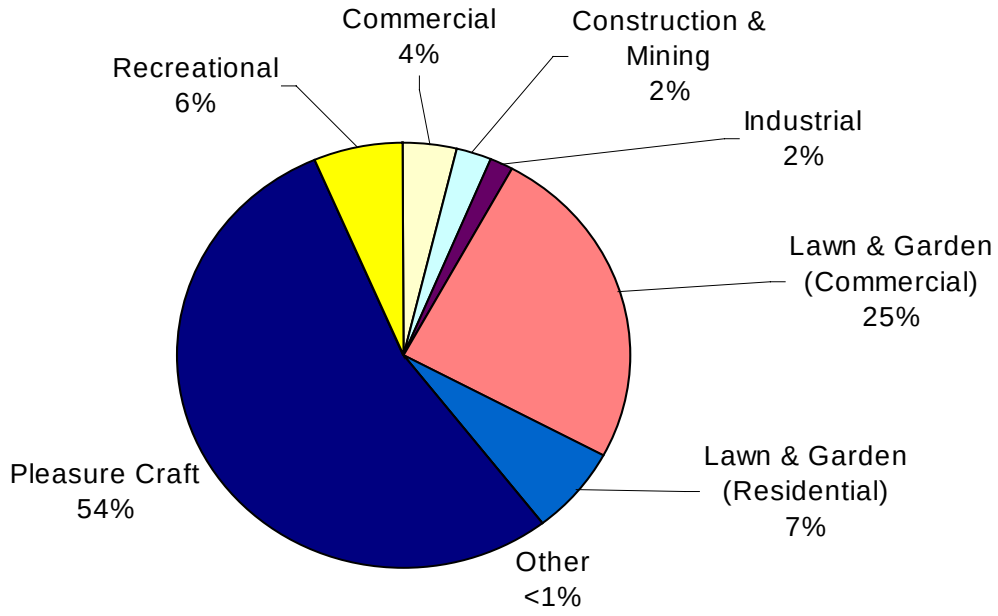
- From off-road spark-ignited engines, Lawn & Garden contributes
  - 44% daily summer VOC
  - 32% of annual $PM_{2.5}$
  - ~5% of NOx


Off-Road Spark Ignited Engine Emissions
(VOC tons/ summer day)
Airport
1%
Commercial
9%
Construction &
Mining
3%
Industrial
4%
Recreational
7%
Pleasure Craft
32%
Lawn & Garden
(Commercial)
33%
Other
<1%
Lawn & Garden
(Residential)
11%

Off-Road Spark Ignited Engine Emissions (NOx tons/ summer day)



Off-Road Spark Ignited Engine Emissions ($PM_{2.5}$ tons/ year)



Workgroup Progress

- Brainstorming-
  - Marine pleasure craft
    - turnover programs- voluntary, incentive or regulatory
    - restrictions on Ozone Alert days
    - fuel vapor control measures
    - public education on air pollution impact
  - Lawn & Garden
    - emissions cap for landscape operations
    - buyback programs to accelerate introduction of new equipment standards
    - restrictions on Ozone Alert days
    - revise state purchasing specifications
    - public education on air pollution impact
    - “Star “ program- commercial operators with newer equipment/ best practices
    - restrictions on used equipment sales
  - Other
    - Gas can replacement program for new design containers
    - Access ideas from general public

Next Steps

- Some ideas fleshed out
- Introduce and flesh out new concepts
- Do we need to revisit the inventory?
- Finish and do report

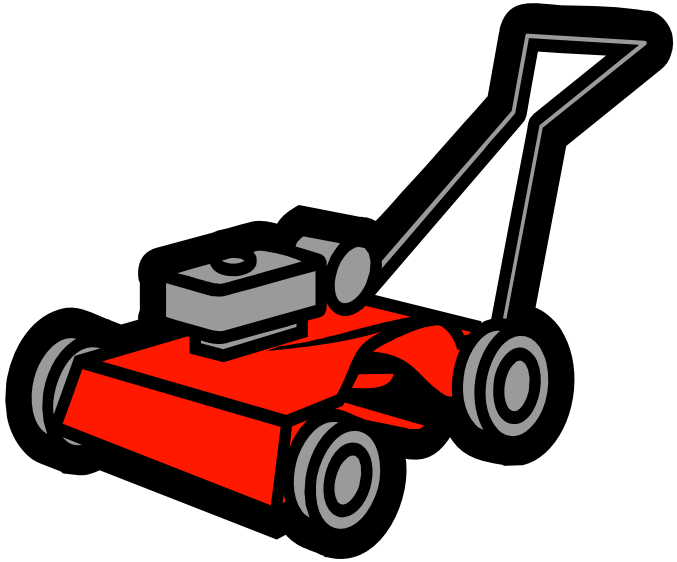
What Other States Are Doing

- California off road engine emissions standards
- California is exploring a replacement program to emphasize electric equipment
- San Francisco coupon/replacement program

Workgroup Charge

- Develop recommendations to reduce VOC, NO_x and PM emissions from off-road "spark-ignited" engines.

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey



Prepared By
The Non-Automotive Gasoline Engines Workgroup

Appendix C – Control Measure Suggestions from the Non-Automotive Gasoline Engines Workgroup

October 31, 2005

NON-AUTOMOBILE GASOLINE ENGINES WORKGROUP
Recommendations for Consideration by NJDEP

1. Accelerated Equipment Turnover Programs

Proposal	Description of Control Measure	Pros	Cons	Rank[1]	Time Frame[2]	Program Type[3]
1. Voluntary boat engine replacement program	● Accelerate turnover of older engines to emission compliant engines ● Partnership with EPA Region 2 to encourage use of cleaner engines ● Develop public education materials	● Increased use of low emission engines ● Increase public awareness ● Public outreach to advertise fuel economy	● Engine costs are high ● Expensive outreach material development for replacement program ● Disposal costs could be a factor ● Need monetary incentives	A	M	V
2. Mandatory boat engine replacement program	● Mandatory retirement program for non-compliant boat engines	● Reduces emissions ● Public outreach to advertise fuel economy	● Costly to boat owners ● The economic impact may force people out of boating ● Disposal cost could be a factor ● Enforcement challenge	No	M	M
3. Commercial landscape equipment replacement program	● Coupon and Scrap Program targeting older engines (Pre 1997) ● Getting rid of the Tier I engines as the equipment ages	● Reduces emissions ● Commercial operators need to turn over equipment	● Potential high cost ● Administrative oversight is time consuming	A	M	V

[1] A = High Priority, AB = Medium Priority, B = Low Priority or No = Not Suggested for Further Evaluation
[2] S = Short (0 – 2 years), M = Medium (2 – 5 years) or L = Long (> 5 years) Term
[3] V = Voluntary or M = Mandatory

4. Residential replacement program for mowers	● Coupon and Scrap Program	● Positive community interest and participation in the program (California) ● Reduces emissions	● Emission reduction is lower than commercial ● Potential high cost to administer ● Administrative oversight is time consuming ● Difficulty in identifying used versus unused equipment	AB	M	V
5. Replacement of gas-powered equipment with newer technology (Residential)	● Replacing gas-powered chainsaws with either newer technology gas-powered or electric-powered ones in residential homes ● Coupon and Scrap Program	● Less expensive than gas-powered	● Monetary incentives needed	A	M	V
6. State agencies to purchase equipment that meet the cleanest emission standards	● Enhance language in the purchase order to include equipment specification NOTE - Contract language already covers this specification. Future contract language should specify requirement for lowest emission rate	● Reduces emissions ● Replace existing state equipment at a faster rate with equipment with the lowest emission rate	● Likely to increase contracting costs	A	M	M

7. "Star" type recognition programs for landscaping operations using cleaner equipment and practices	● Develop a system to recognize commercial landscaping companies that turn over their equipment ~ every two years and have a Best Management Practices component ● Develop a recognition program for manufacturers similar to the 'Energy Star Program' (State will need to develop specifications for this program)	● Raise level of awareness for both consumers and providers about emissions generated by lawn care equipment ● Reward the commercial operations that have lower emissions	● High administrative burden for commercial operators ● Administrative burden for state to develop a program	A	S - M	V
8. Restrictions on secondary markets	● Restricting used equipment sales for non-compliant equipment (This measure will apply to pre emission control equipment only)	● Eliminates non-compliant equipment from the market, thus, reducing emissions	● Difficult to implement ● Negative effects on businesses whose livelihood is sale of secondary market and private sales ● Big manufacturers will be pre-cluded from selling equipment after lease expires ● Devalues equipment assets ● May force extended use of old equipment ● Difficult to enforce ● Legal authority need to be investigated ● Likely to have the strongest impact on small businesses who depend on purchasing used equipment	No	M	M

2. Modification of Activities/Operations						
Proposal	Description of Control Measure	Pros	Cons	Rank	Time Frame	Program Type
9. Activity reductions on ozone and/or PM action days[1] (Boats)	● Prohibit or reduce the number of hours of activities on ozone and/or PM action days	● Emission reduction on ozone and/or PM action days	● The high ozone days are more likely to be days the boaters will want to use their boats ● Limited boating season already exists ● Economic impact on the industry ● Difficult to enforce ● Significant regulatory burden	No		M
10. Emission cap for commercial landscaping	● General permit-track by fuel consumption or log of hours	● Reduces emissions ● Drives turnover to cleaner equipment	● Administrative burden on commercial operators and government ● Difficult to enforce ● May force some small operators to reduce operations to comply – possibly too costly ● Negative economic impact on industry	No	L	M

[1] Days on which ozone and/or PM concentrations are forecast to reach the unhealthy for sensitive groups (USG) category.

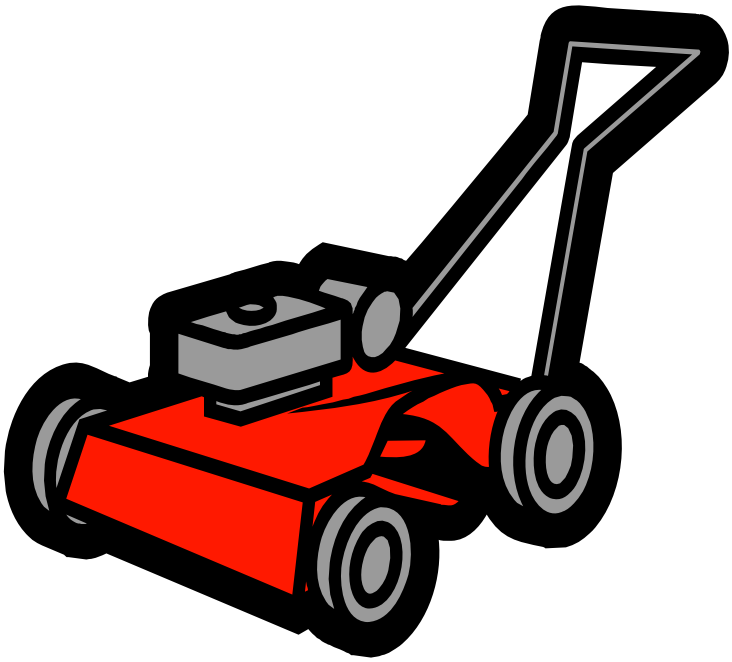
11. Restricting government landscaping equipment activities on ozone and/or PM action days	● Prohibit any landscaping activities for government agencies on ozone and/or PM action days	● Decrease emissions on worst days	● May affect the time it takes to complete work assignments in some agencies that already have restrictions that curtail landscaping operations	A	S	M
12. Restricting use of certain equipment (leaf blowers, trimmers, etc…) on ozone and/or PM action days	● Restrict equipment use (for example, no leaf blowing, etc…) on ozone and/or PM action days	● Decrease emissions on worst days	● Public compliance ● Economic impact on lawn care industry ● Difficult to enforce	A	S-M	M
13. Reduce hours of operating lawn and garden equipment for commercial businesses on ozone and/or PM action days	● Reduce hours of operations on ozone and/or PM action days	● Decrease emissions on worst days	● Public compliance ● Economic impact on lawn care industry ● Difficult to enforce	B	S-M	M

3. Educational Programs						
Proposal	Description of Control Measure	Pros	Cons	Rank	Time Frame	Program Type
14. Public education on Best Management Practices to reduce emissions	● Public notifications (e.g. flyers, posters, pamphlets) ● Update websites (DEP – Clean Marina and MTA/NJ)	● Increase public awareness ● Reduces emissions	● Funding	A	M	V
15. Access ideas from the public through the media	● TV, Radio, and Newspapers advertisements soliciting control measure ideas	● More ideas ● Wider public exposure	● Time consuming ● TV and radio are expensive	Outside the scope of this effort	S - M	V
16. Public education on alternative, low maintenance landscapes	● Alternative landscape practices include tree planting, growing low height turf grasses and ground cover, etc.	● Reduces emissions because less lawn is planted and mowed	● May have high development and outreach costs	A	S - M	V
17. Public education on reducing large lawn areas	● This measure targets corporate offices and residences with large lawn areas	● Reduces emissions through reduced mowing of lawns	● May have high development and outreach costs	A	M - L	V

4. Best Management Practices for Fuel Handling						
Proposal	Description of Control Measure	Pros	Cons	Rank	Time Frame	Program Type
18. Regulate portable fuel tanks for boats (< 7 gallons)	● Extend current Portable Fuel Container regulation to cover boat tanks under 7 gallons ● Replace old tanks with new low emission ones	● Reduces emissions ● Saves fuels ● May not be difficult to manufacture	● Currently unavailable	B	M	M
19. Vapor recovery fueling compatibility for boats that are filled at automobile gas stations	● Modification of the boat fuel tank filler neck to properly interface with Stage II vapor recovery system. Currently, there is no requirement that they are compatible with the gas pump vapor recovery systems on the land side, so vapor escapes	● Reduces emissions ● Saves fuels ● Boats compatible with land side	● Currently unavailable ● United States Coastal Guard (USCG) requires vented tanks that might interfere with the effectiveness of the stage II vapor recovery	A	M	M
20. Use of low-emitting portable fuel containers	● Prohibit gas stations from dispensing fuel into old containers	● Reduces emissions ● Saves fuels ● Affordable	● Cost ● Disposal issues – possible hazardous waste, may be expensive to dispose	B	S	M

21. Vapor recovery for refueling gasoline-powered aircraft	● Regulate the refueling process -Vapor recovery for aircraft refueling	● Reduces emissions	● Aircraft are not covered by Stage II	A	M	M
22. Proper fuel disposal after pre-flight" checks	● Insure that after pre-flight check, fuel is disposed of in a sealed waste container	● Reduces emissions ● Reduces potential contaminated run-off into surface water or ground water		A	M	M
5. Other						
Proposal	Description of Control Measure	Pros	Cons	Rank	Time Frame	Program Type
23. Golf courses and golf cart electrification	● Require equipment turnover to be funded through greens fees, etc. ● Require electric golf carts	● Reduces emissions ● Self funded	● Costs ● No conclusive data that this would reduce emissions to a significant amount to offset costs	B	M	M
24. Evaluate feasibility of low-emitting forklift program when finalized in California	● Mandatory turn over ● Retrofit ● California fleet average program	● Fuel savings ● Reduces emissions	● Costs ● California program not fully developed	A	M - L	
25. State non-road equipment	● Review state operation of non-road equipment	● Reduces emissions	● Costs			M

A Collaborative Report Presenting Recommended Air Quality Strategies for Further Consideration by the State of New Jersey



Prepared By
The Non-Automotive Gasoline Engines Workgroup

Appendix D – White Papers Submitted to the Non-Automotive Gasoline Engines Workgroup

October 31, 2005

National Marine Manufacturers Association
444 North Capitol Street, N.W., Suite 645
Washington, D.C. 20001
202-737-9750 Fax 202-628-4716 www.nmma.org

September 26, 2005

Stella Ononiwu
New Jersey Department of Environmental Protection
Bureau of Air Quality Planning
401 East State Street
P.O.BOX 418
Trenton, NJ 08625

Dear Stella;

The National Marine Manufacturers Association (NMMA) and the New Jersey Marine Trades Association (MTA/NJ) supports the efforts of the New Jersey Department of Environmental Protection (NJDEP) to encourage consumers to replace old technology marine engines with new technology engines.

As part of the Non-Automobile Gasoline Engine Workgroup, Melissa Danko and I have consistently explained that for any program to be successful, it must be voluntary and have sufficient incentive to encourage a consumer who has an old technology engine to trade it in for a new technology engine. The NMMA and MTA/NJ believe that the Memorandum of Understanding (MOU) signed with the NJDEP in 2002 provides a framework for developing a workable engine retirement program.

The NMMA and MTA/NJ strongly oppose any program that would require mandatory engine bans or boating bans on ozone alert days. In addition to the significant economic loss that would be suffered by the owners and families of the over 200, 0000 registered boats in the New Jersey, the state's tourism business and those businesses dependant on boaters would suffer. The economic effect would be devastating, driving many boaters out of boating and scaring potential new customers away from boating.

By the end of this year, virtually all new outboard engines sold in New Jersey will be new technology. The burden of a mandatory old technology engine ban or

boat ban on ozone alert days will be carried by the average hardworking citizen who happens to be a sailor and power boat owner. This includes, not only citizens of New Jersey, but out of state tourists who come to sail, fish, and recreate in the waters.

It is also very important for the NJDEP to recognize that a boating ban not only restricts old technology engines, but all boats and engines. This would include four-stroke and new technology outboards, the very engines we are trying to promote.

During the period from 1993 through the final EPA outboard and PWC rulemaking in 1996, both engine manufacturers and the USEPA struggled with both the emission limits and timing for introducing new technology engines. In a perfect world, the marine industry would snap its fingers and all consumers would have zero emission engines. In the real world the technology needs to be researched, invented, tested, produced and marketed. Marine engine technology development presents durability and safety challenges that are not found with other types of engines. This is an especially daunting task due to the expense that must be absorbed by an engine manufacturer for a product that people purchase with their discretionary income, for fun.

NMMA and the MTA/NJ are ready willing and able to work with the NJDEP to assist in promoting the sale of new technology engines. We recognize that maintaining a healthy recreational marine business climate is vital to New Jersey's tourism economy. Please feel free to contact either Melissa Danko or myself if you have any questions.

Sincerely

John McKnight, Director
EH&S Compliance

Melissa Danko, Executive Director
Marine Trades Association of NJ

State of New Jersey

DEPARTMENT OF TRANSPORTATION
P.O.Box 600
Trenton, New Jersey 08625-0600

RICHARD J. CODEY
Acting Governor

JACK LETTIERE
Commissioner

October 13, 2005

Stella Ononiwu
New Jersey Department of Environmental Protection
Bureau of Air Quality Planning
401 East State Street
PO Box 418
Trenton, New Jersey 08625

Subject: White Paper Submission

Dear Ms. Ononiwu:

The following comments are submitted in response to the Non-Automobile Gasoline Engines Work Group's proposal to "Prohibit any landscaping activities for government agencies" on Ozone Alert Days:

> The Department's "Operations" is not in favor of any proposed language that prohibits the Department's landscaping activities on ozone alert days. We currently have restrictions that curtail operations, and this would be another restriction to have to work around to get the required work completed.
>
> Besides normal mowing operations, we need to cut back brush and growth that obstructs signage and line-of-sight of the roadway (e.g. at ramps and intersections). The motoring public's safety can be affected. Forty-four (44) days of ozone alerts, as in 2002, could significantly affect the Department's landscape operations as well as other scheduled roadway maintenance considering all of that lost time.

Sincerely,

Jeffrey J. Callahan

Jeffrey J. Callahan
Assistant Commissioner
Operations