The State of New Jersey
Department of Environmental Protection

Proposed
State Implementation Plan Revision for the Attainment and Maintenance of the 1-Hour Ozone National Ambient Air Quality Standard

Update to Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy: Additional Emission Reductions, Reasonably Available Control Measures Analysis, and Mid-Course Review

Appendix III: Reasonably Available Control Measures Analysis

June 18, 2001

Reasonably Available Control Measures (RACM) Analysis for the Two Severe Ozone Nonattainment Areas in New Jersey

I. Introduction

This document provides an analysis of both potential transportation control measures (TCMs) for on-road mobile sources and non-TCM potential control measures for point, area, off-road and on-road source categories in order to document whether or not there are additional reasonable available control measures (RACM). The analysis will determine if any RACM are available for inclusion in the ozone attainment plans for the New Jersey portions of the Northern New Jersey/New York City/Long Island (New York area) and Philadelphia/Wilmington/Trenton (Philadelphia area) severe ozone nonattainment areas. This analysis is in response to USEPA's request documented in the letter from Kathleen C. Callahan, USEPA Director of Environmental Administrator of Air Quality Management dated January 18, 2001 (Attachment III-D).

II. Background

As a result of comments received by the USEPA during the public comment period for the attainment demonstrations for eight severe and serious ozone nonattainment areas outside of New Jersey, the USEPA has recently determined that the states must document an analysis to determine whether or not additional reasonably available measures exist that would advance the attainment date for nonattainment areas. Reasonable available measures that would advance the attainment date are considered RACMs that must be included in the SIP. The comments contended that RACMs are necessary to ensure that the attainment date is "as expeditious as practicable". The comments specifically focused on the failure of SIPs to address TCMs that are RACM, but the comment was directed to stationary source measures as well. New Jersey has previously submitted a list of control measures already in place as part of the Phase II Ozone SIP. Based on the recent comments and evolving guidance, the USEPA has determined that additional analysis and documentation is required.

The USEPA has cited the following guidance (Attachment III-D) regarding the RACM requirement issue. Excerpts from these references are provided below because they explain the Clean Air Act (CAA) RACM requirement and the subsequent related USEPA interpretations. Each reference is cited below along with a summary of the relevant guidance.

- Federal Register/Vol. 44, No. 66/April 4, 1979/General Preamble for Proposed Rulemaking. The USEPA provides the following guidance on the need for all RACM in the SIP. "Part D requires the SIP to provide for the level of control necessary to assure attainment of the standards as expeditiously as practicable, and no later than the specified deadlines, and reasonable further progress in the interim. It does not require that all sources apply RACM if less than all RACM will suffice for reasonable further progress and attainment. Therefore, if a state adopts less than all RACM and demonstrates (a) that reasonable further progress and attainment of the NAAQS are assured, and (b) that application of all RACM would not result in attainment any faster than a plan with less than all RACM may be approved. An exception is that most ozone SIPs must include, as a minimum, RACT requirements for certain stationary sources."

- Federal Register/Vol. 57, No. 74/April 16, 1992/Proposed Rules/General Preamble. The USEPA provides an interpretation of the Clean Air Act (CAA) Section 172(c)(1) requirement that the plans for all nonattainment areas provide for the implementation of all RACMs as expeditiously as practicable. The USEPA indicates that where measures that might in fact be available for implementation in the nonattainment area but could not be implemented on a schedule that would advance the date for attainment for the area, the USEPA would not consider it reasonable to require implementation of such measures. Also, the CAA Section 108(f) list of TCMs are: not necessarily reasonable available in all areas, should not be viewed as exhaustive, and can be considered as groups of interacting measures rather than individual measures. Also, with respect to TCMs or any other control measures, "EPA does not believe that Congress intended the RACM requirement to compel the adoption of measures that are absurd, unenforceable or impracticable." Furthermore, the USEPA believes that its "RACM interpretation would provide for the rejection of control measures as not reasonable available for various reasons related to local conditions even where such costs fell short of substantial widespread impact." Finally, "any measure that a comment indicates during the public comment period is reasonably available for a given area should be closely reviewed by the planning agency to determine if it is in fact reasonably available for implementation in the area in light of local circumstances."

- EPA Memorandum, "Guidance on the RACM Requirement and Attainment Demonstration Submissions for Ozone Nonattainment Areas", from John S. Seitz, EPA Director Office of Air Quality Planning and Standards to the EPA Regional Air Division Directors Regions I-IX, dated November, 1999. This memorandum states that "in order for EPA to determine whether a State has adopted all RACM necessary for attainment as expeditiously as practicable, the State will need to provide a justification as to why measures within the areas of potentially reasonable measures

have not been adopted. The justification would need to support that a measure was not reasonably available for that area and could be based on technological or economic grounds. Sources of potentially reasonable measures include measures adopted in other nonattainment areas and measures that the EPA has identified in guidelines or other documents."

- EPA Memorandum, "Additional Submission on RACM From States With Severe 1-hour Ozone Nonattainment Area SIPs", from John S. Seitz, EPA Director office of Air Quality Planning and Standards and Marge Oge, EPA Director Office of Transportation and Air Quality to Regional Air Division Directors, Regions I, II, III, V and VI, December 14, 2000. The USEPA states that "for purposes of the attainment demonstration SIPs, measures could be justified as not meeting RACM if a measure (a) is not technically or economically feasible, or (b) does not advance the attainment date for the area." The USEPA also notes that "EPA's guidance provides that even measures that are included in a TIP may possibly be determined to not be RACM if they do not meet the RACM tests outlined in EPA guidance and the CAA."

- Federal Register/Vol. 66, No. 2/January 3, 2001/Final Rule for Approval and Promulgation of Air Quality Implementation Plans; Connecticut; One-Hour Ozone Attainment Demonstration and Attainment Date Extension for the Greater Connecticut Ozone Nonattainment Area. The USEPA states that "the EPA's approach toward the RACM requirement is grounded in the language of the Clean Air Act. Section 172 (c)(1) states that a SIP for a nonattainment area must meet the following requirement, 'In general. – Such plan provisions shall provide for the implementation of all reasonable available control measures as expeditiously as practicable (including such reductions in emissions from existing sources in the area as may be obtained through the adoption, at a minimum, of reasonable available control technology) and shall provide for attainment of the national primary ambient air quality standards'. The EPA interprets this language as tying the RACM requirement to the requirement for attainment of the national primary ambient air quality standard. The Act provides that the attainment date shall be 'as expeditiously as practicable but no later than the deadlines specified in the Act.' EPA believes that the use of the same terminology in conjunction with the RACM requirement serves the purpose of specifying RACM as the way of expediting attainment of the NAAQS in advance of the deadline specified in the Act. In other words, because of the construction of the RACM language in the CAA, EPA does not view the RACM requirement as separate from the attainment demonstration requirement. Therefore, EPA believes that the Act supports its interpretation that measures may be determined to not be RACM if they do not advance the attainment date. In addition, EPA believes that it would not be reasonable to require implementation of measures

that would not in fact advance attainment."

"The term reasonable available control measure is not actually defined in the definitions in the Act. Therefore, the EPA interpretation that potential measures may be determined not to be RACM if they require an intensive and costly effort for numerous small area sources is based on the common sense meaning of the phrase, that is technologically and economically feasible and that can be readily implemented. Ready implementation also includes consideration of whether emissions from small sources are relatively small and whether the administrative burden, to the States and regulated entities, of controlling such sources was likely to be considerable. As stated in the General Preamble, EPA believes that States can reject potential measures based on local conditions including cost."

III. Transportation Control Measures (TCM) Analysis

A. Introduction of TCMs

This section provides information on the ozone precursor[1] emissions reduction potential of 15 prospective mobile source measures for the New Jersey portion of the New York-New-Jersey-Long Island ozone nonattainment area and the New Jersey portion of the Philadelphia -Wilmington-Trenton ozone nonattainment area. These potential transportation control measures (TCMs) affecting mobile source emissions may be grouped into the following categories:

- Travel Demand Management (TDM) / Commuter Choice
- Transportation Pricing Strategies and Scenarios
- Traffic Flow Improvements
- Transit Projects and Transit Oriented Design
- Vehicle Fuel and Technology

This section also provides an impact analysis of two non-mobile source measures that have potential to reduce vehicle miles traveled (VMT) and thus vehicle emissions. However, these two measures are not being included as possible "TCMs". These two measures are land use related which NJDOT does not have the authority to control.

B. Background on Transportation Control Measures (TCMs) in New Jersey

After the passage of the Clean Air Act Amendments of 1990, New Jersey made a full-scale commitment to traditional Transportation Control Measures (TCMs). TCMs are transportation strategies which reduce emissions by reducing the number and/or length of vehicle trips and/or improve traffic flow. The State included 134 TCMs in the original 15% Rate of Progress SIP in 1993 which provided 1.4 tons per day of

[1] Ozone precursors are volatile organic compounds (VOC) and oxides of nitrogen (NO_x).

volatile organic compound (VOC) emission reduction. This was less than 0.7% of the 209 tons of reduction needed to meet the 15% VOC reduction target.

While New Jersey has since opted not to include TCMs in the SIP, the New Jersey Department of Transportation (NJDOT) has continued to commit to the support and implementation of air quality friendly transportation projects and programs. Of the 134 TCMs included in the 1993 SIP, approximately 80% have been completed. New Jersey has initiated new programs such as Transit Villages, the Smart Moves for Business program and a program to implement 2000 miles of bicycle accommodations by the year 2010. The NJDOT has also committed to study value pricing, household transportation choices through the use of household trip diaries, the use of electric cars to and from rail stations, ultra low sulfur fuels, reductions in truck idling, and improved catalytic converters. The NJDOT has also been a leader in state government efforts to implement the State Development and Redevelopment Plan (SDRP), which is a program within the Office of State Planning in the Department of Community Affairs. In addition, the state's transportation capital program continues to stress transit projects, system preservation, and systems management over the provision of new highway capacity.

C. Identification of Potential Mobile Source Measures

The measures considered for this RACM evaluation were identified by NJDOT in consultation with the New Jersey Department of Environmental Protection (NJDEP). These measures were initially assessed as available in the context of potential for implementation, and then each was analyzed for their potential ozone precursor emissions reductions, economic impacts, practicality, and adverse impact.

Section 108(f) of the Clean Act Amendments of 1990 list 16 potential TCMs:

1. Programs for improved public transit
2. High occupancy vehicle (HOV) lanes
3. Employer-based transportation management plans
4. Trip reduction ordinances
5. Traffic flow improvement programs
6. Fringe and transportation corridor parking for high occupancy vehicle programs
7. Limits or restrictions on vehicle use in specified areas
8. HOV and shared-ride programs
9. Bicycle and pedestrian facilities, lanes and restrictions
10. Bicycle storage, travel lanes and related improvements and programs
11. Control of idling vehicles
12. Reduction of extreme cold start emissions
13. Employer-sponsored flexible work schedules
14. Facilitation of non-automobile, HOV, and mass transit travel
15. Pedestrian and non-motorized vehicle facilities, paths and areas
16. Voluntary retirement of pre-1980 light duty vehicles

Note: Measure #12 is not applicable to weather conditions experienced in New Jersey.

Additionally, an extensive literature review and New Jersey experience on TCMs was consulted to guide the identification and selection of measures for analysis. Sources used to identify potential TCMs are listed in Attachment III-A of this Appendix.

New Jersey has extensive experience with numerous measures in each of the geographic areas analyzed. Direct state experience ranges from individual transportation system improvements (e.g., transit service route changes) to broad programs (e.g., volunteer & episodic programs, Smart Moves for Business, former Employee Commute Options programs). Measures for which the literature or experience supported potential qualification as RACM were analyzed. This includes hundreds of measures that were considered in earlier analyses.[2]

D. Mobile Source Measures Analyzed

TCM 1	Travel Demand Management (TDM) Measures
TCM 2	Bicycle Projects
TCM 3	Parking Cash Out
TCM 4	E-Z Pass Toll System
TCM 5	Incident Management
TCM 6	Commercial Vehicle Information Systems and Networks (CVISN)
TCM 7	Arterial/Signal System Improvements
TCM 8	Transit Villages
TCM 9	Transit Fixed Guideway Projects
TCM 10	System Wide Transit Fare Reduction (No Fare Increase)
TCM 11	System Wide Transit Service Expansion
TCM 12	High Emitter Vehicle Detection (Dirty Screening)
TCM 13	Bio Diesel Fuel
TCM 14	Retrofit Technologies
TCM 15	Electric Vehicles at Transit Stations

E. Non-Mobile Source Measures Evaluated

Impact of Open Space Preservation (1,000,000 acres)
Impact of State Development and Redevelopment Plan

F. Evaluation Criteria

Criteria for Reasonably Available Control Measures include measures which are technologically and economically feasible, do not have widespread or unreasonable adverse impacts, are legally enforceable and practical, and which advance the attainment date. Each is briefly summarized below in the context of mobile source emissions control measures. States must justify why measures within the realm of potentially reasonable measures have not been adopted as RACM.

- Technological and Economical Feasibility
- Relevant technology exists or is reasonably expected to exist within the schedule allotted, is sufficiently available, and can be applied to achieve a stated result. For transportation measures, this item includes technological changes to vehicles, fuels, necessary infrastructure

[2] See NJ reports, ibid.

and similar considerations.

- The cost associated with a measure are justifiable relative to results, affordable, and compare favorably with other potential emissions control measures (of all types on all emissions sources).

- Adverse Impacts, Enforceability and Practicality

- RACM measures should not cause widespread and long-term adverse impact. Considerations may include, but are not limited to, disruption of fuel supplies, non-discrimination among various population groups, critical reduction in mobility, and similar concerns.
- Measures must be legally enforceable, and legal under federal and state law. This is a key aspect regarding land use issues, which are vested at the local governmental level under New Jersey's Home Rule.
- RACM measures should be practical, realistic and have a strong potential to achieve estimated emissions reductions.
- May be implemented and produce the anticipated emissions reductions in the timeframe allowed. This includes consideration of the schedule for planning, regulatory action, implementation and time to achieve the targeted results.

- Will advance the statutory attainment date.

Emissions reductions are sufficient to advance the attainment date in each ozone nonattainment area, as follows:

- From 2007 to 2006 for the New Jersey portion of the New York-New Jersey-Long Island severe 17 ozone nonattainment area.

- From 2005 to 2004 for the New Jersey portion of the Philadelphia-Wilmington-Trenton severe 15 ozone nonattainment area.

This analysis was conducted to investigate the advancement of the ozone attainment date by at least one ozone season, based on the facts that [a] ozone is a summer seasonal phenomenon and [b] mobile source emissions modeling is performed on the basis of an average summer day for a particular summer, per USEPA regulatory models and SIP requirements. This analysis approach is the most advantageous for air quality improvement.

New Jersey concurs with the USEPA that no entity can analyze every conceivable emissions control measure. Rather, an analysis of those measures representative of the universe of measures, and those which are most likely to yield sufficient or significant emissions benefits is warranted. Similarly, the analyses performed incorporate standing technical practices, and need not include every conceivable technical analysis.

G. Analysis and Methodology

- The process followed and analyses performed conform to the United States Environmental Protection Agency (USEPA) guidance regarding Reasonably Available Control Measures (RACM).[3] Each potential measure was analyzed separately for the Northern New Jersey and the Philadelphia area of New Jersey, both classified as severe nonattainment areas for ozone.

[3] Includes: Additional Submission on RACM from States with Severe 1 hour Ozone Nonattainment Area SIPs, December 14, 2000, EPA; General Preamble to the Clean Air Act Amendments of 1990; RACM Analysis for Four Serious Areas Designated Nonattainment for 1 Hr- Ozone NAAQS, October 12, 2000, EPA; CAA, November 15, 1990.

By the USEPA's definition, a measure(s) classified as an RACM must [1] be technologically and economically feasible, and [2] advance the attainment date for the area.[4] States are not required to implement those measures which may cause widespread and long-term adverse impact, or which are not enforceable or impractical.

Analysis of prospective emission control measures was performed for each nonattainment area. Modeling inputs were derived from a wide array of sources, including New Jersey Department of Transportation, New Jersey Transit, and the North Jersey Transportation Planning Authority, and MOBILE model inputs and outputs for each of the three major modeling areas.[5]

For the purposes of analysis, "advancement of the attainment date" was analyzed for a one ozone summer season acceleration (from 2007 to 2006 in northern New Jersey and from 2005 to 2004 in southern New Jersey.) Analysis information includes:

- Analysis dates are 2006 for the New Jersey portion of the NY-NJ-LI severe 17 ozone nonattainment area and 2004 for the New Jersey portion of the Philadelphia-Wilmington-Trenton Severe 15 ozone nonattainment area.

- Prospective measures were analyzed with an implemented date not later than one ozone season prior to the statutory attainment deadline.

- The Post Processor for Air Quality (PPAQ) was used. PPAQ is New Jersey's standard off-model tool for handling data inputs, triggering MOBILE5b, and aggregating regional outputs.

- MOBILE5b provided emissions factors for start, running, soak and diurnal emissions.

- Vehicle fleet data was based from 1999 age distributions, as projected forward by the USEPA's regulatory model MOBILE5b to the analysis year for each area.

- Other MOBILE5b inputs were per existing New Jersey practice, as evidenced in the existing state implementation plans and adjusted for the advanced start date.

H. Analysis Methodology Tools and Data

Off-network analysis techniques, such as the Federal Highway Administration (FHWA) Travel Demand Management (TDM) model, were used for measures which included transportation demand elements not included in traditional travel demand forecasting models, or with a magnitude of change not likely to be reflected in a regional demand model.

Existing demand forecasting models were used to analyze infrastructure improvements of sufficient scale to be reflected in these models. It should be noted that the current regulatory model (MOBILE5) only accounts for average speed. It does not account for change in variation. As such, emissions benefits from projects that reduce queuing or smooth flow may not be calculated correctly.

For each prospective emission control measure, a methodology was identified or developed that [1] encompassed that measure, [2] was within the technical confines of data and analysis tools, and [3] was reflective of the nature and extent of potential emissions reductions.

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[4] Additional Submission on RACM from States with Severe 1 hour Ozone Nonattainment Area SIPs, December 14, 2000, EPA.

[5] Per NJDOT model parameters and counties included in each modeling area.

These analysis methodologies followed practices and techniques in the literature, prior New Jersey experience, and applications from other states.

Projects and programs currently listed on a transportation improvement program (TIP) or long range plan (Plan) are those which may proceed to implementation. This information is used to model future year transportation and related emissions. Inclusion of a project or program on a TIP or Plan does not constitute a binding commitment that these items will proceed as depicted. Similarly, projects and programs may be included in the modeling assumptions for the applicable attainment year, in which case additional emissions reductions are not available for these projects as currently defined.

I. TCM Analysis Results

The analysis finds that none of the TCMs, singly or in combination, will yield emissions benefits sufficient to advance the attainment date for the respective New Jersey ozone nonattainment areas. Emissions benefits from VOC and NOx combined range from 0.0 tons/day to 2.054 tons/day in the New Jersey portion of the New York-New-Jersey-Long Island ozone nonattainment area and from 0.0 tons/day to 1.10 tons/day the New Jersey portion of the Philadelphia -Wilmington-Trenton ozone nonattainment area.

Additionally, the analysis finds that the cost effectiveness of implementing certain measures from an air emissions perspective is above reasonable levels. From that perspective, these costs are likely to represent substantial and widespread adverse impacts imposed on the residents, taxpayers and travelers in the potentially affected areas. TCMs may provide other societal benefits.

Tables 1 and 2 are a summary by nonattainment area of the 15 TCMs that were considered and analyzed. Attachment III-B provides a more detailed description of each TCM and the basic assumptions that were used.

J. Impact of Land Use Measures

Although land use measures are not under the authority of the NJDOT, two current statewide programs were reviewed and evaluated for their potential impact to reduce vehicle miles traveled (VMT) and emissions. The two measures are:

- Impact of Open Space Preservation (1,000,000 acres)

  The New Jersey Governor's Office has committed to preserving 1,000,000 acres of open space, throughout the entire state, over a 10-year period. Motor vehicle emissions are impacted to the extent that this occurs and influences development patterns by the analysis year. New Jersey is a "home rule" state. As such, there is no legally binding commitment to this program at the local level.

  There is a wide range of benefits associated with this type of program. However, for the purposes of this analysis, the benefits were confined to the consideration of air quality impacts only. This measure was only modeled for Northern New Jersey because it was reasoned that in comparison to Southern New Jersey, the North is where this type of program would have the greatest impact. It is assumed that the benefits achieved in Northern New Jersey would represent the best case,

Table 1
New Jersey Portion of NY-NJ-LI Ozone Nonattainment Area (2006)
Summary of Findings, Mobile Source Emission Measures

	Potential Transportation Control Measure under Federal Reasonably Available Control Measure (RACM) Requirement (1)	Emission Benefits (VOC+NOx tons/summer day)	Feasibility			Cost per ton
			Legal Issues (2)	Techno-logical (3)	Schedule (4)	
1	Travel Demand Management (TDM) Measures	0.354	voluntary only	yes	yes	$118,110
2	Bicycle Projects	0.207	none	yes	yes	$5,797
3	Parking Cash Out	0.182	not legally enforceable	yes	yes	$913,077
4	EZ Pass Toll System	0.160	none	yes	yes	$6,250
5	Incident Management	0.100 increase	none	yes	yes	no reduct'n
6	Commercial Vehicle Information Systems (CVISN)	1.459 increase	none	likely	no	no reduct'n
7	Arterial / Signal System Improvements	0.090	none	yes	yes	$786,000
8	Transit Villages	0.012	none	yes	yes	$50,000
9	Transit Fixed Guideway Projects	1.342	none	yes	yes	$196,572
10	System Wide Transit Fare Reduction (No Fare Increase)	0.893	none	yes	yes	$343
11	System Wide Transit Service Expansion	2.054	none	no	no	$42,401
12	High Emitter Vehicle Detection (Dirty Screening)	1.100	state law prohibits	yes	yes	$10,000
13	Bio Diesel Fuel	1.730	none	possible	no	$2,396
14	Retrofit Technologies	0.058	none	maybe	no	$17,045
15	Electric Vehicles at Transit Stations	0.001	insurance	yes	yes	$307,258

Table 2
New Jersey Portion of Phil-Wil-Trenton Ozone Nonattainment Area (2004)
Summary of Findings, Mobile Source Emission Measures

	Potential Transportation Control Measure under Federal Reasonably Available Control Measure (RACM) Requirement (1)	Pollution Reduction Effectiveness (VOC+NOx	Feasibility			Cost per ton
			Legal Issues (2)	Techno-logical (3)	Schedule (4)	
1	Travel Demand Management (TDM) Measures	0.105	voluntary only	yes	yes	$118,110
2	Bicycle Projects	0.059	none	yes	yes	$5,797
3	Parking Cash Out	0.093	not legally enforceable	yes	yes	$913,077
4	EZ Pass Toll System	0.120	none	yes	yes	$6,250
5	Incident Management	*-0.021*	none	yes	yes	no reduct'n
6	Commercial Vehicle Information Systems (CVISN)	*-1.744*	none	likely	no	no reduct'n
7	Arterial / Signal System Improvements	0.120	none	yes	yes	$786,000
8	Transit Villages	0.003	none	yes	yes	$50,000
9	Transit Fixed Guideway Projects	0.004	none	yes	yes	$196,572
10	System Wide Transit Fare Reduction (No Fare Increase)	0.013	none	yes	yes	$343
11	System Wide Transit Service Expansion	0.379	none	yes	no	$42,401
12	High Emitter Vehicle Detection (Dirty Screening)	1.100	state law prohibits	yes	yes	$10,000
13	Bio Diesel Fuel	0.990	none	possible	no	$2,396
14	Retrofit Technologies	0.036	none	maybe	no	$17,045
15	Electric Vehicles at Transit Stations	0.004	insurance	yes	yes	$307,258

or high end of the potential benefit spectrum. The estimated emission benefits are approximately 0.11 tons per day (VOC + NOx) with an estimated cost per ton of $1.78 million.

A November 1998 statewide referendum approved funding. Available revenues accrue over time, with early years funding and activity anticipated to be focused on identification of parcels and the means and priorities associated with acquisition. As such, this is anticipated to be a 10 year program and would be phased in, with significant activity in the final years of the program. Implementation not to be completely in place by 2004 or 2006 would be partial, and is not anticipated to "advance the attainment date

- Impact of State Development and Redevelopment Plan

The State Development and Redevelopment Plan is based on "smart growth" principles, and concentrates growth into urban centers along main transportation corridors as opposed to low-density, decentralized suburban development. It is estimated that the plan will enable the same growth in population and employment to occur, but will require substantially less expansion of the highway system.

This measure was analyzed through the application of data from the NJDOT publication "Transportation Choices 2025, New Jersey Long Range Transportation Plan Update" (March 2001) to the projected impact of the SDRP through the analysis year. The estimated emission benefits are 0.452 tpd (VOC + NOx). The cost per ton is difficult to quantify because there are too many unknown variables.

As with any long range planning effort, this program will not produce immediate results. The prevailing development pattern in NJ, and across much of the country, over the past fifty years, which is suburbanization, has been the exact opposite of what this program is advocating. Therefore, long lead times will be required before this measure will have an impact and can be effective on a regional scale.

It should be noted that the SDRP is only a plan that provides for voluntary participation by independent municipal government units, which control land use, zoning and permitting within their borders. As such, the SDRP has no force of law under New Jersey's Home Rule, and is considered to be guidance and policy direction only.

IV. Non-TCM Analysis

In this analysis potential control measures are identified and assessed against RACM criteria for all significant emission source categories in the stationary point, stationary area, mobile off-road and mobile on-road (except TCMs) sectors. The methodology and results of the non-TCM control measure analysis are discussed in this section. The overall conclusions for both the TCMs and non-TCM control measures are provided in Section V.

The overall methodology involved the performance of an emission inventory screen to identify significant source categories followed by a screening of potential control measures for the significant source categories. The methodology is summarized in Figure 1 and discussed in detail below.

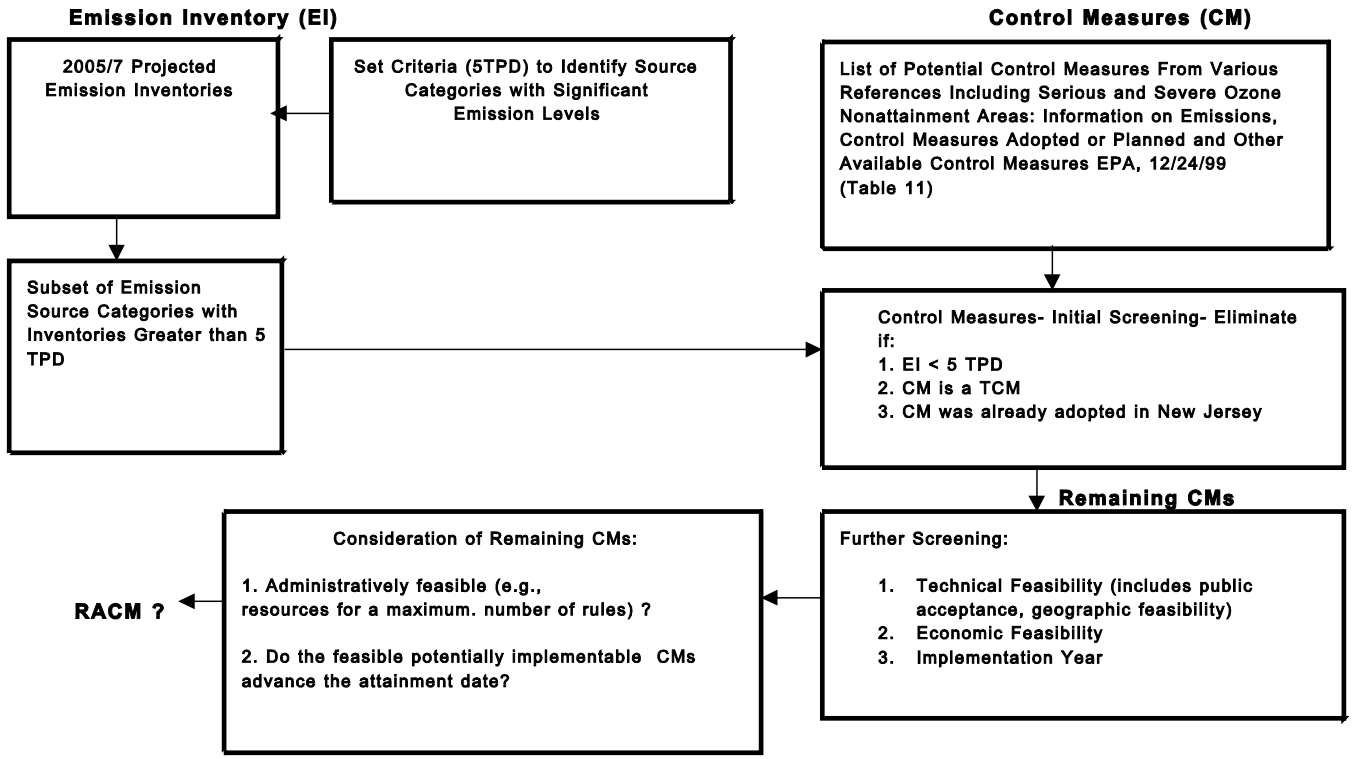
A. Emissions Inventory Screening

The analysis of non-TCM control measures was performed by first conducting a screening of New Jersey's emission inventories by sorting source categories from highest to lowest emission levels. Source categories are groups of similar individual sources which have their emissions reported together in the emissions inventory. Source categories consist of: Source Classification Codes (SCC) or Standard Industrial Classification (SIC) for the point source sector; SCC for the stationary area source sector; and equipment or vehicle type for the mobile non-road and mobile on-road sectors. The emission inventories used were the projected values for the attainment years from the recent Rate of Progress (ROP) SIP[6], i.e., 2005 for the Philadelphia area and 2007 for the New York area. VOC and NO_x inventories for the stationary point, stationary area, mobile off-road and mobile on-road sectors were sorted separately.

All categories which exhibited a projected emissions level of 5 tons per day (TPD) or greater (VOC and NO_x considered separately) were considered as opportunities for the application of possible new control measures which could be considered RACM. The 5 TPD threshold was applied to the New Jersey emissions which are projected to contribute to attainment year emissions in either the New York or Philadelphia areas. It is likely that potential emission benefits from new control measures for source categories with emissions less than 5 TPD would not be large enough for the control measures to be considered technically, economically, or administratively feasible. For example, if a new control measure which can achieve a 10-20% emission reduction is applied to a 5 TPD source then the emission benefits would be only 0.5-1.0 TPD. Technical feasibility would be improbable because it is likely that emissions are already being controlled to low levels and the administrative feasibility of writing rules for additional control measures for such a small emissions benefit would be questionable. Economic feasibility would also be improbable because of the high costs generally required to achieve extremely high removal efficiencies and the high cost/benefit ratio with regard to rule establishment and enforcement costs versus the small emission benefits. In any case, potential benefits from source categories with inventories less than 5 TPD would not be expected to be large enough, alone or in aggregate, to advance the attainment date.

[6] Proposed SIP Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard (NAAQS), New Jersey 1996 Actual Emission Inventory and Rate of Progress (ROP) Plan for 2002, 2005 and 2007. December 31, 2000.

Figure 1
Summary of Non-TCM Control Measure Methodology
Emission Inventory/Control Measures Screening Process



Emission inventory screening tables are provided in Attachment III-C. The number of source categories by sector with projected attainment year emissions of 5 TPD or greater are summarized in the following table.

Table 3 Number of Source Categories With Sum of Projected New Jersey Attainment Year Emissions for Both Nonattainment Areas _5.0 TPD

ctor	VOC	NO_x
int Sources	4	4
ea Sources	14	3
-Road Sources	5	13
-Road Sources	6	5
tal	29	25

Note: "≥" means greater than or equal to.

The projected emissions from each of these source categories were examined for the potential application of new control measures. Such measures could include control measures for previously uncontrolled sources and revisions to existing controls which would result in additional benefits.

B. Control Measure Screening

The next step in the analysis of non-TCM control measures was the identification of all potential new control measures for the inventory categories with projected inventories of 5 TPD or greater. Potential control measures were obtained from a variety of sources. They include measures being considered or adopted by other states, (e.g., Texas, California) and measures that the USEPA has identified in guidelines or other documents. In particular, the draft report "Serious and Severe Ozone Nonattainment Areas: Information on Emissions, Control Measures Adopted or Planned and Other Available Control Measures", USEPA, November 24, 1999 provided a table (Table 11) containing a comprehensive compilation of 614 potential control measures which served as a useful reference source. Potential non-TCM control measures, which were not already adopted by New Jersey for the inventory categories with projected inventories of 5 TPD or greater were retained for further analysis.

C. Analysis of Potential Control Measures for Significant Source Categories

The next step in the RACM analysis of non-TCM control measures was the analysis of all identified potential new control measures for significant (>5 TPD) source categories by assessing their feasibility. The estimated benefits for the potentially implementable feasible control measures were then compared against the emission reductions necessary to advance the attainment date for either area. The assessment of feasibility included the determination of technical and economic feasibility as well as whether or not the measure could be readily implemented (implemented prior to the attainment dates for the areas). Technical feasibility included not only a determination of the ability of the control measure to actually achieve certain emission reductions but also a consideration of local factors such as public/political acceptance. Economic feasibility was assessed by considering estimated costs per ton of emission benefit. The earliest year of implementation was estimated because potential control measures which could not provide emission reduction benefits prior to the attainment years of 2007 for the New York area and 2005 for the Philadelphia area need not be considered further for this RACM analysis. These measures could not be readily implemented and therefore they would not be "feasible" for the

purposes of this exercise.

The results of the feasibility assessment phase of the RACM analysis are presented in Table 4 for VOCs and Table 5 for NO_x. The first four or five columns in these tables provide the results of the emission inventory screening step. Each source category with projected emissions of 5 TPD or greater is listed with its corresponding inventory values. For the NO_x point sources the non-allocated[7] component of the inventory is also shown. Next to the inventory values are the potential control measures identified for each source category. Subsequent columns provide a summary of the technical and/or economic feasibility of the candidate control measures followed by estimates of the emission benefit and earliest implementation year for technically/economically feasible measures. Best available information from the control measure references was used along with actual New Jersey experience and engineering judgement to complete the assessments documented in Tables 4 and 5. It should be noted that the feasibility analysis and emission benefit estimates are based on a limited amount of currently available information. If detailed study was made of a measure, both feasibility and emission benefits may change.

[7] The non-allocated component comes from those sources that are not subject to New Jersey's NO_x Cap Program.

Table 4 VOC Results of Feasibility Assessment

	2007 NY/NJ/LI Area VOC Emissions (TPD)	2005 PHIL/WILM /TRTN Area VOC Emissions (TPD)	Total for Both Areas VOC Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implementation Year
Point Sources							
Chemicals and Allied Products Batch Processes (SIC 28)	9.56	2.2	11.76	98% Control efficiency (STAPPA/ALAPCO)(125)	NJAC 7:27-16, 7:27-8, certain MACT delegations, Hazardous Air Pollutants (HAP) and SOTA requirements are equivalent to these control measures. It is not technically, economically or administratively feasible to achieve significant emission benefits by 2006 due to the high number of diverse sources from various industry types and processes.	NA	NA
				98% reduction in emissions from SOCMI sources + exemptions based on EPA's CTG's (STAPPA/ALAPCO)(149)			
				MACT for SOCM (MACT - Final 4/22/1994)(246)			
				ACT for SOCM batch processes - vapor collection system + incineration (ACT Final 2/94)(254)			
Organic Solvent Surface Coating Misc. Metal Parts (SCC 40202500-99)	3.09	4.15	7.24	VOC content limits for coatings, etc. (SCAQMD Rule 1107 Amended 8/14/1998)(6)	SCAQMD VOC limits are similar to current NJ limits (7:27-16.7)	NA	NA
				Measures for misc.metal parts (incineration V22303, BAAQMD Rule 11 amended V22302)(73-75)	Sources could be further controlled by rule change which would require add-on controls. Could result in a benefit of 2.5 TPD (1.9 in Phila. Area). May not be economically or temporally feasible.	2.5	2004
				Measures for metal furniture, appliances, parts (SCAQMD limits V24502, MACT V24501)(76-77)	SCAQMD VOC limits are similar to current NJ limits (7:27-16.7)	NA	NA
				MACT for coating of misc. metal parts and products (207)	Potential measures are still under development. USEPA estimated dates: Proposed by USEPA: 5/2001, Final by USEPA: 5/2002.	NA	NA
Organic Solvent Surface Coating Autos Lt. Duty Truck (SCC 40201600-99)	6.53	0.02	6.55	VOC content limits for coatings, etc. (SCAQMD Rule 1107 Amended 8/14/1998)(6)	SCAQMD VOC limits are similar to current NJ limits (7:27-16.7)	NA	NA
				MV assembly line coating operations measures (SCAQMD Rule 1115 Amended 5/12/1995)(18)	Two assembly facilities could be further controlled by rule change which would require add-on controls. Benefit estimated to be approximately 3.7 TPD. Add-on controls have been estimated to cost $10,000 per ton of VOC at one source.	3.7	2006
				Auto assembly measures including spray booth abatement at 5.8 lbs/gal + 10lbs/gal level w/o spray booth abatement (STAPPA/ALAPCO)(124)	Similar to existing NJ rule (7:27-16.7)	NA	NA
				MACT for surface coating of autos and light duty trucks (171)	Potential measures are still under development. USEPA estimated dates: USEPA Proposed: 8/2001, USEPA Final: 5/2002.	NA	NA
				Low solvent coatings for autos and lt. duty trucks (NSPS Subpart MM)(270)	Low VOC coatings are part of the existing NJ rule (7:27-16.7)	NA	NA
Organic Solvent Surface Coating Paper Coating (SCC 40201300-99)	4.9	0.11	5.01	Various measures for paper, fabric and film coating operations (SCAQMD Rule 1128 Amended 3/8/1996)(19)	SCAQMD VOC limits are similar to current NJ limits (7:27-16.7). NJ SOTA requirements are more stringent for destruction efficiency (95 to 99 for NJ vs. 90 to 95% for SCAQMD).	NA	NA
				Incineration (V24001)(87) or Catalytic Oxidation.	Sources could be further controlled by rule change which would require add-on controls. Benefits estimated to be 1.2 TPD however not economically feasible.	NA	NA
				MACT for surface coating of paper and other webs (MACT - Final 11/15/2000)(217)	Depending on threshold levels, proposed MACT approximately equal or slightly less than NJ SOTA.	NA	NA
Controlled Point Sources	NA	NA	NA	Declining cap rule - cap & trade program (Illinois EPA)(252)	Potential benefits from this measure are possible however due to the time required to establish and implement a cap & trade program emission benefits could not be achieved by 2005/7.	NA	NA

Table 4 VOC Results of Feasibility Assessment (Continued)

	2007 NY/NJ/LI Area VOC Emissions (TPD)	2005 PHIL/WILM /TRTN Area VOC Emissions (TPD)	Total for Both Areas VOC Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implementation Year
Area Sources							
Total Comm/Consumer Solvent Use (SCC 2465000000)	61.62	17.66	79.28	None, OTC Model Rule Being Implemented.	NA	NA	NA
Architectural Surface Coating (SCC 2401001000)	47.63	13.65	61.28	None, OTC AIMS Model Rule Being Implemented.CARB limits for aerosol paints not selected by OTC due to technical infeasibility(34)(119).	NA	NA	NA
Other Special Purpose Coatings (SCC 2401200000)	11.47	3.21	14.68	None, OTC AIMS Model Rule Being Implemented.	NA	NA	NA
Degreasing (SCC 2415000000)	14.01	4.05	18.06	None, OTC Model Rule Being Implemented.	NA	NA	NA
Other Product Coatings (SCC 2401090000)	8.84	2.53	11.37	Measures for Magnet Wire Coating Operations (SCAQMD Rule 1126 Amended 1/13/1995)(13)	There are no magnet wire coating operations in New Jersey. No other potential control measures identified.	NA	NA
Gasoline Refueling Stage II (SCC 2501060102), Balanced Submerged Filling (SCC 2501060050), and Gasoline Tank Breathing (SCC 2501060201)	12.54	4.98	17.52	Various Stage I and II measures including vapor balance, P-V valves, 95% control efficiency,etc. (95,100,101,138,147,152)	Existing NJ rule meets USEPA requirements. Additional enhancements, not required by the USEPA, are being pursued which are based on CARBs EVR rule.	2	2004
High Performance Maintenance Coatings (SCC 2401100000)	7.52	2.11	9.63	None, OTC AIMS Model Rule Being Implemented.	NA	NA	NA
Bakery (SCC 2302050000)	7.41	1.99	9.4	SCAQMD Rule 1153, BAAQMD Regulation 8, Rule 42.	Both rules include exemptions for smaller bakeries, i.e., <2 MMBTU/hr or 50 lbs VOC/day and <100,000 lbs bread/day or 150 lbs ethanol/day. The emission inventory values for this category are likely from bakeries that would be exempt, therefore no benefits would be achieved. Existing NJ rule (7:27-16.16) applies to larger bakeries.	NA	NA
Graphic Arts (offset litho/letterpress) (SCC 2425000000)	7.08	2.03	9.11	Offset litho - low solvent inks & fountain sols.(ACT Final 6/94)(2), Various measures for graphic art materials (SCAQMD Rule 1130 Amended 10/8/1999)(12), Eliminate isopropyl alcohol + control ink dryer emisions by 95-98% w/ additional controls or limit VOC content of inks for offset litho printing (STAPPA/ALAPCO)(140)	According to STAPPA/ALAPCO approximately 77% of all VOC emissions resulting from lithographic printing occur from the fountain solution, 15.4% from the cleaning solutions and 7.6% from the inks. Technically feasible control strategies include: add-on controls such as incinerators ($1,700-$3,100/ton); condenser filters with carbon ($1,300-$3,000/ton); process modifications such as cooling the fountain solution; and material reformulation/substitution ($628/ton). Existing NJ rules (7:27-16.16) do not specify control strategies but limit emissions to levels based on vapor pressure and VOC concentration with exclusion rates as high as 3.5 lbsVOC/hr. Modifications to the NJ rule to limit VOC content of material formulations (such as to the SCAQMD VOC limits of 300 g/l for inks and 80-100 g/l for fountain solution) or to set specific emission limits without exemptions may result in emission benefits. A 10% VOC reduction was conservatively assumed for this rule modification as a rough estimate.	0.9	2005
				MACT for surface coating - printing/publishing (MACT - Final 5/30/1996)(230)	Rule applies to rotogravure and flexograghic printing only.	NA	NA
Furniture & Fixtures Surface Coating (SCC 2401025000)	7.52	0.92	8.44	VOC content limits for coatings, etc. (SCAQMD Rule 1107 Amended 8/14/1998)(6)	Limits VOC concentrations to 2.3-3.5 lb/gal. These are not significantly different than the limit of 3.0 lb/gal in the existing NJ rule(7:27-16.7).	NA	NA
				MACT for surface coating of metal furniture.	Potential measures are still under development. USEPA estimated dates: USEPA Proposed: 5/2001, USEPA Final: 5/2002.	NA	NA
Auto Refinishing-paint content and equip cleaning (2401005000)	12.33	2.87	15.2	None, OTC Model Rule Being Implemented.	NA	NA	NA
Marine Vessel Ballasting Crude Oil (SCC 2505020030)	1.64	5.83	7.47	No new measures identified.	NA	NA	NA

Table 4 VOC Results of Feasibility Assessment (Continued)

	2007 NY/NJ/LI Area VOC Emissions (TPD)	2005 PHIL/WILM /TRTN Area VOC Emissions (TPD)	Total for Both Areas VOC Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implementation Year
Metal Containers Surface Coating (SCC 2401040000)	5.27	0.03	5.3	Various measures for metal containers, closure and coil coating operations (SCAQMD Rule 1125 Amended 1/13/1995)(16), Incineration for beverage can coatings (V0349)(44)	SCAQMD VOC limits are the same or slightly lower than the existing NJ rule (7:27-16.7). It is assumed that the lower limits would result in a 10% reduction in VOC emissions. Incineration as an add-on control could achieve additional emission benefits however at high cost (>$9,000/ton).	0.5	2005
				MACT for surface coating of metal cans (MACT - Final 11/15/2000)(205)	Potential measures are still under development. USEPA estimated dates: USEPA Proposed: 5/2001, USEPA Final: 5/2002.	NA	NA
Industrial/Commercial Adhesives	NA	NA	NA	Various measures - (SCAQMD Rule 1168 Amended 2/13/1998)(3)(33)(118)	The SCAQMD rule provides VOC limits by application on various architectural, specialty, substrate, specific applications and sealants. NJ does not have a similar rule. There may be benefits associated with a new control measure for this category; however, there is no USEPA guidance concerning inventory estimation. Therefore, potential benefits cannot be currently estimated.	NA	NA
				MACT for plywood and composite wood products (MACT - Final 11/15/2000)(225)	MACT will apply to plywood/wood product manufacturers. Potential measures are still under development. USEPA estimated dates: USEPA Proposed: 5/2001, USEPA Final: 5/2002.	NA	NA
Emulsified Asphalt Application (SCC 2461022000)	3.63	1.57	5.2	VOC Content Limit SCAQMD Rule 1108.1 Amended 11/4/1983) (10)	The SCAQMD rule limits VOC content to 3% while the current NJ rule (7:27-16.19) specifies an 8% VOC limit. There may be benefits for reducing the VOC limits however further assessment of actual emulsifiied asphalt use during the ozone season is required.	NA	NA
Non-Road Sources							
Lawn & Garden Commercial Turf Equipment 4S (SCC 2265004071) Lawn & Garden Residential Lawn Mowers 4S (SCC 2265004010) Lawn & Garden Commercial Lawn Mowers 4S (SCC 2265004011)	5.88 5.49 4.14	1.5 1.69 1.04	7.38 7.18 5.18	Voluntary program to replace gasoline powered lawn and garden equipment with electric powered equipment (Arizona DEQ)(613), (STAPPA/ALAPCO) (607)	Arizona funded the program at $500,000/yr. and reported a cost of $3,019/ton of ozone. The program is being discontinued . This measure would require further studies including cost/benefit assessments for NJ and legislative consultation. Potential benefits (small) could not be achieved prior to 2007.	NA	NA
				No operation of spark ignition lawn and garden equipment less than 25hp between 6am and noon 4/1-10/31 starting in 2005 (Texas SIP gap measure)	The effects of emission shifts on ozone levels in NJ are uncertain. Even if this measure is technically feasible the time required to assess potential benefits and obtain public acceptance would make implementation by 2007 infeasible.	NA	NA
				Adopt California standards for large new off-road engines (Texas SIP)	A Federal rule for this category is moving towards a 2007 implementation date. Texas is proposing to advance the new LSI engine standards for 2004 and subsequent model-year engines. Texas estimated NOx benefits of 2.8 TPD in 2007 for the Houston NAA with some VOC benefits also expected. If NJ implemented this measure for the 2005 model year potential VOC/NOx benefits of less than 1 tpd could result.	<1	2005
				Ban of lawn care on Ozone Action Days (PA Stakeholders Group).	Potentially significant benefits in PA were estimated by the Group (11.2 tpd VOC and 6.7 tpd NOx) if all lawn care is banned on high ozone days. Due to the difficulties associated with public acceptance of this measure, implementation by 2007 is judged to be infeasible.	NA	NA

Table 4 VOC Results of Feasibility Assessment (Continued)

	2007 NY/NJ/LI Area VOC Emissions (TPD)	2005 PHIL/WILM /TRTN Area VOC Emissions (TPD)	Total for Both Areas VOC Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implementation Year
Pleasure Craft Outboard 2S (SCC 2282005010)	4.52	2.16	6.68	No new measures identified.	NA	NA	NA
Airplane	2.94	3.62	6.56	Landing fees based on NOx emissions. Establish airport emission budgets	NJ is working with other States, NESCAUM and USEPA to explore these and other options. The timing of these efforts precludes the achievement of emission benefits prior to 2007.	NA	NA
Recreational Equipment Offroad 2S MC/ATV (SCC 2265001030)	4.38	1.71	6.09	No new measures identified.	NA	NA	NA
On-Road Sources							
				Augmentation of existing NJ ASM I/M program including full pressure testing, annual inspections, tighter cutpoints (STAPPA/ALAPCO)(575), High enhanced I/M (566) and Remote sensing to identify high-emitting vehicles (Texas NRCC)(591).	It is not technically feasible to assess changes to NJ's current enhanced I/M program at this time due to OBD effects, and ongoing performance assessments of the existing program.	NA	NA
Light Duty Gasoline Vehicles	51.22	27.78	79.00	Accelerated vehicle retirement in conjunction with the I/M program (STAPPA/ALAPCO)(571)(601)(602)	P.L. 1993, c. 69 required NJDEP to develop a plan for an accelerated vehicle retirement program. The plan was submitted to the State Legislature in 1994. The State Legislature has subsequently taken no action on this plan. The result of public workshops on this plan has been an extremely negative public reaction. This measure is infeasible from public acceptance, cost and timing of benefits standpoints.	NA	NA
Light Duty Gasoline Trucks 1	10.89	7.33	18.22				
Motorcycles	12.16	1.11	13.27				
Light Duty Gasoline Trucks 2	6.38	3.04	9.42	California LEV program (STAPPA/ALAPCO)(572)	NJ currently participates in the NLEV program. Change from NLEV to CALEV is prohibited if it precedes adoption of similar proposals in OTR States representing 40% of new vehicle registrations. No emission benefits would be likely prior to 2007.	NA	NA
Heavy Duty Gasoline Vehicles	5.21	1.69	6.90				
				Tax credits or deductions for conversion to alternatives fueled vehicles program (Arizona DEQ)(611)	NJ has an incentive based Clean Fuel Fleet program known as the New Jersey Clean Fleets (NJCF) program with the objective of increasing the use of alternative fueled vehicles. In addition the Governor's Advanced Technology Task Force keeps NJ informed of new vehicle technologies. Potential changes to NJ's existing efforts would not provide significant additional emission benefits prior to 2007.	NA	NA
				Reduce truck idling. Possible measures include sign postings, notices to trucking associations and actions to encourage truck stop electrification as well as similar technologies/options.	Potentially significant VOC and NOX benefits are possible.	<1	2002
Heavy Duty Diesel Vehicles	3.71	1.37	5.08	Adopt CARB diesel fuel properties	The Federal rule will require reformulated diesel fuel in 2007. Arizona reported a 33.9% reduction in VOC emissions and a 6.1% reduction in NOX emissions. Although significant benefits may be possible, it would not be feasible to implement this measure prior to 2007 due to the time required to establish the rule, seek and obtain a Section 211(c) Federal waiver, and for refineries to make the required process/equipment changes prior to 2007.	NA	NA
Other							
Controlled Point and Area Sources	NA	NA	NA	Rule effectiveness improvement beyond the 80% level set by the USEPA (STAPPA/ALAPCO)(145)	For point and area sources, rule effectiveness may be improved by additional training of inspectors, larger penalties for non-compliance and more frequent inspections. This is not economically feasible because at the current time NJ is performing the best possible enforcement efforts with given resources.	NA	NA

NOTES:

1. The references and numbers provided in parentheses for many of the control measures correspond to the references and control measure nombers from "Serious and Severe Ozone Nonattainment Areas: Information on Emissions, Control Measures Adopted or Planned and Other Available Control Measures" USEPA, 12/24/99 (Table 11).

Table 5 NO_x Results of Feasibility Assessment

	2007 NY/NJ/LI Area NOX Emissions (TPD)	2005 PHIL/WILM/ TRTN Area NOX Emissions (TPD)	Total for Both Areas NOX Emissions (TPD)	Non-Allocated Total NOX Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implementation Year
Point Sources								
Extcomb. Boiler Elect. Generation Bituminous Coal Pulv. Coal Wet Bottoms (SCC 10100201)	34.48	48.32	82.8	2.83	NA	Source category inventory is less than 5 TPD when the non-allocated emissions are considered.	NA	NA
Internlcomb Elect. Generation Natural Gas Turbine (SCC 20100201)	72.21	2.84	75.05	15.33	Continuous in-stack NOX/O2 monitors + selective catalytic reduction for stationary gas turbines (SCAQMD - Rule 1134 amended 8/8/1997)(292)	Existing NJ rule (7:27-19.8) sets emission limits at 42 ppm. Model OTC NOx Rule for 11 States also sets a limit of 42 ppm.	NA	NA
Extcomb. Boiler Elect. Generation Natural Gas >100 MMBTU/HR EXTF (SCC 10100601)	40.49	4.95	45.44	4.14	NA	Source category inventory is less than 5 TPD when the non-allocated emissions are considered.	NA	NA
Extcomb Boiler Elect. Generation Residual Oil No.6 Oil Norm FRG (SCC 10100401)	16.43	1.02	17.45	0.58	NA	Source category inventory is less than 5 TPD when the non-allocated emissions are considered.	NA	NA
Internlcomb Elect. Generation Natural Gas Reciprocating (SCC 20100202)	9.7	0.07	9.77	9.77	NOX limit for stationary IC engines (SCAQMD - Rule 1110.1 amended 10/4/1985)(293)	Existing NJ rule (7:27-19.8) is not significantly different from the SCAQMD rule.	NA	NA
					Ignition retard, air-to-fuel ratio, L-E and selective catalytic reduction for IC engines - gas (N02201, N02204, N02207, N02210, N02211, N02212)(403-408)	Model OTC NOx rule for 11 States has been developed. For this category, rule for retrofits for reciprocating engines is based on fuel-neutral standards. Existing NJAC 7:27-19.8 is equivalent to OTC rule for this category.	NA	NA
					ACT for IC engines (ACT - Final 1993)(521)	Existing NJ rule (7:27-19.8) is less than ACT levels.	NA	NA
Extcomb Boiler Industrial Process Gas Petroleum Refinery (SCC 10200701)	6.75	2.66	9.41	3.94	NA	Source category inventory is less than 5 TPD when the non-allocated emissions are considered.	NA	NA
Internlcomb Elect. Generation Keronaphtha Jet Fuel Turbine (SCC 20100901)	4.16	1.62	5.78	2.95	NA	Source category inventory is less than 5 TPD when the non-allocated emissions are considered.	NA	NA
Extcomb Boiler Elect. Generation Solid Waste (SCC 10101201)	2.12	2.93	5.05	5.05	ACT and NSPS regulations for utility boilers (ACT - Final 1994,NOX NSPS Regulations Subpart Da)(527,531),	All facilities in compliance with Federal Plans for large municipal solid waste combustion facilities. Inventory currently below 5 TPD.	NA	NA
Controlled Point Sources	NA	NA	NA	NA	Reduce NOX cap further	This measure cannot be evaluated until the effectiveness of the existing cap is demonstrated.	NA	NA

Table 5 NO_x Results of Feasibility Assessment (Continued)

	2007 NY/NJ/LI Area NOX Emissions (TPD)	2005 PHIL/WILM/ TRTN Area NOX Emissions (TPD)	Total for Both Areas NOX Emissions (TPD)	Non-Allocated Total NOX Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implemen-tation Year
Area Sources								
Construction & Mining Equipt. Off-Highway Trucks Diesel (SCC 2270002051)	8.26	2.48	10.74	NA	Scrappage programs to increase turnover (STAPPA/ALAPCO)(576)	This measure would require further studies including cost/benefit assessments for NJ and legislative action. Potential benefits could not be achieved prior to 2007.	NA	NA
Commercial Natural Gas Combustion (SCC 2103006000)	10.17	2.59	12.76	NA	Measures for space heaters including low NOx burners, flue gas recirculation, selective cat/noncat reduction, 02 trim and H20 inject. (N05501-5)(486-490), Low NOx burners for furnaces (N07201)(319), NOx emission limit for fan-type central furnaces (SCAQMD - Rule 1111 amended 7/8/1983)(288)	Low NOx burners can provide 75% NOx reduction for space heaters at a cost of $1,600/ton of NOx. Low NOx burners can provide 45% NOx reduction for water heaters at no additioinal cost. Benefits were estimated assuming one year heater turnover and lifetimes of 20 years for space heaters and 10 years for water heaters. It was also assumed that 79% of NOx emissions are from space heaters and 21% of NOx emissions are from water heaters.	0.8	2005
Lawn & Garden Commercial Turf Equipment Diesel (SCC 2270004071)	5.73	1.34	7.07	NA				
Construction and Mining Equipment Excavators Diesel (SCC 2270002036)	5.2	1.51	6.71	NA				
Residential Natural Gas Combustion (SCC 2104006000)	6.96	1.82	8.78	NA	Set limit on new sources and incentives to replace older units for residential space and water heaters (STAPPA/ALAPCO)(516)	This measure would require further studies including cost/benefit assessments for NJ and legislative action. Potential benefits could not be achieved prior to 2007.	NA	NA
Industrial Equipment AC/Refrigeration Diesel (SCC 2270003060)	5.01	1.46	6.47	NA				
Construction & Mining Equipt. Graders Diesel (SCC 2270002048)	4.11	1.21	5.32	NA	Require the early replacement of off-road diesel equipment greater than 50 hp with cleaner Tier 2/3 equipment (Texas SIP)	Significant benefits appear to be available with this measure (a 12.2 TPD NOx benefit was estimated for the Houston NAA). However the earliest implementation could not be prior to 2007 due to the dates that the new engines become available and the uncertain availability of retrofit equipment prior to 2007.	NA	NA
Industrial Equipment Forklifts Diesel (SCC 2267003020)	4.2	1.1	5.3	NA				
Industrial Natural Gas Combustion (SCC 2102006000)	4.04	1.03	5.07	NA			NA	NA
Locomotive	11.43	1.25	12.68	NA	Measures beyond the existing Federal standards such as engine modifications, LNG fuel, conversion to electric.	These measures would require regional and/or Federal actions which could not be implemented by 2007.	NA	NA
Non-Road Sources								
Industrial Equipment Forklifts LPG (SCC 2267003020)	10.83	2.6	13.43	NA	No new control measures identified beyond the planned Federal rule. Estimated dates: Proposed: 9/2001, Final: 9/2002.	NA	NA	NA
On-Road Sources								
Commercial Marine Transit	43.81	10.39	54.2	NA	Selective catalytic reduction and water/fuel emulsion (STAPPA/ALAPCO, 1994)	Significant potential benefits could result from catalytic reduction (70-90% NOx reduction) and water/fuel emulsion (up to 35% reduction) however the measures would require Federal and internation cooperation, and would be most effective as regional rules. Therefore acheivement of benefits prior to 2007 would be highly unlikely.	NA	NA
Light Duty Gasoline Vehicles	81.37	39.25	120.62	NA	Augmentation of existing NJ ASM I/M program including full pressure testing, annual inspections, tighter cutpoints (STAPPA/ALAPCO)(575), High enhanced I/M (566) and Remote sensing to identify high-emitting vehicles (Texas NRCC)(591)	It is not technically feasible to assess changes to NJ's current enhanced I/M program at this time due to OBD changes, and ongoing performance assessments of the existing program.	NA	NA
Airplane	15.45	1.49	16.94	NA	Landing fees based on NOx emissions. Establish airport emission budgets	NJ is working with other States, NESCAUM and USEPA to explore these and other options. The timing of these efforts precludes the achievement of emission benefits prior to 2007.	NA	NA
Construction & Mining Equipt. Crawler Tractor/Dozer Diesel (SCC 2270002069)	17.57	10.39	27.96	NA	Accelerated vehicle retirement in conjunction with the I/M program (STAPPA/ALAPCO)(571)(601)(602)	P.L. 1993, c. 69 required NJDEP to develop a plan for an accelerated vehicle retirement program. The plan was submitted to the State Legislature in 1994. The State Legislature has subsequently taken no action on this plan. The result of public workshops on this plan has been an extremely negative public reaction. This measure is infeasible from public acceptance, cost and timing of benefits standpoints.	NA	NA
Light Duty Gasoline Trucks	12.07	3.53	15.6	NA				
Construction & Mining Equipt. Rubber Tire Loaders Diesel (SCC 2270002060)	10.68	3.11	13.79	NA	Adopt Texas use restrictions (Texas SIP)	The effects of daily emission shifts on ozone levels in NJ are uncertain. Even if this measure is technically feasible the time required to assess potential benefits and obtain public acceptance would make implementation by 2007 infeasible.	NA	NA
Heavy Duty Gasoline Vehicles	21.89	3.65	25.54	NA	California LEV program (STAPPA/ALAPCO)(572)	NJ currently participates in the NLEV program. Change from NLEV to CA LEV is prohibited [illegible] adoption of similar proposals in OTR States representing 40% of new vehicle registrations. No emission benefits would be likely prior to 2007.	NA	NA
Constr. & Mining Equipt Tractors/Loaders/Backhoes Diesel (SCC 2270002066)	10.61	2.99	13.6	NA				

Table 5 NO_x Results of Feasibility Assessment (Continued)

	2007 NY/NJ/LI Area NOX Emissions (TPD)	2005 PHIL/WILM/ TRTN Area NOX Emissions (TPD)	Total for Both Areas NOX Emissions (TPD)	Non-Allocated Total NOX Emissions (TPD)	Potential New Measure?	Technically and Economically Feasible? (Rationale)	Assumed Level of New Control (Added TPD Benefit)	Earliest Implementation Year
Light Duty Gasoline Trucks 2	11.11	4.37	15.48	NA	Tax credits or deductions for conversion to alternatives fueled vehicles program (Arizona DEQ)(611)	NJ has an incentive based Clean Fuel Fleet program known as the New Jersey Clean Fleets (NJCF) program with the objective of increasing the use of alternative fueled vehicles. In addition the Governor's Advanced Technology Task Force keeps NJ informed of new vehicle technologies. Potential changes to NJ's existing efforts would not provide significant additional emission benefits prior to 2007.	NA	NA
Heavy Duty Diesel Vehicles	29.55	6.73	36.28	NA	Reduce truck idling. Possible measures include sign postings, notices to trucking associations and actions to encourage truck stop electrification as well as similar technologies/options.	Potentially significant VOC and NOX benefits are possible.	2	2002
					Adopt CARB diesel fuel properties	The Federal rule will require reformulated diesel fuel in 2007. Arizona reported a 33.9% reduction in VOC emissions and a 6.1% reduction in NOX emissions. Although significant benefits may be possible, it would not be feasible to implement this measure prior to 2007 due to the time required to establish the rule, seek and obtain a Section 211(c) Federal waiver, and for refineries to make the required process/equipment changes prior to 2007.	NA	NA
					Expanded I/M for HDD trucks (Texas NRCC)(586), e.g., ROVER NOX test device	NJ is studying the addition of NOX test equipment to the current opacity test. Potential NOX reductions would be on the order of 10%. A current problem is the length of time to administer the test (15 minutes). Overcoming this problem may require technology improvements. A minimum of 5-6 years may be required to implement this measure therefore benefits would not be available prior to 2007.	NA	NA
					Encourage clean fueled city buses, LNG, LPG or fuel cells (Texas NRCC)(583)	NJ conducts the Clean Cities Program as part of the NJ Clean Fleets Program.The purpose of this program is to encourage the use of alternative fueled vehicles. Currently there are approximately 1500 alternatively fueled vehicles in the State fleet. In addition NJ is conducting a bio-diesel bus pilot program. Potential changes to NJ's existing efforts would not provide significant additional emission benefits prior to 2007.	NA	NA
					Prohibit sales of used trucks with defeat devices in NJ	Potentially significant benefits from this measure but may not be feasible due to Federal preemptions, the need for State legislative approval and potential conflicts with the Federal consent decree agreement with manufacturers.	NA	NA
					Requires local on-highway vehicles, non-road diesels, commercial marine and locomotives to use emulsion fuels starting in 2004 (Texas SIP)	NOx reductions for the Houston NAA were estimated at 4.68 TPD (on-road) and 6.02 TPD (off-road), however this measure was withdrawn by Texas. The need for regional action would make implementation prior to 2007 infeasible.	NA	NA
					Adopt California's NTE engine standards for Model Years 2005 and 2006	NJ is working on this feasible measure with other OTC States. Estimated benefits of 1.7 TPD for the NY area may be achieved by 2006.	1.7	2005
					Incentives for use of newer trucks in the northeast	Newer trucks not available until 2004. There will not be a significant pool of newer trucks available prior to 2007.	NA	NA
					Include as part of existing on-road inspections a check for compliance with the USEPA retrofit program.	At this time this measure is not feasible because specific trucks and schedules are not available from the USEPA.	NA	NA

NOTES:

1. The references and numbers provided in parentheses for many of the control measures correspond to the references and control measure nombers from "Serious and Severe Ozone Nonattainment Areas: Information on Emissions, Control Measures Adopted or Planned and Other Available Control Measures" USEPA, 12/24/99 (Table 11).

2. Total NOx inventories consist of allocated and non-allocated components. Allocated NOx emissions are from sources that are in the NJ NOx Budget Program. Sources in this program have their emissions limited by a budget with allocated allowances for specific years. For the RACM analysis it is appropiate to consider the non-allocated emission sources as candidates for new control.

V. Conclusions

The potentially implementable TCMs and other control measures that result from the analysis of technical feasibility, economic feasibility, magnitude of benefit and timing are listed in the following table.

Table 6 Summary of the Potentially Implementable TCM and Other Control Measures Resulting From the Analysis of Technical/Economic Feasibility, Magnitude of Benefit and Timing

		Estimated Benefits (TPD)	
urce Category	**ntrol Measure**	**New York (2006)**	**Philadelphia (2004)**
nsit Improvements	ed Guideway Projects	1.3 VOC + NO_x	-
os Lt. Duty Trucks - Surface Coating	d-on Controls	3.7 VOC	-
c. Metal Parts - Surface Coating	Add-on Controls	0.6 VOC	1.9
vy Duty Diesel Vehicles	for Small Souces (<5TPY)	1.7 NO_x	VOC
oline Transfer Operations	E Engine Standards	1.7 VOC	-
vy Duty Diesel Vehicles	anced Vapor Recovery	1.6 NO_x	0.3
	luce Truck Idling		VOC
			0.4 NO_x

Transit improvement projects is the only TCM that provides significant potential emission benefits among the feasible TCMs. Each of the other feasible TCMs provide potential benefits estimated to be less than one ton per day. The five non-TCM control measures listed in Table 6 are those that provide the largest potential emission benefits among the feasible measures.

The USEPA's RACM analysis for four other nonattainment areas[8] were conducted by performing separate comparisons of emission benefits from TCMs and stationary source control measures to the emission reductions required to advance the attainment dates. First the USEPA considered if the TCM emission benefits would advance the attainment date; then, as a separate step, the emission benefits from the stationary source control measures were compared against the emission reductions required to advance attainment. New Jersey is considering if a combination of the most promising TCMs and other control measures could provide sufficient emission reductions to advance attainment. This methodology provides a more stringent RACM test regarding the "advance the attainment date" criterion.

[8] RACM Analysis for Four Serious Areas Designated Nonattainment for 1-hr Ozone NAAQS. USEPA Office of Air Quality Planning and Standards, October 12, 2000.

The maximum number of additional control measures that can be effectively implemented within the timeframe necessary to provide emission benefits prior to the attainment dates would be limited based on practical administrative feasibility factors such as: resource limitations, constraints imposed by the regulatory process, and availability of specific implementation funds. Implementation of more than the six TCM/other measures listed in Table 6 is impracticable. Therefore, if the estimated benefits from Table 6 are considered, total VOC and NO_x benefits of 10.6 TPD could be realized for the New York area in 2006 and 2.6 TPD could be realized for the Philadelphia area in 2004. For purposes of this analysis VOC and NO_x effects are considered together as a simple sum which is an appropriate level of approximation consistent with the accuracy and precision of the available data. As shown below, these benefits are less than the emission reductions required to advance the attainment date for either area.

In order to assess the level of emission reductions required to advance the attainment date for each area it was necessary to quantify the VOC and NO_x reductions expected in the year prior to the attainment year. One year is used as the advancement time since ozone attainment is based on measurements taken during a 5 month ozone season each year. The latest combined VOC/NO_x inventories from the ROP SIP,[9] with adjustments for the projected benefits for the control measure commitments elsewhere in this proposed SIP[10] revision, were used for this purpose. In addition, it should be noted that the RACM analysis was performed for only the New Jersey inventory share of each nonattainment area. Attainment date advancement would only be possible if each State within a given area is able to achieve sufficient emission benefits in the year prior to the attainment year.

For the New Jersey portion of the New York nonattainment area the VOC plus NO_x emission inventories from the ROP SIP are 1,089.62 TPD for 2005 and 1,075.49 TPD for 2007 for a reduction of 14.13 TPD over the two year period. The benefits associated with the control measure commitments in this proposed SIP[11] revision will be achieved by 2006 except for those associated with the portable fuel containers rule which will be phasing in over a 10 year period starting on January 1, 2003 at a rate of 5.6 TPD per year (25 TPD benefit in July, 2007 based on 4.5 years of phase-in). Therefore, the amount of VOC/NO_x reduction in the year prior to the current attainment year of 2007 is estimated to be the sum of the benefit from the Portable Fuel Containers rule (5.6 TPD) and the net change in emissions from all other sources (7.1 TPD based on the average change over a two year period) for a total of 12.7 TPD.

In order to assess the advancement of the attainment date criteria for the New Jersey portion of the Philadelphia area it is necessary to consider the amount of VOC and NO_x emission inventory reduction combined in the year prior to the current attainment year of 2005. This is estimated to be the sum of the benefits from the AIMs, Consumer Products and Portable Fuel Containers rules (29.5 TPD) and the net change in emissions from all other sources (17.6 TPD based on the annual average change from 435.68 TPD in 2002 to 382.90 TPD in 2005) for a total quantity of 47.1 TPD. The VOC and NO_x reductions in the year prior to the attainment year is much greater for the Philadelphia area because a significant portion of benefits from the AIMs and Consumer Products rules are expected early in 2005. These benefits result in a large step reduction in emissions in the year prior to the attainment year for the Philadelphia area (2005) but provide no step reduction in the year prior to the attainment year for the New York area (2007).

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[9] ROP SIP, Table 10 and 11.

[10] Update to Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy-Additional Emission Reductions, Reasonably Available Control Measures Analysis and the Required Mid-Course Review, May 31, 2001.

[11] Update to Meeting the Requirements of the Alternative Ozone Attainment Demonstration Policy-Additional Emission Reductions, Reasonably Available Control Measures Analysis and the Required Mid-Course Review, May 31, 2001.

The sum of the estimated benefits from the potentially implementable TCMs and other control measures were estimated to be 10.6 TPD for the New York area and 2.6 TPD for the Philadelphia area. These benefits are less than the values (12.7 TPD for the New York area and 47.1 TPD for the Philadelphia area) required to advance the attainment date for either area. Therefore, no TCM or other control measures have been identified which could advance the attainment dates for either area. None of these TCMs or other control measures can be considered to be RACM and it is unnecessary to include any of these measures in the State's attainment plan.