

**Updates to the
Ozone Attainment Demonstration for the
Southwest Connecticut Severe Ozone Nonattainment Area**

Final Version for Submittal to EPA

Connecticut Department of Environmental Protection

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1.0 BACKGROUND AND SUMMARY

Pursuant to the Clean Air Act, as amended in 1990 (CAA), the U.S. Environmental Protection Agency (EPA) included portions of Connecticut in two one-hour ozone nonattainment areas. Southwest Connecticut (i.e., all of Fairfield County except the town of Shelton, plus the Litchfield County towns of Bridgewater and New Milford) was assigned to the New York-Northern New Jersey-Long Island severe ozone nonattainment area, with a required attainment date of 2007. The remainder of Connecticut was assigned to the Greater Connecticut serious ozone nonattainment area, with a required attainment date of 1999.

The Connecticut Department of Environmental Protection (CTDEP) submitted attainment demonstrations for both the Southwest Connecticut and Greater Connecticut ozone nonattainment areas on September 16, 1998. The attainment demonstrations used photochemical grid modeling and weight of evidence analyses to demonstrate that adopted and mandated control programs within Connecticut and upwind areas were sufficient to enable all areas of the State to achieve attainment of the one-hour ozone standard of 0.12 parts per million (ppm) by 2007. The attainment demonstration for Greater Connecticut included a technical analysis showing that overwhelming transport of ozone and ozone precursor emissions (i.e., volatile organic compounds (VOC) and nitrogen oxides (NO_x)) from upwind areas precluded compliance by that area's required 1999 attainment date and requested an extension to 2007.

EPA published proposed rulemakings regarding CTDEP's attainment demonstrations on December 16, 1999 (64 FR 70332 and 64 FR 70348). For Greater Connecticut, EPA proposed to approve both the 2007 attainment date extension request and the attainment demonstration for the area, contingent upon submittal of an adequate motor vehicle emissions budget that was consistent with attainment. CTDEP submitted the required motor vehicle budgets for Greater Connecticut in February 2000, which were found adequate by EPA on June 16, 2000 (65 FR 37778). As a result, EPA issued final approvals for the 2007 attainment date extension, motor vehicle budgets, and attainment demonstration for Greater Connecticut on January 3, 2001 (66 FR 634).

EPA's December 16, 1999 rulemaking also proposed to conditionally approve the ozone attainment SIP for the Southwest Connecticut portion of the New York-Northern New Jersey-Long Island nonattainment area, and in the alternative, to disapprove the SIP if the specified conditions are not satisfied. Conditions for SIP approval include: 1) submittal of an adequate 2007 motor vehicle emissions budget consistent with attainment; 2) submittal of measures achieving additional emission reductions (i.e., the "attainment shortfall") identified by EPA as necessary for attainment by 2007; 3) submittal of a rate-of-progress plan for the period from 1997 through 2007, as well as any associated control measures; 4) a commitment to revise the 2007 motor vehicle emissions budget within one year after official release of EPA's MOBILE6 emissions model; and 5) a commitment to submit the results of a mid-course review of attainment progress by the end of 2003. EPA subsequently notified States that submittal of mid-course reviews would not be required until the end of 2004, in order to allow inclusion of regional emission reductions resulting from EPA's NO_x SIP Call, which must occur by May 2004.

CTDEP partially addressed EPA's conditional approval of the Southwest Connecticut attainment demonstration with a SIP revision submitted on February 8, 2000. That revision included 2007 mobile source budgets, which were subsequently found to be adequate by EPA on June 16, 2000 (65 FR 37778), as well as commitments to adopt tighter limits on municipal waste combustor (MWC) units, submit additional control measures to address the EPA-identified attainment shortfalls, revise motor vehicle emission budgets within one year after release of MOBILE6, and perform a mid-course review by the end of 2003.

The current SIP revision follows up on EPA's December 16, 1999 conditional approval and CTDEP's subsequent February 8, 2000 commitments for the Southwest Connecticut one-hour ozone nonattainment area. Specifically, CTDEP is:

- 1) Providing SIP documentation demonstrating that adopted control measures will produce sufficient emission reductions by 2007 in Southwest Connecticut to meet the rate-of-progress (ROP) and contingency measure requirements of the Clean Air Act, as amended in 1990 (CAA);
- 2) Incorporating adopted regulations into the SIP that further reduce emissions of nitrogen oxides (NO_x) from municipal waste combustion facilities, partially addressing the EPA-identified attainment shortfall for Southwest Connecticut;
- 3) Committing to pursue adoption of regulations further restricting emissions from mobile equipment repair and refinishing facilities and consumer products to address the remaining EPA-identified shortfalls in Southwest Connecticut. CTDEP commits to pursue adoption of regulations as soon as possible, with implementation prior to the 2005 ozone season, well before the required attainment date of 2007;
- 4) Revising the schedule for submittal of the mid-course review to December 31, 2004 for both the Southwest Connecticut and Greater Connecticut nonattainment areas.

Each of these SIP elements is described in further detail below.

2.0 POST-1999 RATE-OF-PROGRESS PLAN FOR SOUTHWEST CONNECTICUT

Section 182(c)(2) of the Clean Air Act (CAA) requires each state with one-hour ozone nonattainment areas classified as serious and above to submit a SIP revision describing how it will make progress reducing ozone precursor emissions during the period after 1996. The SIP revision must provide for emission reductions of VOC equal to three percent per year for each contiguous three-year milestone period starting with 1997-1999, through the required attainment year. In areas such as Connecticut, where reductions in NOx emissions result in improved ambient ozone levels, emission reductions of NOx can be substituted to meet all or a portion of the required level of VOC reduction.

The CTDEP previously satisfied the ROP requirement statewide for the first milestone period (i.e., 1997 through 1999) through submittal of the 1999 ROP Plan, which was approved by EPA in the October 19, 2000 Federal Register. The current SIP revision, known as the Post-1999 ROP Plan, describes how Connecticut will meet the CAA's rate-of-progress requirements for the period between 2000 and 2007, the required attainment year for the Southwest Connecticut severe nonattainment area. Note that, although EPA recently issued final approval extending the required attainment date for the Greater Connecticut serious nonattainment area to 2007 (due to overwhelming transport from upwind areas; published in the January 3, 2001 Federal Register), ROP requirements for that area only apply through the CAA-defined 1999 date.

The Post-1999 ROP Plan, included as Enclosure A and summarized here, describes the local and regional control measures that have been adopted to meet rate-of-progress requirements in Southwest Connecticut between the years 2000 and 2007. The Plan demonstrates that programs will be implemented in a timely manner, sufficient to satisfy the requirement that ozone precursor emission reductions average at least 3 percent per year for the milestone periods ending in 2002, 2005, and 2007. The Plan also provides excess reductions in 2007 (i.e., beyond ROP requirements) which meet CAA Section 172(c)(9) and 182(c)(9) requirements that contingency measures be included in the SIP. The contingency requirement would be triggered if actual emissions in 2007 exceed ROP target levels. In addition, the Plan establishes 2002 and 2005 transportation conformity budgets for Southwest Connecticut based on on-road mobile source emission projections.

Post-1999 ROP emission reduction requirements will be satisfied in Southwest Connecticut through implementation of the state and federal control programs listed in Table 1 (summary of all source categories) and Table 2 (expanded information on non-road engine controls). These control programs are in addition to those previously accounted for in Connecticut's 15% Plan and 1999 ROP Plan.

Projected anthropogenic VOC and NOx emissions for Southwest Connecticut are displayed in Figure 1 for the years 2002, 2005, and 2007. Emission projections incorporate the control programs described above and reflect estimated growth levels over the time period. VOC and NOx emissions are projected to decrease by 35% and 34%, respectively, in Southwest Connecticut between 1996 and 2007. The largest projected VOC emission decreases occur within the on-road (68% reduction over the period) and non-road sectors (46% reduction). These reductions are attributed to the

Table 1
Southwest Connecticut Severe Ozone Nonattainment Area
Ozone Precursor Reduction Strategies Included in Post-1999 ROP Plan¹

Control Strategy	Pollutant		Federal Program	State Program	Rule Approval Date ²	Initial Year of Implementation ³
	VOC	NOx				
<i>Stationary Sources⁴</i>						
NOx Budget Program (EPA NOx SIP Call)		*		*	12/27/2000	2003
Municipal Waste Combustor Controls		*		*	10/26/2000 ⁶	2000,2003
<i>Mobile Sources</i>						
Enhanced I/M (final cutpoints)	*	*		*	10/27/2000	2002
Reformulated Gasoline - Phase II ⁴	*	*	*		2/16/1994	2000
Tier 1 Motor Vehicle Controls	*	*	*		6/5/1991	1994
National Low Emission Vehicle Program	*	*	*		3/2/1998 ⁷	1998 (in CT)
Tier 2 Motor Vehicle Controls/Low Sulfur	*	*	*		2/10/2000	2004-2008
Heavy Duty Diesel Vehicle Phase 1 Controls	*	*	*		10/6/2000	2004-2005
Non-Road Engine Standards ⁵	*	*	*		1994-2000 ⁸	1996-2008

¹ These controls are in addition to those described in the 15% Plan and the 1999 ROP Plan (i.e., pre-1990 Federal Motor Vehicle Control Program; federal rules addressing architectural & industrial maintenance coatings, consumer products, and automobile refinishing; RFG Phase I; enhanced I/M with initial cutpoints; Stage II vapor recovery with annual inspections; VOC RACT; NOx RACT; OTC Phase II NOx controls; and increased rule effectiveness of cutback asphalt and gasoline loading rack rules)

² Unless otherwise noted, this is the date that the final federal rule or EPA's approval of the state SIP submittal was published in the Federal Register.

³ A range of implementation years is listed for some strategies due to gradual phase-in of standards. In addition, all listed mobile source strategies (except enhanced I/M and reformulated gasoline) result in increased levels of emission reductions through and beyond 2007 due to the gradual turnover of the affected fleets.

⁴ Reformulated gasoline requirements also result in a reduction in evaporative VOC emissions throughout the gasoline distribution system.

⁵ The initial implementation date for non-road vehicle standards varies by category (e.g., small gasoline engines, locomotives, construction equipment, etc). See Table 2 for additional information for each category.

⁶ This is the date the Phase II MWC regulation became effective in Connecticut. The Department is submitting the regulation as an element of this SIP revision.

⁷ EPA Administrator Browner determined that the NLEV program was in place on 3/2/1998. As a result, rules published on 6/6/1997 and 1/7/1998 went into effect.

⁸ Federal rule approval dates for on-road engine standards vary by category. See Table 2 for more detailed information.

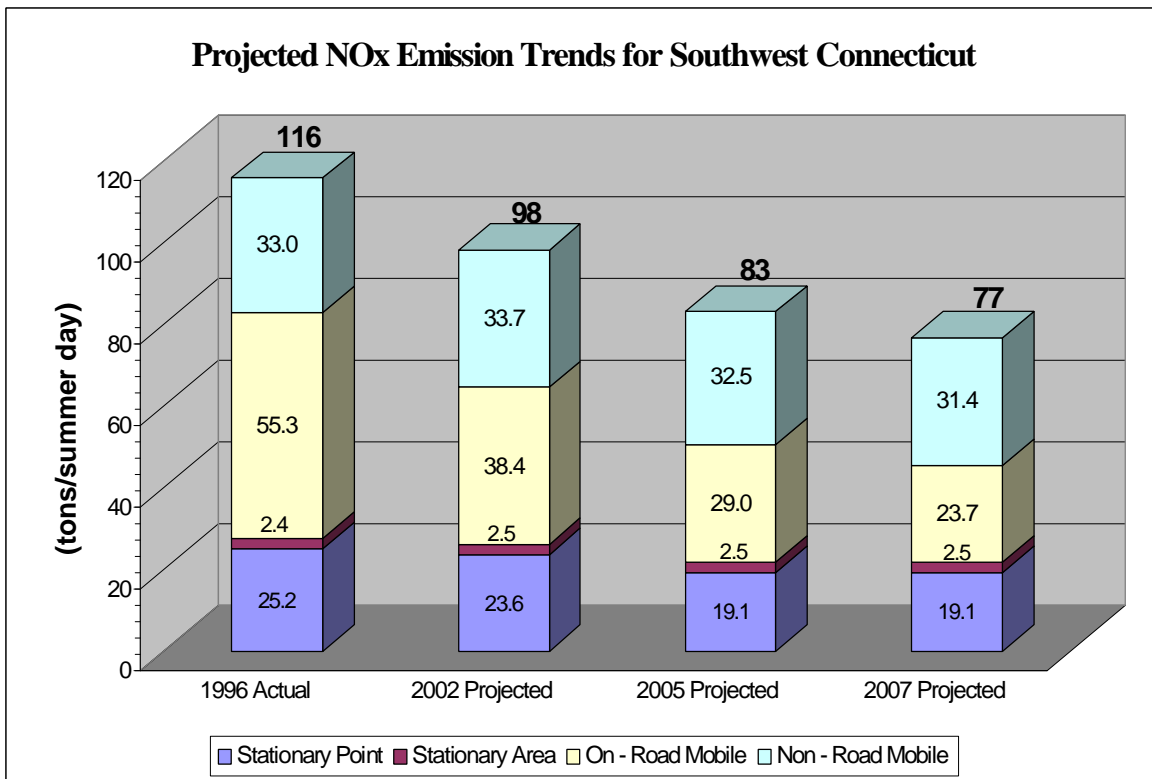
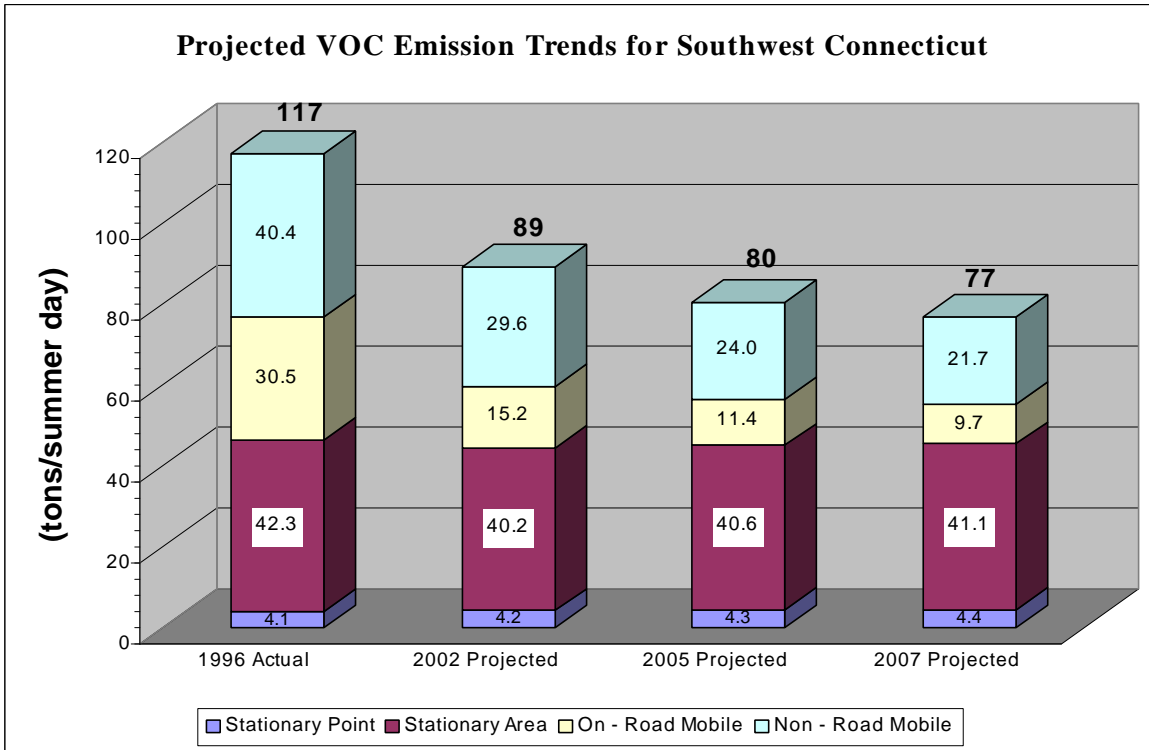
Table 2
EPA Non-Road Engine Standards

Non-Road Engine Category	Date of Final Rule	Implementation Phase-In Period
<i>Compression Ignition (diesel) Engines</i>		
Tier 1: Land-Based Diesel Engines > 50 hp	06/17/1994 (59 FR 31306)	1996-2000
Tier 1: Small Diesel Engines < 50 hp	10/23/1998 (63 FR 56968)	1999-2000
Tier 2: Diesel Engines (all sizes)	10/23/1998 (63 FR 56968)	2001-2006
Tier 3: Diesel Engines 50 - 750 hp	10/23/1998 (63 FR 56968)	2006-2008
<i>Spark-Ignition (e.g., gasoline) Engines</i>		
Phase 1: SI Engines < 25 hp (except marine & recreational)	07/03/1995 (60 FR 34581)	1997
Phase 2: Non-Handheld SI Engines < 25 hp	03/30/1999 (64 FR 15208)	2001-2007
Phase 2: Handheld SI < 25 hp	04/25/2000 (65 FR 24268)	2002-2007
Gasoline SI Marine Engines (outboard & personal watercraft)	10/04/1996 (61 FR 52088)	1998-2000
<i>Marine Diesel Engines</i> ¹		
MARPOL: New/Old Engines on Vessels Constructed Starting 1/1/2000	09/27/1997 MARPOL (Annex VI of International Convention on Prevention of Pollution from Ships)	2000
EPA: Commercial Marine Diesel Engines (US-flagged vessels)	12/29/1999	2004/2007
<i>Locomotives</i>		
New & Remanufactured Locomotives and Locomotive Engines ²	04/16/1998 (63 FR 18978)	(see note 2) Tier 0: 1973-2001 Tier 1: 2002-2004 Tier 2: 2005 +

¹ The Post-1999 ROP Plan does not take emission reduction credit for marine diesel controls because EPA's NONROAD model does not provide projections for that category.

² EPA has established three sets of locomotive standards, applied based on the date the locomotive was first manufactured (i.e. during the Tier 0, Tier 1, or Tier 2 periods). The applicable standards take effect when the locomotive or locomotive engine is first manufactured and continue to apply at each periodic remanufacture.

Figure 1



enhanced I/M program and the second phase of reformulated gasoline (by 2002), as well as increasingly stringent federal emission standards for new on-road and non-road engines that are reflected throughout the period as the affected fleets gradually turn over.

The largest decreases in NO_x emissions between 1996 and 2007 occur within the on-road and stationary point source sectors. The on-road reductions (57% over the period) result from the enhanced I/M program, new federal emission standards, and (to a lesser extent) the second phase of reformulated gasoline. Both the NO_x Budget Program and the adoption of more stringent emission limits for municipal waste combustion facilities contribute to the estimated 24% reduction in NO_x emissions from stationary point sources in Southwest Connecticut between 1996 and 2007.

Emission projections are compared with the required ROP target levels in Table 3. Target levels were calculated using EPA procedures and represent emission levels corresponding to the ROP requirement for reductions averaging 3% per year through the mandated attainment year. Projected emissions in 2002, 2005, and 2007 are less than or equal to their respective target levels, thus demonstrating that the ROP goal will be achieved. In addition, the surplus NO_x emission reduction of 36.9 tons per day in 2007 is sufficient to satisfy CAA Section 172(c)(9) and 182(c)(9) mandates requiring contingency measures providing an additional 3% reduction in emissions, triggered if actual emissions in 2007 exceed the ROP target levels.

On-road mobile source projections for 2002 and 2005 will serve as conformity budgets for transportation planning in Southwest Connecticut. Budgets are established at emission levels of 15.2 tons/day of VOC and 38.4 tons/day of NO_x in 2002 and 11.4 tons/day of VOC and 29.0 tons/day of NO_x in 2005. Transportation conformity budgets were previously established for 2007, and are equal to on-road emission projections included in this Post-1999 ROP Plan (i.e., 9.7 tons/day of VOC and 23.7 tons/day of NO_x).

Table 3

**Southwest Connecticut Severe Nonattainment Area
Comparison of Projected Emissions to Rate-of-Progress Target Levels
(tons/day)**

	VOC	NOx
2002 Target Emission Levels	96.1	115.2
2002 Projected Emissions	89.2	98.2
2005 Target Emission Levels	83.7	114.9
2005 Projected Emissions	80.4	83.1
2007 Target Emission Levels	76.8	113.7
2007 Projected Emissions	76.8	76.8
2007 Surplus Reductions	0.0	36.9
2007 Required Contingency	--	3.6

Notes:

- 1) Projections include all programs listed in Table 1 and its footnotes.
- 2) Target emission levels represent the level of emissions that must be achieved by each milestone year to comply with rate of progress requirements. Target levels were calculated based on procedures specified in EPA guidance, as described in Section 2.2. Note that calculated target levels must account for non-creditable emission reductions resulting from pre-1990 CAA requirements (i.e., the pre-1990 federal motor vehicle emission control program, also known as the "Tier 0" control program).
- 3) The Post-1999 ROP Plan must include measures to achieve an additional 3 percent reduction, beyond ROP requirements, if needed to meet shortfalls from other control strategies. The contingency requirement can be satisfied with reductions in either VOC or NOx emissions (or a combination of both). Surplus reductions (the difference between 2007 target and projected emissions, or 36.9 tpd of NOx) are available for use to satisfy the contingency requirements of sections 172(c)(9) and 182(c)(9) of the Clean Air Act.

3.0 MUNICIPAL WASTE COMBUSTOR REGULATIONS

In accordance with sections 111 and 129 of the Clean Air Act, in 1995 the EPA issued Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Municipal Waste Combustors (60 FR 65387; codified at 40 C.F.R. Part 60, Subparts Cb and Eb)(as subsequently amended, the “Emissions Guidelines” and the “NSPS”). Pursuant to the Emissions Guidelines, the NSPS and 40 C.F.R. Part 60, Subpart B, CTDEP developed and submitted a Plan for Implementing the Municipal Waste Combustor Emission Guidelines and New Source Performance Standards (the Plan). EPA approved the Plan by direct final rule on April 21, 2000 (65 FR 21354), and the Plan became effective June 20, 2000.

The Plan is enforced through Regulations of Connecticut State Agencies Section 22a-174-38 (Section 38), which became effective on June 28, 1999. This version of Section 38 included oxides of nitrogen (NO_x) emission limits (Phase I NO_x limits) that were equivalent to the emission limits established in the Emission Guidelines. The Phase I NO_x limits became effective as of December 19, 2000.

Amendments to Section 38 were adopted by the Department on October 26, 2000. The revisions to Section 38 included a second phase of NO_x emission limits (Phase II NO_x limits) that were more stringent than the limits established in the Emission Guidelines. The Phase II NO_x limits will become effective on May 1, 2003.

The CTDEP’s amended Plan was submitted to EPA on November 28, 2000. The Phase II NO_x limits were stricken from the revised Section 38 submitted to EPA at that time. The Department is now submitting the revised Section 38 Phase II NO_x limits (see Enclosure B) in order to include the resulting NO_x reductions as part of the Department’s Ozone Attainment SIP. Table 4 quantifies the estimated NO_x reductions achieved by the implementation of the Phase II NO_x limits. Using projected annual heat input levels for municipal waste combustors in Connecticut, it is estimated that the following reductions will be achieved statewide, relative to emission levels prior to the MWC Phase I NO_x limits:

- 592 tons per year;
- 248 tons per ozone season (May 1 – September 30);
- 1.62 tons per day during the ozone season.

These reductions, in combination with those expected from two additional VOC control measures described in Section 4, satisfy the EPA-identified one-hour ozone attainment shortfall for the Southwest Connecticut portion of the New York-New Jersey-Long Island nonattainment area. Section 4 also provides rationale for using statewide NO_x (and VOC) emission reductions to meet the attainment shortfall in Southwest Connecticut.

Table 4

Additional NO_x Reductions Due to Connecticut's Municipal Waste Combustor Regulations

FACILITY	Projected Facility Annual Heat Input (MMBtu) (90% of MRC)	Lower of RACT / Permit / Trading Limit (lb/MMBtu)	Emission Rate w/o SNCR (or pre-SNCR rate)	MWC Rule Phase II Limits (ppmv)	MWC Rule Phase II Limits (lb/MMBtu)	Emissions at Lower of RACT or w/o SNCR Rates	Emissions at Lower of Phase II or w/o SNCR Rates	ADDITIONAL REDUCTIONS PHASE II VS RACT LIMITS®
Bridgeport RESCO Co., L.P.	7,686,900	0.38	0.42	177	0.308	1,461	1,183	278
Resource Recovery Systems (Mid-CT)	7,710,552	0.31	0.31	147	0.258	1,195	995	200
American Ref-Fuel Co. of SE CT	2,270,592	0.38	0.42	177	0.312	431	355	76
Ogden Martin Systems of Bristol	1,923,696	0.38	0.51	200	0.346	366	333	33
Ogden Projects of Wallingford	1,371,816	0.38	0.23	177	0.299	158	158	0
Riley Energy Systems of Lisbon	1,702,944	0.31	n/a	177	0.304	264	259	5
	22,666,500				ANNUAL (tons)	3,875	3,283	592
					OZONE SEASON (tons)	1,624	1,376	248
					OZONE SEASON (tons per day)	10.62	8.99	1.62

4.0 ADDITIONAL POTENTIAL CONTROL MEASURES

In December 1999, EPA published conditional approvals of one-hour ozone attainment demonstrations for several nonattainment areas in the Northeast and elsewhere. In each case, the rulemakings identified levels of additional emission reductions EPA determined were necessary to achieve attainment by the required attainment date. For the New York nonattainment area, EPA stated that an additional 3.8% VOC and 0.3% NO_x reduction from base year 1990 inventories would be necessary to approve a revised and re-submitted attainment demonstration for this area. EPA's most recent calculations of the shortfall in emission reductions for the Connecticut portion of the nonattainment area are 5.3 tpsd of VOC and 0.5 tpsd of NO_x (see 66 FR 42177; August 10, 2001).

CTDEP responded to EPA's conditional approval with a February 8, 2000 SIP revision, which included a commitment to adopt more stringent NO_x emission limits applicable to municipal waste combustion (MWC) units. Connecticut is meeting that commitment by submitting revised MWC regulations as part of this SIP package (see Enclosure B). As described in the previous section, the revised regulation is estimated to result in additional statewide NO_x emission reductions totaling 1.6 tons/day in 2007. These statewide reductions will be used to meet a portion of Connecticut's emission reduction shortfall, consistent with EPA guidance allowing credit for NO_x emission reductions from sources within 100 kilometers of the boundary of the subject nonattainment area ("Guidance for Implementation of the One-Hour Ozone and Pre-Existing PM-10 NAAQS"; December 1997) and substitution of NO_x reductions for VOC reductions on an equal percentage basis ("Clarification of Policy for Nitrogen Oxide (NO_x) Substitution"; John Seitz memorandum of August 5, 1994).

CTDEP's February 2000 SIP revision also included a commitment to work with other jurisdictions of the Ozone Transport Commission (OTC) to identify potential additional control measures that could be adopted to address the remainder of the emissions shortfall. On June 1, 2000, Connecticut joined other OTC States in a memorandum of understanding (MOU) entitled "Regarding the Development of Specific Control Measures to Support Attainment and Maintenance of the Ozone National Ambient Air Quality Standards". Model rules and technical support information were then developed by OTC workgroups in accordance with the MOU for the following source categories:

- 1) Architectural and industrial maintenance coatings;
- 2) Consumer products;
- 3) Portable fuel containers;
- 4) Mobile equipment repair and refinishing;
- 5) Solvent cleaning;
- 6) Additional NO_x controls for fuel combustion sources, including cement kilns, gas turbines, stationary reciprocating engines, and industrial boilers.

Estimates of emission reductions creditable towards the attainment shortfalls were calculated by comparing model rule emission limits to those currently incorporated into ozone nonattainment SIPs.

Throughout the process, OTC sought and received input from the regulated community, EPA, and other stakeholders. The draft model rules were subsequently reviewed and approved by the OTC Stationary/Area Source Committee and the OTR Commission. The final model rules were released on March 28, 2001.

Emission reduction estimates for each of the model rules, if applied throughout Connecticut, are summarized in Table 5. One or more of these control strategies, in combination with Connecticut's recently adopted MWC NO_x regulation, would provide sufficient statewide emission reductions to meet the EPA-identified attainment shortfall for Southwest Connecticut. More detailed information regarding each model rule, as well as emission calculation documentation, is available in a technical report prepared for OTC, included as Enclosure C (and referred to below as the "OTC Model Rule report"). Copies of each model rule are included in Enclosure D.

The use of additional statewide NO_x and VOC reductions to meet the EPA-identified emission reduction shortfalls in Southwest Connecticut is appropriate and consistent with both EPA guidance and air quality data. EPA addresses the geographic substitution issue in a December 23, 1997 memorandum entitled "Guidance for Implementation of the One-Hour Ozone and Pre-existing PM-10 NAAQS." The guidance indicates that one-hour nonattainment areas are allowed to take credit for emissions reductions obtained from sources outside the designated nonattainment area as long as the reductions occur no further than 100 km (for VOC sources) or 200 km (for NO_x sources) away from the nonattainment area. When applied to the New York-New Jersey-Connecticut (NY-NJ-CT) nonattainment area, these substitution distances encompass all of Connecticut (*see* Figure IV-2 of the OTC Model Rule Report, included as Enclosure C of the original hearing package). Although this guidance was initially intended to address geographic substitution for use in post-1996 rate of progress plans, EPA has indicated that it can also be applied for attainment planning purposes given the regional nature of the ozone problem. In addition, EPA control strategies, such as the NO_x Budget Program, reflect these same principles by pursuing regional emission reductions to achieve attainment of the ozone standard.

Note also that, historically, many of the highest measured ozone levels measured in Connecticut occur outside of the Southwest Connecticut portion of the NY-NJ-CT severe nonattainment area. For example, the highest design values in the state for each of the years from 1998 through 2000 were measured either in Middletown or Madison, towns located downwind of the NY-NJ-CT severe nonattainment area, although significantly influenced by transport from that area. In recognition of this, ozone control strategy SIP's in the NY-NJ-CT severe area have been developed with the objective of achieving ozone attainment throughout *all* portions of Connecticut, not just the Southwest Connecticut portion of the NY-NJ-CT nonattainment area. With that objective in mind, the Department intends to implement all selected shortfall measures statewide to address Connecticut's contribution to nonattainment areas both within the state and further downwind.

Table 5
Estimated Statewide Emission Reductions in Connecticut
Resulting from Potential Control Measures*

Potential Control Measure	VOC (tons/day)	NOx (tons/day)
Mobile Equipment Repair and Refinishing*	4	--
Consumer Products*	5	--
AIM Coatings	10	--
Portable Fuel Containers	5	--
Solvent Cleaning Operations	16	--
NOx Controls on Combustion Sources	--	4

* All estimates are from the OTC report "Control Measure Development Support Analysis of Ozone Transport Commission Model Rules", included in this package as Enclosure C. As part of this SIP submittal, CTDEP is committing to pursue adoption of regulations for the first two categories: mobile equipment repair and refinishing operations and consumer products. An additional statewide NOx reduction of 1.6 tons/day will result from CTDEP's previously adopted regulation for municipal waste combustor (MWC) units, as described in the text. The combined reductions from these three measures will be sufficient to address the EPA-identified emission reduction shortfall

EPA guidance materials (*e.g.*, EPA's August 5, 1994 memorandum entitled "Clarification of Policy for Nitrogen Oxides (NO_x) Substitution") also address the conditions under which NO_x reductions can be substituted for VOC reductions. Requirements to qualify for NO_x substitution include: 1) submittal of photochemical grid modeling showing that NO_x reductions are an effective means to reduce ozone concentrations; and 2) submittal of reasonably available control technology ("RACT") regulations for NO_x point sources. As documented in Section 2.1 of the Post-1999 ROP Plan, SIP modeling analyses submitted by the Department identify regional NO_x emissions as a prime contributor to ozone formation in Connecticut and throughout the Northeast, supporting the need for large-scale NO_x reductions to achieve compliance with the one-hour ozone standard in Connecticut. The Department has also submitted the required NO_x RACT regulations, along with the recently adopted MWC regulations and NO_x Budget Program. Together, these control strategies will provide significant NO_x reductions from stationary sources within the state.

As part of the public hearing process for this SIP revision, CTDEP solicited public comment on each of the model rules. Comments were requested regarding the technical feasibility, cost, and air quality benefits of each rule. No comments were received during the public review period related to the model rules; therefore, the Department has used information gathered by OTC, nearby states, and other sources to guide its selection of additional shortfall measures to pursue through the Connecticut regulatory process. Additional opportunity for public comment will be provided as specific regulatory language is proposed to implement the selected measures.

A brief description of each model rule is provided below. As noted, two of the measures (*i.e.*, additional control requirements for mobile equipment repair and refinishing operations and the consumer products industry) have been selected to address the remaining attainment shortfall. CTDEP may pursue one or more of the remaining measures at some point in the future (*e.g.*, depending on the results of the mid-course review; to comply with the 8-hour ozone standard).

4.1 Mobile Equipment Repair and Refinishing

The Federal automobile refinish coating rule became effective September 11, 1998 (63 FR 48806). It regulates the manufacturers and importers of automobile refinish coatings and coating components, and reduces national VOC emissions from the category by 33 percent compared to pre-control levels.

The OTC has developed a model rule that addresses VOC emissions from mobile equipment repair and refinishing operations. The rule includes VOC limits for paints used in the industry that are consistent with the Federal limits for mobile equipment refinishing materials. The rule would also establish requirements for using improved transfer efficiency application equipment and enclosed spray gun cleaning, and require minimal training.

In addition to requiring that refinishing materials meet the Federal VOC limits, the model rule would propose a number of pollution prevention initiatives. For example, the model

rule's coating application requirements specify using improved transfer efficiency spray equipment such as high volume-low pressure (HVLV) equipment. Using higher transfer efficiency equipment would reduce paint use and consequently reduce painting-related emissions. Reduced "overspray" from painting operations would reduce the frequency of booth filter replacement and related disposal and replacement costs, making operations more economical for the facility owners.

The model rule would also require operators to use spray gun cleaning equipment that minimizes solvent loss. While commercially available spray gun cleaners are desirable, the proposal would allow other containers for spray gun cleaning to be used, as long as the container is closed when not in use.

Operators would be required to complete minimum training in proper use of equipment and materials, and maintain a record of the training. The training requirement could be met through attending formalized training centers or through information provided by paint and equipment representatives during routine shop visits.

Incremental to the Federal rule, the OTC model rule would require the use of high transfer-efficiency painting methods (e.g., high volume low pressure spray guns), and controls on emissions from equipment (e.g., spray gun) cleaning, housekeeping activities (e.g., use of sealed containers for clean-up rags), and operator training. An incremental control effectiveness of 38 percent was estimated for the OTC model rule relative to the Federal rule. This estimate includes a 35 percent reduction from the use of high transfer-efficiency spray guns and another 3 percent from the use of enclosed spray gun cleaners. For Connecticut, the OTC model rule is estimated to result in 4 tons/day of additional VOC reductions, relative to the Federal rule. OTC estimates reductions can be achieved at a cost of \$1,534 per ton.

CTDEP is committing, as part of this SIP revision, to pursue adoption of regulations which will achieve emission reductions approximating those estimated for the corresponding OTC model rule. CTDEP commits to pursue adoption of regulations as soon as possible, with implementation prior to the 2005 ozone season, well before the required attainment date of 2007

4.2 Consumer Products

The Federal consumer product rule became effective September 11, 1998 (63 FR 48819). It regulates manufacturers, importers, and distributors of 24 product categories representing 48 percent of the consumer products inventory nationally, and reduces VOC emissions from those product categories by 20 percent. Over one-half of the inventory is unregulated by the Federal rule. In order to capture additional emission reductions from this sector, the OTC developed a model rule for this source category.

The OTC model rule would regulate approximately 80 consumer product categories, and uses more stringent VOC content limits than the Federal rule. Some of the limits are currently in effect in California, and are known to be technologically feasible; others have

future effective dates. The proposed compliance date for the model rule limits is January 1, 2005. Manufacturers would ensure compliance with the limits through reformulation and/or substitution with compliant products that are already on the market.

The OTC model rule contains requirements for approximately 80 product categories. Examples include aerosol adhesives, floor wax strippers, dry cleaning fluids, and general-purpose cleaners. It also contains administrative requirements for labeling, reporting, code-dating, and a “most restrictive limit” scenario. There is a reporting requirement, such that manufacturers may be required to submit information to the State upon written notice.

A CARB test method would be primarily used to demonstrate compliance. Alternative accepted test methods are also allowed. Enforcement with the product VOC content limits and other requirements would be performed on a State-by-State basis.

If complying with the VOC content limits becomes difficult, flexibility options are provided for in the draft model rule. These include an innovative product exemption (e.g., a non-compliant product with a delivery system that puts it in compliance with the limits); variances; exemptions; an alternative control plan; and a provision that allows products to be sold that are manufactured before the rule applicability date.

The OTC model rule requires manufacturers of particular products to reformulate them to meet VOC limits. The VOC limits in the model rule are based on rules adopted or under consideration by CARB. Consumer product emission reductions for the OTC model rule are estimated to be 14.2 percent of the total consumer product inventory (beyond reductions due to the existing Federal rule). These estimated reductions were based on information in the ARB staff report and surveys (see the enclosed OTC Model Rule report). Recent information can be found on the ARB website *Consumer Products Program* section (<http://www.arb.ca.gov/consprod/consprod.htm>).

OTC estimates that the consumer products model rule would result in VOC emission reductions of 5 tons/day in Connecticut. CARB has estimated the cost of their rule to be \$800 per ton. Since the OTC model rule emission limits are based on California’s, this value should approximate the costs incurred to meet the same limits in the OTC States. However, because compliance costs are spread over a larger portion of sales in the OTC than in California, costs incurred by manufacturers are expected to be lower than \$800 per ton.

CTDEP is committing, as part of this SIP revision, to pursue adoption of regulations which will achieve emission reductions equivalent to those estimated to result from the corresponding OTC model rule. CTDEP commits to pursue adoption of regulations as soon as possible, with implementation prior to the 2005 ozone season, well before the required attainment date of 2007

4.3 Architectural and Industrial Maintenance Coatings

The Federal architectural and industrial maintenance (AIM) coatings rule became effective September 11, 1998 (63 FR 48848, as corrected in 64 FR 32103). It regulates

manufacturers and importers of over 50 product categories nationally, and reduces VOC emissions from those product categories by 20 percent compared to pre-control levels.

The OTC Model Rule for AIM Coatings would build on the Federal rule by requiring manufacturers to reformulate coatings to meet more stringent VOC content limits, which are specified in grams per liter. The VOC content limits contained in the model rule are based on the Suggested Control Measure adopted by the California Air Resources Board (CARB), and the State and Territorial Air Pollution Program Administrators/Association of Local Air Pollution Control Officials (STAPPA/ALAPCO) model rule for AIM Coatings.

As written, the model rule would require all products manufactured for sale or use after January 1, 2005 to comply with the specified VOC content limits. A provision allows products to be sold that are manufactured before the rule applicability date. Testing to demonstrate compliance would primarily be done in accordance with EPA Method 24, although alternative test methods may be allowed.

The AIM model rule is estimated to provide an additional 31 percent reduction in VOC emissions when compared to the current EPA Federal rule. This reduction was computed by OTC using information from data provided by the Industry Insights Survey for the National Paints and Coatings Association (see the enclosed OTC Model Rule report).

EPA and stakeholders used this same data set in the regulatory negotiation process when the Federal architectural coatings rule was established.

The OTC estimates that the AIM model rule would result in VOC emission reductions of 10 tons/day in Connecticut and that reductions can be achieved at a cost of \$6,400 per ton. OTC model rule emission reductions were computed on a constant solids basis.

CTDEP is not committing to pursue adoption of the OTC AIM model rule at this time but may do so at some point in the future (e.g., depending on the results of the mid-course review; to comply with the 8-hour ozone standard).

4.4 Portable Fuel Containers

OTC's model rule addresses VOC emissions from portable fuel containers. The rule would specify performance standards for portable fuel containers and/or spouts which are intended to reduce emissions from storage, transport and refueling activities. The model rule states that any portable fuel container and/or spout must provide the following:

- only one opening for both filling and pouring;
- an automatic shut-off to prevent overflow during refueling;
- automatic closing and sealing of the container and/or spout when not dispensing fuel;
- a fuel flow rate and fill level as specified in the rule;
- a permeation rate of less than or equal to 0.4 grams per gallon per day; and

- a warranty by the manufacturer as specified in the rule.

The model rule would apply to any person or entity selling, supplying, or offering for sale or manufacture for sale portable fuel containers and/or spouts on or after January 1, 2003. Manufacturers of portable fuel containers would be required to verify compliance through testing and record keeping. The model rule also specifies administrative and labeling requirements. The rule affects all portable fuel containers and/or spouts except:

- containers with a capacity of less than or equal to one quart;
- rapid refueling devices with capacities greater than or equal to four gallons;
- safety cans and portable marine fuel tanks that operate in conjunction with outboard engines; and
- products which result in cumulative VOC emissions below those of a representative container and/or spout.

The model rule would require manufacturers to comply with the requirements by January 1, 2003. Rule penetration would increase with time as consumers buy new compliant fuel containers to replace existing ones. California conducted an industry survey on portable fuel container sales and determined that there is a five-year turnover rate for fuel containers. For the purpose of this analysis, the OTC chose a more conservative ten-year turnover rate, with 100 percent rule penetration by January 1, 2013. A constant rate of turnover was assumed (i.e., every year after 2003, 1/10 of the total fuel containers would be replaced, until all are replaced by 2013). Therefore, emission benefits calculated for July 2007 (i.e., 4-1/2 years from the compliance date) are based on a 45% turnover to model rule compliant containers. For Connecticut, this translates into a VOC emission reduction in 2007 of 5 tons/day. OTC estimates that reductions can be accomplished at a cost of \$581 per ton.

CTDEP is not committing to pursue adoption of the OTC portable fuel container model rule at this time but may do so at some point in the future (e.g., depending on the results of the mid-course review; to comply with the 8-hour ozone standard).

4.5 Solvent Cleaning

The OTC's Solvent Cleaning Operations model rule would establish hardware and operating requirements and alternative compliance options for vapor cleaning machines used to clean metal parts. These requirements are based on the Federal maximum achievable control technology (MACT) standard for chlorinated solvent vapor degreasers. The requirements implement higher levels of technology than required under EPA's existing Control Technique Guidance. Cold cleaner solvent volatility provisions are also included in the model rule, based on regulatory programs in place in several States, including Maryland and Illinois.

Vapor cleaning machines are generally used in manufacturing operations to clean soils, including grease, oil, waxes, and the like, from parts where the highest level of cleanliness is necessary. Such manufacturing operations include the electronics industry

and high quality metal machining and finishing operations. Typically, these machines have used VOC and hazardous air pollutant (HAP) solvents, but as the MACT standard is implemented, there are indications that VOC/HAP solvents are being replaced with non-HAP VOCs. The proposed requirements would apply to operators of vapor cleaning machines with a solvent surface area greater than one square foot.

In contrast, cold cleaners are used less frequently in manufacturing operations. They are more typically used in automobile repair and maintenance facilities, and in industrial maintenance shops. It is estimated that in excess of 50 percent of cold cleaning units are in automotive maintenance facilities. These units are either small remote reservoir machines or small immersion cleaning machines. The machines are useful in removing heavy soils where extreme cleanliness is not required.

The cold cleaner provisions of the model rule would primarily affect small business and solvent suppliers. Most of the cold cleaning machines are provided to users through contract with regional and national companies. Under the model rule, the machine providers would be responsible for assuring that the cold cleaner solvent meets the volatility limit (i.e., 1 millimeter mercury). In other cases, the users and solvent providers would have to assure that the solvent meets the required limit. All limits would apply only to cold cleaners containing greater than one liter of solvent.

Overall, the model rule requirements would apply only to cold cleaners and vapor cleaning machines cleaning metal parts. Exemptions would be provided in situations where safety concerns result from using low volatility cold cleaning solvents.

The OTC model rule establishes hardware and operating requirements for specified vapor cleaning machines, as well as solvent volatility limits and operating practices for cold cleaners. An incremental control effectiveness of 66 percent was estimated for the OTC model rule relative to the base case (see the OTC Model Rule report for further information). For Connecticut, this results in a VOC reduction of 16 tons/day. OTC estimates reductions can be achieved at a cost of \$1,400 per ton, based on information from California's South Coast Air Quality Management District.

CTDEP is not committing to pursue adoption of the OTC solvent cleaning model rule at this time but may do so at some point in the future (e.g., depending on the results of the mid-course review; to comply with the 8-hour ozone standard).

4.6 Additional NO_x Controls for Fuel Combustion Sources

The OTC's NO_x Model Rule would affect NO_x emissions from industrial boiler, stationary combustion turbine, cement kiln, and internal combustion engine sources. The model rule is intended to achieve NO_x reductions from stationary point sources that are not expected to be regulated by either the EPA NO_x SIP Call or Phase III of the OTC NO_x Memorandum of Understanding (MOU).

The model rule proposes to reduce NO_x emissions from many sources ranging in size from large to very small. These sources are numerous, and most emit high levels of NO_x on a per-hour or per-unit of energy basis. Affected sources include: (1) boilers that are used to heat institutional, commercial, and large residential building complexes, and for heat and power in industrial applications; (2) small to large internal combustion engines that can be used as stand-alone power generation units and at pipeline compressor stations; (3) turbines that are typically used as on-site backup electric power generators; and (4) cement kilns. There are no cement kilns in Connecticut.

Emission reductions would be achieved by establishing more stringent NO_x emission rate limits or requirements for percentage NO_x reductions for source categories based on size (i.e., number of British thermal units [BTUs] per hour heat input). The OTC Model Rule report describes the requirements of the model rule and summarizes (in Table III-1) the emission rates and size cut-offs for each affected source category.

Application of the model rule in Connecticut is estimated to provide additional NO_x reductions of 4 tons/day beyond existing requirements.

CTDEP is not committing to pursue adoption of the OTC NO_x model rule at this time but may do so at some point in the future (e.g., depending on the results of the mid-course review; to comply with the 8-hour ozone standard).

5.0 MID-COURSE REVIEW SCHEDULE

In the notices of proposed rulemaking of December 16, 1999, EPA originally asked States with serious and severe ozone nonattainment areas to commit to submit their mid-course reviews by the end of 2003. The selection of this time was based in large part on the expectation that regional NO_x emission reduction controls under EPA's NO_x SIP call would be implemented prior to the 2003 ozone season. However, in August 2000, the U.S. Court of Appeals for the D.C. Circuit ruled that EPA could not require compliance with the NO_x SIP call reductions before May 31, 2004. As a result, EPA is now recommending that States revise the schedule for their mid-course review commitment to reflect a submittal deadline of December 31, 2004. This change will enable States to include the NO_x SIP Call reductions in mid-course review evaluations.

CTDEP's February 8, 2000 SIP revision included a commitment to complete and submit mid-course reviews for the Southwest Connecticut and Greater Connecticut nonattainment areas by the end of 2003. However, in light of the revised compliance date for the NO_x SIP Call, CTDEP is hereby amending that commitment to include a mid-course review submittal date of December 31, 2004.