Appendix C: Estimated Emission Reduction Calculations from Contingency Plan Measures

Chapter 6 outlines the State's contingency plans, needed in the event that either New Jersey associated nonattainment area is unable to attain the 1997 annual $PM_{2.5}$ health standard by its required attainment date. These plans require the implementation of the following measures (nine State measures and one Federal):

1) Diesel idling rule changes,
2) Diesel cutpoint rule changes,
3) Municipal Waste Combustor (MWC) measures,
4) Refinery measures,
5) Onroad Motor Vehicle Control Programs (Fleet turnover 2010),
6) Nonroad Motor Vehicle Control Programs (Fleet turnover 2010),
7) New Industrial/Commercial/Institutional (ICI) boiler rule,
8) NO_x RACT Rule (2006) for certain boilers,
9) Asphalt production plants rule, and
10) Federal Clean Air Interstate Rule (CAIR) Program 2010 – Phase I SO_2 Cap

All of these measures will produce additional emission reductions beyond those included in the regional attainment modeling. A detailed description of all these measures is included in Chapter 4 (a brief description is also provided in this appendix as well) and the estimated additional benefits from these measures are included in Chapter 6. The remainder of this appendix provides the detailed calculations used to determine the emission benefits from these measures. Since it is the State and Federal government's intention to implement these measures as soon as practical, regardless of their need in the contingency plans, these additional benefits provide further confidence that New Jersey will attain the $PM_{2.5}$ National Ambient Air Quality Standard (NAAQS) by 2009. By following the USEPA's guidance that encourages early implementation of contingency measures and relying on measures already implemented or under development, New Jersey is ensuring that no additional contingency measures will need to be developed and implemented beyond those identified.[1]

1. New Jersey Diesel Idling Rule Changes Calculations

Emission reductions will be realized through implementation of rule changes to Subchapter 14, Control and Prohibition of Air Pollution from Diesel-Powered Motor Vehicles, adopted in May 2007. These changes included clarifying the language on some exemptions; eliminating other exemptions, such as "sun setting" the sleeper berth exemption in 2010; and other associated changes such as enforcement, education, outreach, and legislative changes.

Emission Reduction Calculation Methodology:
The following emission reduction estimates are calculated for use as credits for contingency measure purposes only. They are based on the amount of idling emissions implicit in the MOBILE6 model. This methodology differs from that used for estimating emission benefits

[1] 72 Fed. Reg. 20642-43 (April 25, 2007).

during the rulemaking process.

Emission benefits were estimated by:

1. Starting with the MOBILE6 based value[2] for the percent of heavy duty truck emissions that result from idling: Idling emissions from onroad (class 8) heavy duty highway trucks represent approximately 3.4 percent of total emissions;
2. Applying an idling reduction percent assumption: Assuming that New Jersey's actions will reduce idling by 50 percent; and
3. Applying this to the New Jersey 2009 inventory emissions for class 8 heavy duty highway trucks.

The 50 percent reduction in idling from class 8 vehicles is estimated to be achieved from the following sources:

- Subchapter 14 rule revision (which includes eliminating / tightening many exemptions, the phasing-in of idling alternates such as auxiliary power units and sun setting the sleeper berth exemption in 2010),
- Increased enforcement through a legislative language change (N.J.S.A. 39:3-70.2), which allows State and local police to clearly enforce this rule,
- Education and outreach,
- Idling sweeps by the Compliance and Enforcement group,
- Sales of "No Idling" signs, yielding increased awareness of the regulation

The 2009 Emission Inventory for class 8 onroad diesel heavy duty vehicles attributable to long duration truck idling is 8 tpy of $PM_{2.5}$ and 435 tons per year (tpy) of NO_x for the Northern New Jersey/New York/Connecticut nonattainment area and 4 tpy of $PM_{2.5}$ and 223 tpy of NO_x for the Southern New Jersey/Philadelphia nonattainment area. A 50 percent reduction yields approximately 4 tpy of $PM_{2.5}$ and 218 tpy of NO_x for the Northern New Jersey/New York/Connecticut nonattainment area and 2 tpy of $PM_{2.5}$ and 112 tpy of NO_x for the Southern New Jersey/Philadelphia nonattainment area.

2. <u>New Jersey Diesel Cutpoint Rule Changes</u>

The New Jersey Department of Environmental Protection (NJDEP) is working toward proposing and adopting, in accordance with the New Jersey Administrative Procedures Act and the New Jersey Air Pollution Control Act, changes to establish more stringent test standards (cutpoints) for the existing diesel inspection and maintenance (I/M) program. The stricter cutpoints will result in additional emission reductions of direct $PM_{2.5}$ and NO_x. Emission reduction estimates are shown in tons of pollutants per day.

[2] USEPA. Guidance for Quantifying and Using Long Duration Truck Idling Emission Reductions in State Implementation Plans and Transportation Conformity. United States Environmental Protection Agency, Office of Transportation and Air Quality, EPA420-B-04-001, January 2004.

Table C1: 2009 Statewide Emission Benefits from Proposed Stricter Diesel I/M Cutpoint Program (Tons per Year)

2009 Emission Benefits from Proposed Stricter Diesel I/M Cutpoint Program (Tons per Year)	
Direct $PM_{2.5}$	20.5
NO_x	46

Emission Reduction Calculation Methodology:

Estimating inventory reductions due to diesel I/M using the USEPA MOBILE6 model directly is not possible because the most current version of the USEPA MOBILE mode, MOBILE6, has no diesel I/M model representation and assumes almost no deterioration of diesel vehicles. As such, the NJDEP has developed the following methodology to estimate emission benefits for stricter diesel I/M cutpoints.

The California Air Resources Board (CARB) has documented a series of tables of Heavy-Duty Diesel Vehicle (HDDV) emission I/M failure rates and pollutant specific mal-performance factors.[3] A *mal-performance factor* is the average fraction that emissions increase for vehicles that fail inspection. The mal-performance factors used for the New Jersey methodology were derived from the CARB tables of mal-performance frequency and effects by model year and vehicle weight class. The factors were weighted by model year and vehicle type. Each criteria pollutant has its own mal-performance factor. New Jersey's calculation methodology uses the CARB mal-performance factors, New Jersey HDDV vehicle miles traveled (VMT), MOBILE6 HDDV emission factors in grams per mile (GPM) for each criteria pollutant, and the failure/repair rates from the New Jersey diesel I/M program.

Emission benefits for the existing I/M program are estimated as the sum of the deterrent benefit and the repair benefit. It is necessary to use data collected at the beginning of the New Jersey diesel I/M program and compare it to data collected after the initial start-up period. The deterrent benefit is the product of the difference between the pre-enforcement and post-enforcement I/M failure rates, the HDDV VMT, the mal-performance factors, and the average MOBILE6 HDDV emission factors. The repair benefit is the product of the Diesel Emissions Inspection Center (DEIC) failure rate, the repair rate, the HDDV VMT, the mal-performance factors, and the average MOBILE6 HDDV emission factors. The repair rate is estimated by adding together the number of vehicles repaired during the inspection, the number of vehicles that passed a violation re-inspection, and the number of vehicles that passed a later inspection. This sum is divided by the total number of initial inspection failures (pre-repair fails + violation re-inspections) to obtain the repair rate.

The next step is to estimate the emission benefits of reducing the I/M diesel cutpoints, i.e.,

[3] http://www.arb.ca.gov/msei/on-road/downloads/tsd/HDT_Emissions_New.pdf

the "secondary implementation." When opacity cutpoints are reduced, the impact (mal-performance factors) of the secondary implementation must be adjusted from the impact of the initial I/M program implementation to include only the lower end of the mal-performance range (marginal emitters). There will also be a deterrent benefit associated with the cutpoint change that can be initially estimated by comparing the roadside inspection data to the annual Diesel Emission Inspection Center (DEIC) inspection data. Vehicles that arrive for their annual inspection tend to have necessary maintenance performed prior to inspection. Vehicles pulled over at roadside are more likely to be in normal operational mode; that is, possibly in need of repairs or maintenance. The ratio of roadside failure rates to annual DEIC rates can provide an estimate of the deterrent factor involved in a secondary implementation. The actual impact of deterrence will be measurable once failure rates stabilize a year or two after introduction of the new cutpoints.

The emission benefits of the cutpoint change are estimated as the sum of the repair benefits and the deterrent benefits. The repair benefits are estimated as the product of the projected increase in the annual DEIC failure rate, the repair rate, the secondary implementation mal-performance factor, the HDDV VMT, and the average MOBILE6 HDDV emission factors. The secondary implementation mal-performance factors were derived by adjusting the mal-performance factors by the fractional change in cutpoints for each model year range. The deterrent benefits were estimated by multiplying the repair benefits by the ratio of the roadside failure rate to annual DEIC failure rates for the cutpoint changes.

The following is a summary of the equations used for the New Jersey methodology.

1. *Estimation of the Emission Benefits for the Current Diesel I/M Program*

   Diesel I/M Benefits = Diesel I/M Repair Benefit (DRB) + Diesel I/M Initial Deterrent Benefit (DDB)

Diesel I/M Repair Benefit (DRB) Estimation:

DRB = Failure Rate * Repair Rate * NJ Average Daily HDDV VMT * NJ HDDV Average Emission Factor From Mobile 6 * Mal-performance Factor

Failure Rate = DEIC initial fail rates within a calendar year. (CY 2002)

Repair Rate = (RV + V1 + RIP) / IVF

where:

RV = number of repaired vehicles (pre-repair fail/post-repair pass during the initial inspection)
V1 = number of violation reinspections (pre-repair pass only)
RIP = number of reinspection passes (initially failed vehicles, tracked to a post-repair pass on a later inspection)
IVF = number of Initial Inspection Vehicle Fails (Pre repair fails + Violation

reinspections*)

*Pre-repair pass only – A portion of violations came in repaired prior to inspection, but after the violation.

The data used to derive the fail and repair rates is from the DEIC periodic inspection database.

The Mal-performance Factor is the average fraction that emissions increase for vehicles that fail inspection. The mal-performance factors used for the New Jersey interim methodology were derived from the CARB tables of mal-performance frequency and effects by model year and vehicle weight class. The factors were weighted by model year and vehicle type. Each criteria pollutant has its own mal-performance factor.

Diesel I/M Initial Deterrent Benefit (DDB) Estimation:

DDB = FRD * DRB

where:

FRD = Failure Rate Differential (ERF1 – ERF2)
ERF1 = pre-enforcement fail rate (actual tested vehicles)
ERF2 = post-enforcement fail rate (actual tested vehicles)

These fail rates are for roadside inspection data, pre and post enforcement of the I/M program. Pre-enforcement roadside failure rates are based on roadside team data from April 1996 to January 1998.

2. Estimation of Emission Benefits for the Proposed Cutpoint Change

Cutpoint Change Benefit = Repair Benefits Due to Cutpoint Change + Deterrent Benefits Due to Cutpoint Change

Both the repair and deterrent benefits can be expressed as a HDDV mileage rate that when multiplied by the NJ HDDV Average Emission Factor from MOBILE6 results in annual emission benefits. These mileage rates are called “Secondary repair mileage” and “Secondary deterrent mileage” so that:

Cutpoint Change Benefit = (Secondary Repair Mileage + Secondary Deterrent Mileage) * NJ HDDV Average Emission Factor from MOBILE6

Secondary Repair Mileage = Projected Annual Inspection Failure Rate Increase * Repair Rate * Secondary Implementation Mal-performance Factor * NJ Average Daily HDDV VMT

Projected Annual Inspection Failure Rate and Repair Rate are calculated using data from the DEIC periodic inspection database. The fail rates due to the cutpoint changes are based on an analysis of the opacity data.

Secondary Implementation Mal-performance Factor = Weighted Fleet Fraction by Model Year Range * Fraction of Opacity Change * Mal-performance Factor

Fraction of Opacity Change = (Old Cutpoint – New Cutpoint) / Old Cutpoint

Weighted Fleet Fraction by Model Year Range = Fraction of Fleet summed from beginning to end of cutpoint range.

Secondary deterrent mileage = Secondary repair mileage * (Ratio of Annual Inspection failure rate due to the cutpoint changes to Roadside Failure rate due to the cutpoint change)

3. Municipal Waste Combustors

The NJDEP intends to propose a NO_x standard in the range of 100 to 150 ppm for municipal solid waste combustors (MSW), based upon the capability of existing selective non-catalytic reduction (SNCR) emission controls to reduce emissions more than are now being achieved. New Jersey has four resource recovery facilities located in the following counties: Essex, Union, (both in the Northern New Jersey/New York/Connecticut nonattainment area), Camden, and Gloucester (both in the Southern New Jersey/Philadelphia nonattainment area). There are 11 municipal waste combustors (MWC) at these four facilities. There is one facility in Warren County that would be subjected to this rule but Warren County is not part of the 1997 $PM_{2.5}$ nonattainment area so those benefits are not included for the contingency measure in this proposed SIP revision. The NJDEP anticipates an overall NO_x emission reduction of greater than 100 tons per year (67 tpy for May 1, 2009 through Dec 31, 2009) from all five facilities for this rule.

Table C2: Estimated Reductions from Municipal Waste Combustors Calculated for the 1997 $PM_{2.5}$ Nonattainment Areas

Municipal Solid Waste Plant	Air Flow Rates in Actual Cubic Feet per Minute (ACFM)	Air Flow Rates in Dry Standard Cubic Feet per Minute (DSCFM)	Pounds per hour using 100 ppm NO_x limit	Pounds per hour using 130 ppm NO_x limit	Pounds per hour using 150 ppm NO_x limit	1997 $PM_{2.5}$ NNJ/NY/CT NAA	1997 $PM_{2.5}$ SNJ/PA NAA
Essex	237,900	60867	44	57	65	x	
Essex	220,000	56287	40	52	60	x	
Essex	229,000	58590	42	55	63	x	
Average ACFM	**228,967**	58581					
Camden	97,409	24922	18	23	27		x
Camden	99,064	25346	18	24	27		x
Camden	101,495	25967	19	24	28		x
Average ACFM	**99,323**	25412					
Union	128,029	32756	23	30	35	x	
Union	131,191	33565	24	31	36	x	
Union	130,767	33457	24	31	36	x	
Average ACFM	**129,996**	33259					
Warren	50,005	12794	9	12	14		
Warren	55,702	14251	10	13	15		
Average ACFM	**52,854**	13523					
Gloucester	62,820	16072	12	15	17		x
Gloucester	72,130	18454	13	17	20		x
Average ACFM	**67,475**	17263					
Total pounds per hour =			296	385	444		
NNJ/NY/CT NAA			197	256	296		
SNJ/PA NAA			79	103	119		
Warren			19	25	29		
Total tons per year =			1296	1685	1944		

NNJ/NY/CT NAA			864	1123	1296		
SNJ/PA NAA			347	452	521		
Warren			85	110	127		
Assumption: 15% oxygen in the stack and 300 degrees F stack temperature							
Actual 2002 NO_x in tons per year =	1,803	Expected reductions =	507	118	-141		
NNJ/NY/CT NAA	787		None	None	None		
SNJ/PA NAA	761		414	309	240		
Warren	255		170	145	128		
Permitted NO_x =	3,541						

Emission Reduction Calculation Methodology:

The NJDEP calculated the estimated emission reductions for this measure, assuming a 130 ppm NO_x limit, by:

- Estimating emissions from each municipal solid waste plant in pounds per hour.
- Converting the pounds per hour estimate to tons per year estimate:
  (lbs/hr)(8760 hours/year)/2000 lbs/ton = tons/year
  (385 lbs/hr)(8760 hours/year)/2000 lbs/ton = 1685 tons/year
- Calculating estimated emission reductions:
  Expected reductions in emissions from MSW plants in tons/year =
  (Actual 2002 NO_x emissions from MSW plants in tons/year) – (Estimated emissions from the MSW plants in tons/year)
  = (1803 tons/year) – (1685 tons/year)
  = 118 tons/year

The NJDEP estimated these benefits based upon permitted airflow rates at each facility. These emissions are higher than the actual emissions reported by the facility because, in general, the facilities operate at air flow rates below the permitted level. For this reason, there are no additional reduction benefits in the 1997 $PM_{2.5}$ Northern New Jersey/New York/Connecticut nonattainment area.

When New Jersey set an emission limit in the proposed rules at 150 ppm, actual emissions were estimated to be maintained around 130 ppm. Therefore, New Jersey took the difference of 1,803 tpy actual emissions in 2002 and 1,685 tpy using the 130 ppm emission rate providing the benefit of 118 tpy shown in the calculation methodology. Also, the NJDEP anticipates that the facilities will decrease their emissions due to optimizing their existing NO_x control systems (i.e., either injecting more ammonia or adding more nozzles). Finally, the NJDEP expects that the Camden County Resource Recovery facility will need to install a

new NO_x control to comply with the proposed rules. Therefore, the NJDEP expects that the estimated benefits will be even greater than those calculated.

4. New Refinery Rules

New Jersey intends to propose rules to reduce emissions from refineries from fluid catalytic cracking units (FCCUs),[4] flares,[5] and process heaters and boilers.[6,7] The largest categories of oxides of nitrogen (NO_x) emissions from refineries are from boilers and process heaters. Controlling boilers and process heaters will result in approximately 40 percent in NO_x emissions using ultra-low NO_x burners (ULNB) or selective catalytic reduction (SCR). The 2002 inventory for this category is approximately 3,000 tons per year (tpy) and a 40 percent reduction will yield an emission benefit of about 1,198 tpy of NO_x. For SO_2, controlling FCCU emissions by 90 percent will result in an emission benefit of 3,486 tpy and flare gas sulfur recovery control measures will result in an emission benefit of 163 tpy. Other operational control measures will also provide 48 tpy of NO_x emission reductions. In total, the control measures for refineries will result in an emission benefit of 1,766 tpy of NO_x and 3,649 tpy of SO_2.

New Jersey has two major point source facilities that will be subject to the proposed rules, one in the Northern New Jersey/New York/Connecticut nonattainment area and one in the Southern New Jersey/Philadelphia nonattainment area. Table C3 shows the anticipated refinery control measures, the 2002 actual emissions, and the estimated reduction for NO_x by 2009 from the anticipated rules. The calculation methodology for these emission benefits are detailed in the State's white papers, referenced in Table C3. The other refineries in the State are subject to similar control measures as a result of Administrative Consent Orders (ACOs) and the associated emission benefits are not included here. The associated benefits from the ACOs were incorporated into the regional modeling for the attainment demonstration (see Chapter 4).

[4] Ahmed, S. SCS004C – Fluid Catalytic Cracking Unit (FCCU) in a Petroleum Refinery. New Jersey Department of Environmental Protection, Stationary Combustion Sources Workgroup, April 11, 2007.
[5] Ahmed, S. SCS004B – Flares in a Petroleum Refinery. New Jersey Department of Environmental Protection, Stationary Combustion Sources Workgroup, February 22, 2007.
[6] Ahmed, S. SCS004A – Process Heaters & Boilers in a Petroleum Refinery. New Jersey Department of Environmental Protection, Stationary Combustion Sources Workgroup, February 22, 2007.
[7] More detailed evaluations were done subsequent to the white papers in order to develop this proposed SIP revision and the rules which implement the SIP.

Table C3: Estimated Reductions from Refineries (tons per year)

Proposed Control Measure	% NO_x Reduction*	NO_x 2002 Emissions (tpy)	Estimated NO_x 2009 Benefits (tpy)	% SO_2 Reduction*	SO_2 2002 Emissions (tpy)	Estimated SO_2 2009 Benefits (tpy)
Fluid Catalytic Cracking Unit (FCCU)	40%	1,675	N/A**	90%	3,837	3,486
Flares	36%***	135	48	49%***	332	163
Boilers & Process Heaters	40%	3,000	1,198	N/A	N/A	N/A
Total	N/A	4,813	1,246	N/A	4,169	3,649

*Percent reductions are based on the information provided in the NJDEP white papers referenced in this section. The NJDEP white papers calculated emission benefits in tons per year. More detailed evaluations were done subsequent to the white papers in order to develop this proposed SIP revision and the rules which implement the SIP.
**Reductions expected post-2009.
*** Percent emission reductions vary by pollutant and depend upon percent of flare gas recovered using a Flare Gas Recovery (FGR) system.

5. Onroad Motor Vehicle Control Programs (Fleet turnover 2010)

The turnover of the onroad fleet of cars, trucks, and buses (i.e., the rate a which newer vehicles replace older ones in the overall fleet population) will result in additional direct $PM_{2.5}$ and NO_x emission benefits in 2009 and beyond because the new vehicles have significantly lower emission standards than the vehicles they are replacing. Onroad fleet turnover will result in a $PM_{2.5}$ decrease of 76 tpy (51 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 25 tpy in the Southern New Jersey/Philadelphia nonattainment area); it will result in a NO_x decrease of 7,421 tpy (5,613 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 1,808 tpy in the Southern New Jersey/Philadelphia nonattainment area).

A number of post-2002 New Jersey rules, such as the New Jersey Low Emission Vehicle (NJLEV) program (which is more stringent than the Tier 2 Federal standards), contribute to the fleet turnover emission benefits. The new vehicle emission standards are also lower because of a number of Federal rules such as the 2007 Heavy Duty Diesel standards for large diesel highway trucks. In order to estimate the emission benefits for fleet turnover between mid-2009 and mid-2010, the NJDEP made a number of assumptions, because the activity data (vehicle miles traveled (VMT), speeds, etc.) obtained from the Metropolitan Planning Organizations' (MPOs') travel demand models were not yet available for 2010. The 2010 emissions were estimated by performing MOBILE6 runs for 2010 using 2009 activity levels. The results from these runs were adjusted for VMT growth by assuming that the VMT growth rate between 2009 and 2010 was similar to the average annual VMT growth rate between 2002 and 2009. The emission benefits for fleet turnover were calculated as the

difference between the 2009 emissions and the 2010 emissions based on the estimated 2010 VMT. Calculation details and the MOBILE6 runs are provided in Attachment 1.

6. Nonroad Motor Vehicle Control Programs (Fleet turnover 2010)

The turnover of many of the nonroad equipment types included in the USEPA Nonroad Emission Equipment Model (NNEM), version 2005c, will also result in additional direct $PM_{2.5}$, NO_x and SO_2 emission benefits in 2009 and beyond because the newer nonroad equipment has to meet significantly lower emission standards than the equipment that they are replacing and the new nonroad diesel fuel standard begins in 2010. Nonroad fleet turnover will result in a $PM_{2.5}$ decrease of 41 tpy (34 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 7 tpy in the Southern New Jersey/Philadelphia nonattainment area), a NO_x decrease of 1231 tpy (1065 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 166 tpy in the Southern New Jersey/Philadelphia nonattainment area), and a SO_2 decrease of 217 tpy (185 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 32 tpy in the Southern New Jersey/Philadelphia nonattainment area).

The new non-road equipment emission standards are lower primarily because of a number of Federal rules such as the 2004 Nonroad Diesel Rule and the benefits of the small gasoline engine standards through Phase 2. In order to estimate the emission benefits for nonroad equipment turnover it was necessary to run the NNEM model for 2009 and 2010. The emission benefits for non-road equipment turnover was then calculated as the difference between the 2009 and the 2010 emissions generated by these two model runs. Calculation details and the NNEM runs are provided in Attachment 2.

7. ICI Boiler Rule

The beyond on the way (BOTW) ICI boiler rule, discussed in detail in Chapter 4, was included in the 2009 BOTW modeling. However, New Jersey has determined that the implementation of this rule will result in additional emission reductions beyond the 0.1 tpd that was included for the modeling.

Currently, New Jersey ICI boilers are regulated according to size, fuel and boiler type. New Jersey's existing NO_x rules generally apply only to ICI boilers at least 50 MMBtu/hr located at major sources. New Jersey intends to propose amendments to its current ICI boiler rules at N.J.A.C. 7:27-19.7. New Jersey plans on reducing the NO_x emission limits for ICI boilers between 25-100 MMBtu/hr. Under the anticipated rule proposal, there are approximately 388 ICI boilers that are assumed to achieve a 50% reduction in NO_x emissions due to the lowering of the emission rate. By 2009, NO_x emission reduction benefits will total approximately 6.8 tons per day. New Jersey estimates additional NO_x reductions beyond those included in the 2009 BOTW modeling – 681 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 193 tpy in the Southern New Jersey/Philadelphia nonattainment area. The emission benefits were allocated to each nonattainment area based on the percent of point source emissions in each nonattainment area.

8. NO_x RACT Rule (2006)

The 2006 RACT NO_x rule, discussed in detail in Chapter 4, was included in the 2009 BOTW modeling. However, New Jersey has determined that the implementation of this rule will result in additional emission reductions beyond the 0.1 tpd that was included for the modeling.

The estimated emission reductions from the New Jersey 2006 amendments to Subchapter 19 "Additional NO_x controls" that were included in the attainment demonstration modeling were calculated in 2001 by E.H. Pechan.[8] However, as discussed in the New Jersey rule proposal dated September 20, 2004, additional reductions were estimated from annual tune-ups for boilers. Specifically, while the benefits of the NO_x RACT rule (2006) included in the regional attainment modeling were 7 tons per summer day (tpsd) (point and area sources);[9] the benefits included in the New Jersey 2006 rule proposal were 13.3 tpsd.[10] The additional emission reductions, for point sources, are approximately 4.7 tpsd statewide. Based upon location, 66 percent of the emissions are in the northern part of the State and 34 percent of the emissions are in the southern part of the State. For details on how the State calculated its benefits from the implementation of this rule, see New Jersey Register 36 N.J.R. 4228(a); September 20, 2004.

For the purposes of contingency for this proposed $PM_{2.5}$ SIP revision, the additional statewide emission reductions were estimated to tons per year (tpy) and reduced to the 1997 $PM_{2.5}$ nonattainment areas as follows:

1. Emission Benefits Statewide (all counties) = 4.7 tpsd

2. New Jersey Portion of the Northern New Jersey/New York/Connecticut nonattainment area:

    a. 0.66 * 4.7 tpsd = 3.1 tpsd
    b. 3.1 tpsd * 0.48 = 1.5 tpsd * 365 days/year = 547.5 tpy
    (48% of New Jersey's counties are in the 1997 $PM_{2.5}$ Northern New Jersey/New York/Connecticut nonattainment area)

3. New Jersey Portion of the Southern New Jersey/Philadelphia nonattainment area:

    a. 0.34 * 4.7 tpsd = 1.6 tpsd (also 4.7 tpsd – 3.1 tpsd = 1.6 tpsd)
    b. 1.6 tpsd * 0.14 = 0.22 tpsd * 365 days/year = 81.76 tpy
    (14% of New Jersey's counties are in the 1997 $PM_{2.5}$ Southern New

[8] E.H. Pechan. Control Measure Development Support Analysis of Ozone Transport Commission Model Rules. Prepared for the Ozone Transport Commission by E.H. Pechan & Associates, Springfield, VA, 01.02.001/9408.000, March 31, 2001.
[9] NJDEP. State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standard: 8-Hour Ozone Attainment Demonstration, Final. New Jersey Department of Environmental Protection, October 29, 2007.
[10] New Jersey Register 36 N.J.R. 4228(a); September 20, 2004.

Jersey/Philadelphia nonattainment area)

9. Asphalt Production Plants Rule

The NJDEP intends to propose amendments to its rules at N.J.A.C. 7:27-19.9 in order to lower NO_x emissions from asphalt production facilities. The proposed amendments, based on an OTC model rule, would pursue control measures to achieve at least a 35% reduction of NO_x emissions from asphalt production plants from current levels, with the inclusion of emission limits based on type of fuel combusted and implementation of Best Management Practices (BMP) requirements.

NO_x Emission Reduction Calculations Methodology:

Basis:

1. NJDEP had complied asphalt pavement production plant stack emission test data between 2001 and 2006 for 29 burners from 22 facilities. A total of 119 test results were reviewed from 38 test events. There are 51 asphalt pavement production plants in New Jersey consisting of 70 asphalt dryers.
2. Industry total, plant average, and monthly production information were obtained from the asphalt pavement production industry.

Limits

Anticipated proposed limits are the average of actual stack test data less 35%. Basic statistics were reviewed in the calculation. The new limits are based on fuel type and will replace the current limit of 200 parts per million, volumetric dry (ppmvd) at 7% oxygen for all plants. Table C4 presents the anticipated proposed new limits. These limits are 37.5%, 50% and 62.5% lower than the current limit, for natural gas, #2 fuel oil and #4 and heavier fuel oil/on-specification used oil respectively.

Table C4: A Comparison of New Jersey Proposed Limits to OTC Recommended Limits

NJ Proposed limits	OTC Recommended Limits
Natural Gas – 75ppmvd @7% Oxygen	Natural Gas (Batch and Drum) – 0.020 lb/Ton
Fuel Oil (#2) – 100ppmvd @7% Oxygen Used Oil and Fuel Oil #4 and higher – 125ppmvd @7% Oxygen @7% Oxygen	Fuel Oil/Waste Oil (Batch) – 0.090 lb/Ton Fuel Oil/Waste Oil (Drum) – 0.040 lb/Ton

The equivalent "lb NO_x/ton asphalt produced are: natural gas- 0.025 lb/ton, #2 fuel oil –0.040 lb/ton, #4 fuel oil or heavier fuel oils/on-specification used oil 0.050 lb/ton.

Tons per Year (tpy) Reduction

Stack test data (average fuel use and average emissions) and production information were

used to calculate total annual emissions and annual emissions reduction for the State.

Total NO_x emissions of 378 tpy and NO_x emission reduction of 132 tpy were estimated for 2011. Average dryer emissions and emission reductions were calculated by county using the statewide number of dryers (i.e., 70). County numbers were totaled by nonattainment area for 2010 to derive the emission reductions for contingency purposes. Zero growth factor was adopted in the calculations.

Ozone Season Tons per Day (tpd) Reduction

Monthly production information available for limited plants was used to calculate the percent monthly production, which in turn was used to calculate monthly emission reduction for the State. This information, along with the average production days per month (23), were used in calculating tons per day emission reduction during ozone season. The estimated NO_x reduction during ozone season was 0.64 tpd.

Compliance with the new limits is expected to be phased-in over a period of three years based on the asphalt production dryers with the highest maximum gross heat input rates coming into compliance first. Each year, approximately 1/3 of the sources will come achieve compliance with the new standards.

1. For an asphalt pavement production dryer with a maximum gross heat input of at least 120 MMBtu/hr or greater shall comply by May 1, 2009.
   Total NO_x reduction in 2009: 43 tpy;
   0.21 tpd ozone season

2. For an asphalt pavement production dryer with a maximum gross heat input of at least 100 MMBtu/hr, but less than 120 MMBtu/hr, shall comply by May 1, 2010.
   Total NO_x reduction in 2010: 86 tpy;
   0.42 tpd ozone season
3. For an asphalt pavement production dryer with a maximum gross heat input rate of less than 100 MMBtu/hr, shall comply by May 12, 2011.

   Total NO_x reduction in 2011: 132 tpy;
   0.64 tpd ozone season

Ozone Season NO_x Reduction by County

Average production per plant and number of plants per county was the basis for the tpd per county calculations.

10. Federal Clean Air Interstate Rule (CAIR) Program 2010 – Phase I SO_2 Cap

CAIR is the USEPA's attempt to address the interstate transport of ozone and fine particulate precursors by requiring emission reductions of SO_2 and NO_x. The CAIR expects to obtain these reductions from large electric generating units (EGUs greater than 25 MW) through three cap-and-trade programs: ozone season NO_x, annual NO_x and annual SO_2. The 2009

SO_2 emission reduction benefit from CAIR is 16,804 tpy **(**16,479 tpy in the Northern New Jersey/New York/Connecticut nonattainment area and 325 tpy in the Southern New Jersey/Philadelphia nonattainment area).

The 2010 SO_2 CAIR benefits for New Jersey were calculated based on Integrated Planning Model (IPM) results from the USEPA. The IPM modeling did not include those reductions being achieved under the facility ACOs. The files are available at: http://www.epa.gov/airmarkets/progsregs/epa-ipm/cair/index.html. The projected SO_2 emissions from "IPM Parsed File EPA Final CAIR parsed for year 2010 (Final CAIR modeling)" were subtracted from the projected SO_2 emissions from "EPA Base Case 2004 parsed for year 2010" for New Jersey units. This gave the 2010 SO_2 CAIR benefits in New Jersey as projected by the IPM results from the USEPA. Calculation details are provided in Attachment 3.