7.0 APPLICATION TO NSPS CONTROLS ON COAL-FIRED POWER PLANTS IN THE EASTERN UNITED STATES

7.1 INTRODUCTION

In this chapter, portions of the generic benefits analysis are applied to a case study of increased NO_x controls on coal-fired power plants in the eastern United States. EPA provided four basic scenarios for analysis:

- o Controls on existing plants with .5 pound per MMBtu NSPS limit beginning in 1995 evaluated with conditions in 1995.

- o Controls on existing plants with .4 pound per MMBtu NSPS limit beginning in 1995 evaluated with conditions in 1995.

- o Controls on existing plants with .5 pound per MMBtu NSPS limit beginning in 1995 evaluated with conditions in 2000.

- o Controls on existing plants with .4 pound per MMBtu NSPS limit beginning in 1995 evaluated with conditions in 2000.

The scenarios covered changes in emitted tons for 31 eastern states and Washington D.C. (see subsequent tables for listing of states). For each scenario EPA provided baseline tons and estimated tons with new controls. A summary of the total tons by baseline and scenario is found in Table 7-l. A summary of changes by urban and rural region by state for the first scenario is found in Table A-l of the Appendix.

To implement the benefits analysis a computer model was developed. The model allows calculation of changes in air quality conditions and calculation of economic measures of change in health and welfare status by rural and urban region by state by scenario. The geographic detail of the model allows improvement over previous similar generic assessments. This is because baseline conditions, population and changes in tons of NO_x emissions can be better matched. Previous efforts had matched changes in pollutant emissions with

Table 7-1

Summary of National NO_x Emissions Under Alternative Assumptions

(1,000s of short tons/year)

	1995	2000
Baseline	7,595.2	8,252.6
Controls on existing plants with .5 lb NO_x/MMBtu NSPS limit beginning in 1995	5,892.7 (77.6% of Base)	6,384.6 (77.4% of Base)
Controls on existing plants with .4 lb NO_x/MMBtu NSPS limit beginning in 1995	5,786.9 (76.2% of Base)	6,171.9 (74.8% of Base)

Source : EPA provided assumptions

population (agriculture, etc.) aggregated for all rural and all urban areas, missing potential significant differences in the location of populations, baseline conditions, and changes in the emitted pollutant. The increased level of detail herein accounts for some of the differences between the results reported here and those from previous assessments.

The full capability of the state by state, region by region analysis is not exploited due to limited baseline air quality data and the use of consistent relationships between emitted and ambient pollutant concentrations across all states. These limitations are the result of the the quick response nature of the analysis, however, the model is designed to incorporate additional region specific data when they become available. The importance of these limitations is that the state by state analysis is likely to improve the accuracy of the total benefit calculations, but limited confidence should be attributed to the exact numbers generated for each state.

The model also allows relatively easy calculation of alternative NO_x control scenarios and allows identification and analysis of critical assumptions. The model was run with nine alternative scenarios as listed in Table 7-2. The first four correspond to the alternative NO_x controls provided by EPA. The remaining five are discussed in Sections 7.2 and 7.3. Detailed results are provided for the Basecase #1 (Tables 7-4, 7-5, and A-l to A-15). Summary results are provided for the alternative scenarios (Tables A-16 through A-31) and compared in Table 7-6.

The remainder of this chapter summarizes the key assumptions and procedures used, and sumarizes the results.

7.2 KEY AIR QUALTIY ASSUMPTIONS

EPA provided several key air quality assumptions used in the analysis including:

- Changes in NO_x emissions would have unknovn effect upon nitrate concentrations, which was translated into a no change assumption. This

Table 7-2

Scenario Key

BASECASE # 1:
1995 .5 lb limits with basic assumptions (with upper and lower physical impacts and values) Table 7-4, 7-5, A-l to A-15

BASECASE #2:
1995 .4 LB = **Basecase #1** augmented only with 1995 .4 lb limits. Tables A16, Al7

BASECASE #3:
2000 .5 LB = **Basecase #1** augmented only with 2000 .5 lb limits. Tables **A18,** A19

BASECASE #4:
2000 .4 LB = **Basecase #1** augmented only with 2000 .4 lb limits. Tables A20, A21

CASE 5:
DAILY PEARS ADJUSTMENT = **Basecase #1** augmented only with alternative assumption that % change in daily peak (and summer daytime 03) equals **(1-C1)*(%change** in annual peak) + **C1*(%change** in annual average). 5a. cl = .66. Tables A22, A23

CASE 6:
NOx TO 03 UPPER LIMITS = **Basecase #1** augmented only with use of upper range assumptions on relationships between **NOx** to ozone as reported in M&O. Tables A24, A25

CASE 7:
NOx TO 03 LOWER LIMITS = **Basecase #1** augmented only with use of lower range assumptions on relationships between **NOx** to ozone as reported in M&O. Tables A26, A27

CASE 8:
MRADS ADJUSTMENT = **Basecase #1** augmented only by assuming all RRADS = MRADS for valuation. Tables A28, A29

CASE 9:
NO2 - EYE IRRITATION = **Basecase #1** augmented only be assuming the rate of NO2 eye irritation is **C2*** (rate in **Schwartz** et al.). C2 = .5. Tables A3O, A31

---

* All Scenarios for 31 eastern states plus Washington, D.C.

eliminated the nitrate visibility benefits analysis and all PM benefit analyses.

- o Changes in NO_x emissions would have unknown effects upon acid deposition, which was translated into a no change assumption. This eliminated the acid deposition benefits analysis, most of which was considered speculative.

- o The percent change in NO_x emissions by state and region would equal the percent change in ambient NO_2 by state and region, as used in McGartland and Ostro (1985).

- o The effect of changes in NO_x emmissions on ambient ozone conditions would be typified by the relationships specified in McGartland and Ostro (1985) and summarized in Table 7-3.

Three additional sensitivity tests were run to examine the importance of these assumptions.

- o CASE 5: DAILY PEAKS ADJUSTMENT. Many of the health analyses utilize an ozone measure of the annual average of the daily high reading. Similarly, rural agricultural damages are tied to summer day time averages. However, the McGartland and Ostro analysis did not provide a prediction for how percent changes in NO_x affect the percent change in the annual average of daily high ozone readings or summer daytime readings. For the basecase analyses, the percentage change in the annual average for all hours ozone estimate was assumed to be equivalent to the percentage change in the annual average of the daily peak hours. However, if changes in the daily peak hour (or agriculture measure) are somewhat related to the change in the peak value relationship presented in McGartland and Ostro, the results may be significantly different. An alternative assumption that the percentage change in the daily high measure equals 1/3rd the percentage change in the peak measure and 2/3rd the percentage change in the average measure is examined.

Table 7-3

Estimated Ozone Reductions from One Percent Reduction in NO_x*

	% Reduction in Urban Ozone (Low, Point, High)	% Reduction in Peak Rural Ozone (Low, Point, High)	% Reduction in Average Rural Ozone (Low, Point, High)
One Percent Reduction in Urban NO_x	-.05, -.1, -.3	-.1, .04, .1	-.09, -.09, -.09
One Percent Reduction in Rural NO_x	0, 0, 0	.05, .15, .24	.05, .11, .2

* Source: McGartland and Ostro (1985)
(+) implies a reduction in NO_x reduces ozone.
(-) implies a reduction in NO_x increases ozone.

- o CASE 6: NO_x TO OZONE UPPER LIMITS. Examines the effect of using the upper estimates of NO_x to ozone formation reported in Table 7-3.

- o CASE'7: NO_x TO OZONE LOWER LIMITS. Examines the effect of using the lower estimates of NO_x to ozone formation reported in Table 7-3.

Ideally, a benefits analysis would use for baseline air quality condition daily observations, or at least a distribution, on the ambient pollutant measures employed in the health and welfare studies, and these measures would be unique to each urban and rural region of each state. The quick response nature of the task precluded this level of detail at this time, although the model allows for the subsequent inclusion of these data. In the future such data might be developed off of SAROAD, SURE, NAPBN or other data bases..

To implement the model we collected statistics on the annual average and annual second high ozone levels, and annual averages for NO_2 for urban and rural monitors using data for 1982 from EPA printed "Air Quality Data : Quarterly and Annual Reports. " We also obtained the average summer daytime ozone measures used in the NCLAN analysis, and updated it with results of Lefohn et al. (1987) where significant errors existed, for use in the agricultural analysis. 'Because the average of the daily high hour ozone and NO_2 were measures frequently used in health studies, and were not reported in the EPA statistical summaries, we relied upon printed results published by various states and calls to selected state air quality offices to make assumptions concerning these measures. In summary, we determined the error in implicitly using the ozone means of the health studies for elasticity calculations would not significantly bias the overall results of this assessment. However, this was not the case for NO_2, which is discussed below when considering the implementation of the Schwartz et al. (1987) NO_2 - eye irritation relationship.

A sample of the computed changes in annual and peak ozone and average NO_2 changes by state by region for BASECASE #1 is found in Appendix Tables A-2 and A-3.

7.3 SUMMARY OF THE APPLICATTON OF THE PHYSICAL EFFECTS AND ECONOMIC VALUE STUDIES

The analysis generally follows the generic plan discussed in Chapters 3 and 4. However, specific details for selected analyses are further discussed below. As mentioned, all nitrate and acid deposition analyses were deleted in this application.

NO_2 Effects on Eye Irritation

This relationship is based upon the Schwartz et al. (1987) reanalysis of the Hammer et al. (1974) data. This reanalysis finds the introduction of NO_2 decreases the ozone coefficient and shows a significant NO_2 effect. This may be due to a potential correlation between PAN and NO_2. Of particular importance in applying the results of this study is that the exposures in the study were significantly higher than typically experienced in the eastern U.S. so that the elasticity measure between changes in daily high NO_2 and probability of eye irritation in the Schwartz et al. study could not be directly applied. To correct this problem, we consulted published statistics from California (where the study was conducted) and air quality personnel in 7 geographically diverse eastern states.

While data on the desired statistics were not readily available in most cases, we found roughly consistent ratios between annual average NO_2 and annual peak hour NO_2 generally between 5 and 10 in California, and between 4 and 8 in the east. In California, reported statistics suggest the ratio of the annual average of the daily high hour to the average of all hours to generally be between about 1.5 and 2. Therefore, we arbitrarily assumed the ratio between annual average of the daily high hour and of all hours in the east to be 1.04. We then computed a unique elasticity for each rural and urban area of each state by adjusting the Schwartz et al. elasticity by the ratio of the computed annual average of the daily high hour in the region to the computed annual average of the daily high hour in the Hammer et al. study.

The above procedure reduced the calculated aggregate value of the change in NO_2 eye irritation benefits by close to 1/4th. The procedure has important

limitations, especially due to the limited availability of rural NO_2 data, and the exact results should not be considered accurate on a state by state basis, although they represent a significant improvement over unadjusted numbers or using aggregate regional numbers.

When combined with the value estimate of $5 per incident, the above procedure resulted in the point estimate. The upper estimate was based on the same procedure and a value estimate of $12 per incident. The lower bound was taken as zero. This is because the strength of the NO_2 eye irritation relationship, plotted in Schwartz et al., appears uncertain below about .08 to .10 ppm NO_2, a threshold which is above the typical values in the east.

Due to the importance of the eye irritation estimates in the economic estimates, an alternative scenario was run. CASE #9: NO2 - EYE IRRITATION considers how the analysis changes if the the NO_2 - eye irritation relationship point estimate and upperbound are cut in half.

Ozone Effects on Forests

Due to the lack of data obtained for this analysis on state by state forest resources and air quality conditions, the analysis was conducted for two aggregate regions: the northeast and the southeast. The ambient ozone measure was assumed to be 5 pphm. Due to this procedure much of the most adverse changes in air quality conditions are averaged out with less severe changes in other locations to result in lower estimates than might have been observed using a state by state calculation. However, even if more disaggregated calculations had been made, the forest values would be quite small relative to other damage categories.

Respiratory Restricted Activity Days

The basecases assume one-third of all RRADs are WLDs or BDDs. Some analyses have suggested all RRADs should be considered MRADs. Due to the potential importance of RRADs to the analysis, an alternative scenario was run. CASE #8: MRADs ADJUSTMENT assumes all RRADs are MRADs for point estimate valuation purposes. This has the effect of reducing values for RRADs by almost one-half.

Another issue concerns whether the RADs due to all pollutants across all studies exceeds available RADs. CASE #8 also can be used to alternatively address this issue by assuming the RRAD estimate is overstated by a factor of two.

Ozone Effects on Incidence of Chronic Illness

Two approaches were considered. The first was as outlined by Krupnick relating changes in ozone to changes in lung functioning then to changes in rates of chronic illness 15 years later using Higgens et al. (1982). These calculations were applied to all adults and resulted in about 200 additional adult cases for a one percent change in ozone. Alternatively, Fraas used results of Portney and Mullahy to calculate changes in chronic illness 5 years later for adult non-smokers with about 270 additional cases for a one percent change in ozone. We calculated a "speculative" upper bound averaging the approaches and used a 10 percent discount rate for 10 years, and assumed the value per year per incremental case of $350. These results are based upon rather ad hoc calculations and speculative linkages and must be treated as speculative.

7.4 RESULTS

The results of the BASECASE #1 are presented in Tables 7-4 and 7-5. Direct damages due to NO_2 are most affected by visibility and eye irritation, both of which exceed the values in McGartland and Ostro, with values per ton largest in urban areas due to the larger populations affected by each ton reduced.

The most significant components of indirect damages. due to NO_x effects through ozone are RRADs and eye irritation, both of which are slightly positive for rural areas, but significantly negative for urban areas, due to increases in ozone, resulting in total $/ton across all areas being negative for changes in ozone induced effects. Of interest is that agriculture values are negative in rural areas while health values are positive. This is the result of different locations of crops and people versus the location of the changes in NO_x emissions in the scenarios (see Tables A-4 to A-15).

Table 7-4
SUMMARY $/TON VALUES - $1986

BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	22.71	128.99	76.66
	UPPER	34.07	193.49	114.98
	LOWER	11.36	64.50	38.33
NO2-EYE IRR	BEST	35.74	198.00	118.09
	UPPER	85.77	475.20	28.3.43
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	19.50	50.76	35.36
	UPPER	19.50	50.76	35.36
	LOWER	9.75	25.38	17.68
TOTAL NO2 EFFECTS				
	POINT	77.95	377.75	230.11
	LOWER	21.10	89.88	56.01
	UPPER	139.34	719.45	398.41
MATERIALS+ORNAMENTALS				
	BEST	0.09	0.08	0.09
	UPPER	0.09	0.08	0.09
	LOWER	0.06	0.06	0.06
AGRICULTURE	BEST	-10.72	0.00	-5.28
	UPPER	-14.26	0.00	-7.02
	LOWER	-7.08	0.00	-3.48
03-RRADS	BEST	3.53	-183.57	-91.43
	UPPER	5.22	-271.68	-135.32
	LOWER	0.71	-36.71	-18.29
03-ASTHMA	BEST	0.23	-11.98	-5.97
	UPPER	0.60	-31.16	-15.52
	LOWER	0.03	-1.80	-0.90
03-EYE IRR	BEST	1.85	-96.25	-47.94
	UPPER	4.81	-250.25	-124.65
	LOWER	1.70	-88.55	-44.11
03-COUGH	BEST	0.41	-21.46	-10.69
	UPPER	0.82	-42.93	-21.38
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	1.11	-57.85	-28.82
TOTAL NO2+OZONE				
	POINT	73.33	64.57	68.89
	LOWER	15.94	-6.43	8.07
	UPPER	136.62	123.52	94.61

'Table 7-4 - (Continued)

SPECULATIVE CATEGORIES				
FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00	0.00	0.00
	LOWER	0.00	0.00	0.00
CHRONIC ILLNESS UPPER ONLY		0.22	-11.45	-5.70
TOTAL QUANTIFIED				
	POINT	73.33	64.57	68.89
	LOWER	15.94	-6.43	8.07
	UPPER	136.84	112.07	88.91

Table 7-5
SUMMARY VALUES - MILLIONS $1986

BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.4740	90.5802	106.0542
	UPPER	23.2111	135.8703	159.0813
	LOWER	7.7370	45.2901	53.0271
NO2-EYE IRR	BEST	24.3489	139.0352	163.3841
	UPPER	58.4373	333.6846	392.1219
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.2827	35.6428	48.9255
	UPPER	13.2827	35.6428	48.9255
	LOWER	6.6413	17.8214	24.4628
TOTAL NO2 EFFECTS				
	POINT	53.1056	265.2583	318.3639
	LOWER	14.3784	63.1115	77.4899
	UPPER	94.9310	505.1978	600.1288
MATERIALS + ORNAMENTALS				
	BEST	0.0597	0.0597	0.1193
	UPPER	0.0597	0.0597	0.1193
	LOWER	0.0412	0.0412	0.0824
AGRICULTURE	BEST	-7.3036	0.0000	-7.3036
	UPPER	-12.9193	0.0000	-12.9193
	LOWER	-1.7290	0.0000	-1.7290
03-RRADS	BEST	2.4030	-128.9014	-126.4985
	UPPER	3.5564	-190.7741	-187.2177
	LOWER	0.4806	-25.7803	-25.2997
03-ASTHMA	BEST	0.1569	-8.4157	-8.2588
	UPPER	0.4079	-21.8808	-21.4729
	LOWER	0.0235	-1.2624	-1.2388
03-EYE IRR	BEST	1.2599	-67.5856	-66.3256
	UPPER	3.2758	-175.7225	-172.4467
	LOWER	1.1591	-62.1787	-61.0196
03-COUGH	BEST	0.2810	-15.0724	-14.7914
	UPPER	0.5620	-30.1447	-29.5828
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	0.7573	-40.6244	-39.8671
TOTAL NO2+OZONE				
	POINT	49.9027	45.2833	95.1860
	LOWER	13.9520	-4.5143	11.1666
	UPPER	89.8734	86.7354	176.6088

Table 7-5 - (Continued)

SPECULATIVE CATEGORIES				
FORESTS	BEST	-0.0112	0.0000	-0.0112
	UPPER	-0.0286	0.0000	-0.0286
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS UPPER ONLY		0.15	-8.04	-7.89
TOTAL QUANTIFIED				
	POINT	49.8916	45.2833	95.1749
	LOWER	13.9520	-4.5143	11.1666
	UPPER	89.9946	78.6982	168.6928

The combined NO_2 and ozone effects result in positive .$/ton values. The speculative categories are relatively small in the total analysis.

The lower and upper estimates in the basecases reflect changes in assumptions on health and welfare impacts and values. Due to conservative assumptions, the upper bound is on the order of only 150 percent of the point estimate while the lower bound is about 10 percent of the point estimate.

Table 7-6 compares the $/ton results across all the scenarios and Table 7-7 provides total dollar benefits for the four basecase scenarios. The effect of the .4 lb limits, versus the .5 lb limits, are most important in increasing the rural ozone benefits, and overall generate 31 to 46 percent increases in the aggregate all site all effects category $/ton estimate.

The adjustment for daily peaks (CASE #5) has a very significant effect on results. The new point estimate now exceeds the BASECASE #1 upper bound estimate by a factor of two.

The adjustments for upper and lower bound relationships between NO_x and ozone are also significant. The upper bound NO_x ozone relationships drive the point estimate of total benefits to be negative and over 3.5 times the magnitude of the BASECASE #1 upper bound as increased urban ozone concentration dominate the analysis. Similarly, the lower bound NO_x ozone relationships drive the benefits to become much larger,, about 3 times the BASECASE #1 upper bound as reduced rates of increase in ozone reduce the damages.

The MRADs (CASE #8) and NO_2 eye irritation (CASE #9) adjustments are also significant , and by far the most significant of all of the physical and economic relationships quantified in the analysis. The MRAD adjustment drives the point estimate up to the BASECASE #1 upper bound, which occurs because the negative impacts due to ozone formation, are reduced. On the other hand, the NO_2 eye irritation adjustment drives the benefits dovn to the BASECASE #1 lower bound.

A scenario not run was to consider altering the relationship between the percent change in NO_x and NO_2 formation. Any such change vould approximately alter the NO_2 direct benefits by a comparable adjustment. For example, assuming a 1

Table 7-6

Summary of $/Ton Point Estimates by Sensitivity Test Scenario

Scenario*	Estimate	Total $/Ton Point Estimate (Urban & Rral) NO2 only Rural	Urban	Total	NO2 + Ozone Rural	Urban	Total
1. Baseline 1995 .5 lb	point	78	378	230	73	65	69
	Lower	21	90	56	16	-6	8
	Upper	139	719	398	137	123	95
2. 1995, .4 lb	point	8 0	379	226	117	65	71
3. 2000, .5 lb	point	72	366	216	78	63	71
4. 2000, .4 lb	point	73	369	207	138	63	104
5. Daily Peak Adjustment, C1=.66	point	78	378	230	329	65	195
6. NO_x to 03 Upper Limits	point	78	378	230	-146	-563	-358
7. NO_x to 03 Lower Limits	point	78	378	230	403	22	311
8. MRADS Adjustment	point	78	378	230	72	139	106
9. NO2 - Eye Irritation	point	60	279	171	55	-34	10

* For comparison, the upper and lower bounds are also provided for Basecase #1. All results are for 31 eastern states plus Washington, D.C.

Table 7-7

Summary of Total Benefits for the Four **Basecase** Scenarios: Point Estimate

For The Eastern United States

($1986 in millions)

Scenario	Rural	Urban	Total
BASECASE #1: .5 lb NO_x NSPS limits in 1995	49.9	45.3	95.2
BASECASE #2: .4 lb NO_x NSPS limits in 1995	**P5.6** ~~116.6~~	45.5 ~~65.1~~	131.5 ~~91.5~~
BASECASE #3: .5 lb NO_x NSPS limits in 2000	59.4 ~~78.4~~	45.5 ~~62.7~~	104.9 ~~70.7~~
BASECASE #4: .4 lb NO_x NSPS limits in 2000	120.4 ~~138.0~~	45.9 ~~63.4~~	166.3 ~~104.1~~

percent change in NO_x only changes NO_2 by .75 percent would reduce NO_2 benefits by about 25 percent and drive the point estimate of total benefits in BASECASE #1 to the lower bound. Alternatively, assuming an elasticity of 1.25 (rather than 1 or .75) would increase total benefits to one-third over the BASECASE #1 upper bound.

Summary of Quantified Estimates

Many of the assumptions have an important impact on the results. However, changes in one assumption can often be offset by changes in another assumption elsewhere. Overwhelmingly the most important of the assumptions is the relationships between NO_x emission changes and ambient air pollution measures of interest to the physical and economic assessment. Variations in these relationships can easily overwhelm even the most significant assumption concerning changes in the physical and economic analysis. The most significant changes in the physical and economic analysis concern the change in 'the rate of, and value for, RRADs and eye irritation. Assumptions concerning other physical impacts and economic values are, relatively speaking, of much less consequence to the aggregate estimates. This, however, does not negate the importance of the impacts to those individuals who experience them.

Significant Omissions and Biases

To a large extent the.potential significant biases have been addressed through the upper and lower bounds, speculative estimates and sensitivity analyses. One bias not addressed is that the model currently uses 1985 population. Updating to 1995 and 2000 would increase estimates by about 9 and 13 percent using the U.S. Census middle series estimates. Table 7-8 lists some of the omissions and biases of potential importance.

Table 7-8

Potentially Host Significant Unquantified Benefits and Biases*

Omitted Categories	Omission Effect on Results
- Nitrate effects on visibility, human health and materials	Uncertain. If decreases in NO_x decrease nitrates then results biased down.
- Potential indoor health effects from outdoor NO2	Probably small downward bias.
- Potential changes in allergic, asthma and respiratory illness due to NO2	Probably small downward bias.
- Ozone health effects in children	Probably small upward bias.
- Acid deposition effects	Uncertain. If decreases in NO_x decrease acid deposition then results probably biased down.
- Omitted visibility non-use benefits and plume reduction benefits	Downward bias in results.
- Use of 1985 population	9-13% decrease in results.
- Use of state averages for air pollutants for entire year and limited treatment of thresholds	Possible overstatement of ozone effects biasing results downward, although upward for some effects categories.
- Use of 1982 air pollutant statistics as representative.	Unknown.
- Forest aggregation	Slight impact.

* Only considers selected items not addressed in upper and lower bound calculations or sensitivity tests.

8.0 REFERENCES

Adams, H.S., S.L. Stephenson, T.J. Blasing, D.N. Duvick and S. Dabney. 1985. "Growth Trend Declines of Spruce and Fir in Mid-Appalachian Subalpine Forests." Environ. Exp. Bot. 25:315-325.

Adams, R.M., J.M. Callaway, and B.A. McCarl. 1986. "Pollution, Agriculture and Social Welfare: The Case of Acid Deposition." Cdn. J. of Agric. Economics. 34:1-19.

Adams, R.M., S.A. Hamilton, and B.A. McCarl. 1985. "An Assessment of the Economic Effects of Ozone on U.S. Agriculture." Journal of the Air Pollution Control Association, 35:938-943. (Based on Adams et al. 1984. The Economic Effects of Ozone on Agriculture. Report to the U.S. Environmental Protection Agency, EPA-600-3-84-090 (September).

_____. 1986. "The Benefits of Pollution Control: The Case of Ozone and U.S. Agriculture." AJAE, Nov. 886-893.

Adams, R.M., T.D. Crocker, and N. Thanavibalchai. 1982. "An Economic Assessment of Air Pollution Damages to Selected Annual Crops in Southern California." Journal of Environmental and Economic Management 9:42-58.

Avol, E.L., W.S. Linn, D.A. Shamoo, C.E. Spier,, L.M. Valencia, T.G. Venet, S.C. Trim and J.D. Hackney. 1987. "Short-Term Respiratory Effects of Photochemical Oxidant Exposure in Exercising Children." JAPCA. 37:158-162.

Avol, E.L., W.S. Linn, D.A. Shamoo, T.G. Venet, and J.D. Hackney. 1983. "Acute Respiratory Effects of Los Angeles Smog in Continuously Exercising Adults." Journal of the Air Pollution Control Association, 34:804-809.

Avol, E.L., W.S. Linn, T.G. Venet, D.A. Shamoo, and J.D. Hackney. 1984. "Comparative Respiratory Effects of Oxone and Ambient Oxidation Pollution Exposure During Heavy Exercise." Journal of the Air Pollution Control Associatioan 34: 804-809.

Barrett, L.B. and T.E. Waddell. 1973. Cost of Air Pollution Damage -- A Status Report. U.S. Environmental Protection Agency Report No. AP-85. Research Triangle Park, NC.

Bauer, M.A., M.J. Utell, P.E. Morrow, D.M. Speers, and F.R. Gibb. 1986a. "Inhalation of .30 ppm Nitrogen Dioxide Potentiates Exercise-induced Bronchospasm in Asthmatics." Am Rev. Respir. Dis. 134:1203-1208.

_____. 1986b. "Effects of .30 ppm Nitrogen Dioxide on Lung Function and Breathing Pollens in Subjects with Chronic Obstructive Lung Disease (COPD)." University of Rochester.

Benoit, L.F., J.M. Skelly, L.D. Moore and L.S. Dochinger. 1983. "Radial Growth Reductions of Pinus Strobus L. Correlated With Foliar Ozone Sensitivity as an Indicator of Ozone-Induced Losses in Eastern Forests." Can. J. For. Res. 12:673-78.

Berkey, C.S., J.H. Ware, D.W. Dockery, B.G. Ferris, and F.G. Speizer. 1986. "A Longitudinal Study of Indoor Air Pollution and Pulmonary Function Growth of Pre-Adolescent Children." Working paper, Harvard School of Public Health.

Botkin, R. and H. Devine. 1986. "Benefits to Forests in the Northeast of Reducing Ambient Ozone Concentrations." Memo to Alan Basala, U.S. EPA-OAQPS (November 3).

Brookshire, D.S., R. d'Arge, W.D. Schulze, and M. Thaver. 1979. Methods Development for Assessing Air Pollution Control Benefits.- Vol. 2: Experiments in Valuing Non-Market Goods: A Case Study of Alternative Benefit Measures of Air Pollution Control in the South Coast Air Basin of Southern California. Prepared for the U.S. Environmental Protection Agency, Washington, D.C.

Bruck, R.I. 1984. "Decline of Montane Boreal Ecosystems in Central Europe and the Southern Appalachian Mountains." Research and Development Conference. TAPPI Press (September).

Bylin, G., T. Lindvall, T. Rehn and B. Sundin. 1985. "Effects of Short-Term Exposure to Ambient Nitrogen Dioxide Concentrations on Human Bronchial Reactivity and Lung Function." Eur. J. Respir. Dis. 66:205-217.

California Air Resources Board (CARB). 1982. California Ambient Air Quality Standard for Particulate Matter (PM10). Sacramento, CA. (December).

_____. 1985. Short-Term Ambient Air Quality Standard for Nitrogen Dioxide: Staff Report and Technical Support Documents. Sacramento, CA. (September).

Callaway, J.M., R.F. Darwin and R.J. Nesse. 1986. "Economic Effects of Hypothetical Reduction on Tree Growth in the Northeastern and Southeastern United States." Battelle Report to the U.S. Environmental Protection Agency.

Chappie, M. and L. Lave. 1982. "The Health Effects of Air Pollution: A Re-analysis." Journal of Urban Economics. 12:346-376.

Chang, L., J.A. Graham, F.J. Miller, J.J. Ospital and J.D. Crapo. 1985. "Effects of Subchronic Inhalation of Low Levels of Nitrogen Dioxide in the Proximal Alveolar Region of Juvenile and Adult Rats." Mimeo. Duke University. (July).

Chestnut, L.G. and C.M. Burchfiel. 1986. "Lung Function as a Predictor of Morbidity and Mortality: A Literature Review." Energy and Resource Consultants, Inc. Report prepared for the U.S. EPA-OPA, Washington, DC.

Chestnut, L.G. and R.D. Rowe. 1986. "Visibility Benefits in California: Applying the Research to Policy Alternatives." In Visibility Protection: Research and Policy Aspects. Air Pollution Control Association. Pittsburgh, PA.

_____. 1983. Integral Vista Benefits Analysis. Energy and Resource Consultants, Inc. Report to the National Park Service, Air Quality Division. Denver, CO.

Chestnut, L.G., R.D. Rowe, J. Murdoch, D. Ross and J. Trijonis. 1986. Review of "Establishing and Valuing the Effects of Improved Visibility in Eastern United States." Energy and Resource Consultants, Inc. Report to the U.S. EPA-OPPE (October).

Chestnut, L.G., R.D. Rowe and B.D. Ostro. 1987. "Santa Clara Criteria Air Pollution Benefit Analysis." Energy and Resource Consultants, Inc. Report to the U.S. EPA Control No. 68-01-7033. Boulder, CO.

Chevone, B.I. and Y.S. Yang. 1985. "Seedling Growth Response of Loblolly and Shortleaf Pine to Ozone and Simulated Acidic Precipitation.," (in prep.)

Colucci, A.V. 1983. "Pulmonary Dose/Effect Relationships in Ozone Exposure." In: S.D. Lee, M.G. Mustafa, and M.A. Mehlman (eds.), Advances in Modern Environmental Toxicology: The Biomedical Effects of Ozone and Related Photochemical Oxidants. Princeton Scientific Publishers, Princeton, NJ.

Cook, E.R. 1985. "The Use and Limitations of Dendrochronology in Studying the Effects of Air Pollution on Forests." Proceedings of papers presented at the NATO workshop on acid rain. Toronto, Ontario (May 11-16, 1985).

Crocker, T.D. and J.L. Regans. 1985. "Acid Deposition Control: A Benefit-Cost Analysis." Evn. Sci and Technology. 19:112-115.

Crocker, T.D. 1985. "On the Value of the Condition of a Forest Stock." Land Economcis 61: 244-254.

Cummings, R., H. Burness and R. Norton. 1981. Methods Development for Environmental Control Benefits Assessment, Volume V: Measuring Household Soiling Damages from Suspended Air Particulates, A Methodological Inquiry. U.S. Environmental Protection Agency, Washington, DC.

Dickie, M., S. Gerking, D. Brookshire, D. Coursey, W. Schulze, A. Coulson, D. Tashkin. 1987. "Reconciling Averting Behavior and Contingent Valuation Benefit Estimates of Reducing Symptoms of Ozone Exposure." Draft Report - under U.S. Envioronmental Protection Agency Cooperative Agreement #CR 812054-01-2 (February).

Dickie, M., S. Gerking, W. Schulze, A. Coulson and D. Tashkin. 1986. Value of Symptoms of Ozone-Exposure: An Application of the Averting Behavior Model. Report under U.S. Environmental Protection Agency Cooperative Agreement #CR 812054-01-2 (September).

Evans, J.S., T. Tosteson, and P.L. Kinney. 1984. "Cross-Sectional Mortality Studies and Air Pollution Risk Assessment." Environment International. 10:55-83.

Fisher, P., B. Remijn, and B. Brunekreef, et. al. 1985. "Indoor Air Pollution and Its Effect on Adult Non-Smoking Women: I. Associations Between Nitrogen Dioxide and Pulmonary Function." Int. J. Epidemiol. 14:215-20.

Forster, B.A. 1984. "An Economic Assessment of the Significance of Longe Range Transported Air Pollution for Agriculture in Eastern Canada." Cdn. J. of Agric. Economics. 32:498-525.

Fraas, A. 1986. "The Benefits of Reducing VOC Emissions." Mimeo Report, Office of Management and Budget, Washington, DC.

Frampton, M.W., A.M. Smeglin, N.J. Roberts, J.N. Finkelstein, D.E. Morrow and M. J. Utell. 1986. "Intermediate Peak Versus Continuous NO_2 Exposure: Effects on Human Alveolar Macrophages." University of Rochester, NY.

Friedland, A.J., R.A. Gregory, L. Karenlampi and A.H. Johnson. 1984. "Winter Damage to Foliage as a Factor in Red Spruce Decline." Can. J. For. Res., 14:963-965.

Gong, et al. 1985. "Relationship Between Oxidant Air Pollution and Respiratory Status in Asthmatics in Los Angeles County: Methodology and Study Sample." In: S.D. Lee (ed.) Evaluation of the Scientific Basic for Ozone/Oxidants Standards. Air Pollution Control Association. Pittsburgh, PA.

Hammer, D.I., V. Hasselblad, B. Portnoy, and P.F. Uehrle. 1974. "Los Angeles Student Nurse Study. Daily Symptom Reporting and Photochemical Oxidants." Archives of Environmental Health, 28:255-260.

Harrington, W. and A. Krupnick. 1985. "Short-term Nitrogen Dioxide Exposure and Acute Respiratory Disease in Children." JAPCA. 35:1061-1067.

Hasselblad, V., and D.' Svendsgaard. 1975. "Reanalysis of the Los Angeles Student Nurse Study." U.S. Environmental Protection Agency, Health Effects Research Laboratory, Research Triangle Park, NC (in-house technical report).

Heintz, et al. 1976. National Damages of Air and Water Pollution. Report submitted to U.S. Environmental Protection Agency

Higgins, M.W., J.B. Keller, M. Becker, W. Hovatt, J.R. Landis, H. Rotman, J.G. Weg, and I. Higgins. 1982. "An Index of Risk for Obstructive Airways Disease." American Review of Respiratory Disease, 125:144-151.

Holguin, A.H., P. Buffler, C. Constant, T. Stock, D. Kotchmar, B. Hsi, D. Jenkins, B. Gehan, L. Noel, and M.Mei. 1985. 'The Effects of Ozone on Asthmatics in the Houston Area.' Air Pollution Control Association Transactions on Ozone/Oxidants Standards, 262-280. Houston, TX (November 1984).

Horst, R.L., et al. 1986. A Damage Function Assessment of Building Materials: The Impact of Acid Rain. Mathtech, Inc. report to the U.S. EPA-OPA, Washington, DC.

Howitt, R.E., T.E. Gossard, R.N. Adams. 1984. "Effects of Alternative Ozone Levels and Response Data on Economic Assessments: The Case of California Crops." Journal of the Air Pollution Control Association, 34:1122-772.

Johnson, A.H., T.G. Siccama, D. Wang, R.S. Turner, and T.H. Barringer. 1981. "Recent Changes in Patterns of Tree Growth Rate in the New Jersey Pinelands: A Possible Effect of Acid Rain." J. Environ. Qual., 10:427-430.

Johnson, A.J., T.G. Siccama, and A.J. Friedland. 1982. "Spatial and Temporal Patterns of Lead Accumulation in the Forest Floor in the Northeastern United States." J. Environ. Qual., 11:577-581.

Keller, M.D., et al. 1979. 'Respiratory Illness in Household Using Gas and Electricity for Cooking. II. Symptoms and Objective Findings." Environ. Res., 19:504-515.

Kerr, J.C.S., et al. 1979. "Effects of Nitrogen Dioxide on Pulmonary Function in Human Subjects: Environmental Chamber Study." Environ. Res., 19:392-404.

Kramer, P.J. and T.T. Kozlowski. 1979. Physiology of Woody Plants. Academic Press, NY.

Kopp, R.J. 1986. "Task Completion Memo to Peter Brucato." U.S. EPA-OAQPS (October 28).

Kopp, R.J. 1985. "Implications of Environmental Policy for U.S. Agriculture: the Case of Ambient Ozone Standards." Journal of Environmental Management 20: 321-331.

Kopp, R.J., W. J. Vaughan, and M. Hazilla. 1983. Agricultural Sector Benefits Analysis for Ozone: Methods Evaluation and Demonstration. Prepared for U.S. Environmental' Protection Agency, Office of Air Quality Planning and Standards, Research Triangle Park, N.C. (September).

Kopp, R.J., W.J. Vaughan, M. Hazilla, and R. Carson. 1984. "Implications of Envrionemental Policy for U.S. Agriculture: The case of Ambient Ozone Standards." Mimeo (Washington, D.C., Resources for the Future).

Krupnick, A.J. 1986. 'Benefit Estimation and Environmental Policy: Setting the NAAQS for Photochemical Oxidants." Paper presented at the ASSA/AERE Meetings, New Orleans, LA (December).

Krupnick, A.J., J.R. Kurland and T. Narel. 1986. A Preliminary Benefits Analysis for the Control of Photochemical Oxidants: Resources for the Future Draft Report to the U.S. EPA-OAQPS. Washington, DC (September).

Kulle, T.J., S.A.J. Goings, L.R. Sauder, D.J. Green and M.L. Clements. 1986. "Susceptibility to Virus, Infection vith NO_2 Exposure." Univeristy of Maryland.

Lave, L.B., and E.P. Seskin. 1977. Air Pollution and Human Health. Johns Hopkins University Press for Resources for the Future, Baltimore and London.

Lebowitz, M.D., C.J. Holberg, B. Boyer and C. Hayes. 1985. "Respiratory Symptoms and Peak Flow Associated with Indoor and Outdoor Air Pollution in the Southwest." JAPCA. 35:1154-1158.

Lioy, P. J., T.A. Vollmuth, and M. Lippman. 1985. "Persistence of Peak Flow Decrement in Children Following Ozone Exposures Exceeding the National Ambient Air Quality Standard." JAPCA. 35:1068-1071.

Loehman, E.T., S.V. Berg, A.A. Arroyo, R.A. Hedinger, J.M. Schwartz, M.E. Shaw, R.W. Fahien, V.H. De, R.P. Fishe, D.E. Rio, W.F. Rossley, and A.E.S. Green. 1979. "Distributional Analysis of Regional Benefits and Cost of Air Quality 'Control." Journal of Environmental and Economic Management, 6:222-243.

Loehman, E., D. Boldt, and K. Chaikin. 1981. "Measuring the Benefits of Air Quality Improvements in the San Francisco Bay Area." Prepared for the U.S. Environmental Protection Agency, Washington, D.C.

Manuel, E.H., R.L. Horst, K.M. Brennan, W.N. Laven, M.C. Duff, J.K. Tapiero. 1982. Benefits Analvsis of Alternative Secondarv National Ambient Air Quality Standards for Sulfur Dioxide and Total Suspended Particulates. Final Report to the U.S. Environmental Protection Agency, Office of Air Quality Planning and Standards. Research Triangle Park, NC.

Mazumdar, S., H. Schimmel, and I.T.T. Higgins. 1982. "Relationship of Daily Mortality to Air Pollution: An Analysis of 14 London Winters, 1958/59 - 1971/72." Archives of Environmental Health, 37 (July/August): 213-20.

McBride, J.R., P.R. Miller and R.D. Laven, 1985. "Effects of Oxidant Air Pollutants on Forest Succession in a Mixed Conifer Forest Type of Southern California." Air Pollutants Effects on Forested Ecosystems. pp. 157-161. Acid Rain Foundation, Minneapolis, MN.

McCarthy, E.F., A.R. Stankunas, D.R. Murray. 1984. "Assessment of Materials Damage and Soiling from Air Pollution in the South Coast Air Basin." Revised Interim Report. California Air Resources Board.

McCarthy, E.F., et al. 1983. Damage Cost Models for Pollution Effects on Material. U.S. Environmental Protection Agency, Environmental Sciences Research Laboratory, Research Triangle Park, NC.

McCarthy, E.F., A.R. Stankunas, and J.E. Yocum. 1982. Benefit Model for Pollution Effects on Materials. Report for Environmental Sciences Research Laboratory. Environmental Protection Agency Contract No. 68-02-3447.

McClenahen, J.R., and L.S. Dochinger. 1985. "Tree Ring Response of White Oak to Climate! and Air Pollution Near the Ohio River Valley." J. Environ. Qual., 14:274-28.

McDonnell, W.F., D.H. Horstman, M.J. Hazucha, E. Seal, E.D. Haak, S. Salaam, and D.E. House. 1983. "Pulmonary Effects of Ozone Exposure During Exercise: Dose-Response Characteristics." Journal of Applied Physiology, 54(5):1345-1352.

McGartland, A.M. 1986. "Implications of Ambient Ozone Standards for U.S. Agriculture: A Comment and Some Further Evidence." Working Paper, Washington, DC.

McGartland, A. and B. Ostro. 1985. "The Economic Benefits of Controlling Volative Organic Compounds and Nitrogen Oxides: A Generic Approach." U.S. EPA-OPA. Washington, DC.

McLaughlin, S.B. 1985. "Effects of Air Pollution on Forests: A Critical Review." JAPCA. 35(5):512-534.

McLaughlin, S.B., R.K. McConathy, D. Duvick and L.K. Mann. 1982. "Effects of Chronic Air Pollution Stress on Photosynthesis, Carbon Allocation and Growth of White Pine Trees." For. Sci., 28:60-70.

Meier, S. and R.I. Bruck. 1984. "Effects of Simulated Acid Precipitation on the Incidence and Vigor of Ectomycorrhizae on Pinus Taeda." In: Aquatic Effects Task Group (E) and Terrestrial Effects Task Group (F) Peer review Research Summaries. NCSU Acid Deposition Program. Raleigh, NC.

Miller, P.R. 1983. "Ozone effects in the San Bernardino National Forest," p. 161. In: D.D. Davis, A.A. Millen and L. Dochinger (eds.) Air Pollution and the Productivity of the Forest. Izaak Walton League and Pennsylvania State University.

Miller, P.R., R.N. Kickert, O.C. Taylor, R.J. Arkley, F.W. Cobb, Jr., D.L. Dahlsten, P.J. Gersper, R.F. Luck, J.R. McBride, J.R. Parmeter, Jr., J.R. Wenz, M. White, and W.W. Wilcox, Jr. 1977. Photochemical Oxidant Air Pollutant Effects on a Mixed Conifer Forest Ecosystem. Annual Progress Report, 1975-1976. EPA-600/3-77/104. U.S. Environmental Protection Agency. 338 pp.

Miller, P.R., O.C. Taylor and R.G. Wilhour. 1982. "Oxidant Air Pollution Effects on a Western Coniferous Forest Ecosysem." Environ. Research Brief. U.S. Environmental Protection Agency, Washington, DC.

Mueller, W.J. and P.B. Stickney. 1970. Final Report on a Survey and Economic Assessment of the Effects of Air Pollution on Elastomers. National Air Pollution Control Association. Contract CPA-22-69-146. Columbus, OH.

Mullahy, J. 1987. Telephone Conversation with R. Rowe (July 7, 1987).

National Academy of Sciences, 1977a. Nitrogen Oxides. National Academy of Sciences, Washington, DC. pp. 197-214.

_____. 1977b. Ozone and Other Photochemical Oxidants. National Research Council, Washington, DC.

_____. 1976. Nitrogen Oxides: Medical and Biologic Effects of Environmental Pollutants. National Research Council, Washington, DC.

Ogston, S.A., C. Florey, and C.H.M. Walker. 1985. "The Tayside Infant Morbidity and Mortality.Study: Effects on Health of Using Gas for Cooking." Br. Med. J., 290:957-60.

Ostro, B.D. 1987. "Air Pollution and Morbidity Revisited: A Specification Test." Journal of Environmental Economics and Management. (March).

_____. 1985. Presentation to Environmental Protection Agency Clean Air Science Advisory Committee. Research Triangle Park, NC (December).

_____. 1984. "A Search for a Threshold in the Relationship of Air Pollution to Mortality: A Reanalysis of Data on London Winters." Environmental Health Perspectives, 58:397-399.

_____. 1983. "Urban Air Pollution and Morbidity: A Retrospective Approach." Journal of Environmental Economics and Management, 10:371-82. (December).

Peterson, D. and J.K. Sueker. 1987. Risks of Forest Response Due to Ambient Ozone. Presented at 80th Annual Meeting of APCA, New York, NY (June 21-26). Paper #87-36-3.

Pinkerton, J.E. and A.S. Lejohn. 1986. "Characterization of Ambient Ozone Concentrations in Commercial Timberlands Using Available Monitoring Data." TAPPI Journal, 69:58-63.

Port, C.D. 1977. "A Comparative Study of Experimental and Spontaneous Emphysema." J. Toxicol. Environ. Health, 2:589-604.

Portney, P.R. and J. Mullahy. 1986a. "Urban Air Quality and Acute Respiratory Illness." Journal of Urban Economics, 20:21-38.

_____. 1986b. 'Econometric Analyses of the Relationships between Respiratory Illness and Air Pollution." Resources for the Future. A Draft Report to the Office of Air Quality Planning and Standards, U.S. Environmental Protection Agency (July).

_____. 1985. Ambient Ozone and Human Health: An Epidemiological Analysis, Vol I (August) EPA-450/5-85-005A.

_____. 1983. "Ambient Ozone and Human Health: An Epidemiological Analysis." Resources for the Future. Report prepared for the U.S. EPA-OAQPS (September).

Prinz, B., G.H.M. Krause and H. Stratmann. 1982. "Forest Damage in the Federal Republic of Germany." LIS Report No. 28. Land Institute for Pollution Control, Landesanstalt fur Immissionsschutz des Landes Nordrhein-Westfalen. Essen. Wallneyer Strabe 6, Federal Republic of Germany. 145 pp. (C.E.G.B. Translation No. T14240).

Puckett, L.J. 1982. "Acid Rain, Air Pollution, and Tree Growth in Southeastern New York. J. Environ. Qual., 11:375-381.

Rae, D.A., J. Hausman, and J. Wickham. 1983. "Benefits of Visual Air Quality in Cincinnati: Results of a Contingent Ranking Survey." Presented at the American Economic Association Meetings, Washington, D.C.

Raynal, D. J., A.L. Leaf, P.D. Manion, and C.J.K. Wang. 1980. "Actual and Potential Effects of Acid Precipitation on a Forest Ecosystem in the Adirondak Mountains." NYS Energy Research and Development Authority. 56/ES-EHS/79.

Reich, P.B. and R.G. Amundson. 1985. "Ambient Levels of Ozone Reduce Net Photosynthesis in Tree and Crop Species." Science. 230:566-570.

Remijn, B., P. Fisher, and B. Brunekreef, et al. 1985. "Indoor Air Pollution and its Effect on Pulmonary Function of Adult Non-Smoking Women: I. Exposure Estimates for Nitrogen Dioxide and Passive Smoking." Int. J. Epidemiol, 14:215-20.

Rowe, R.D. and L.G. Chestnut. 1985a. Oxidants and Asthmatics in Los Angeles: A Benefits Analysis. Energy and Resource Consultants, Inc. Report to the U.S. Environmental Protection Agency, Office of Policy Analysis EPA-230-07-85-010. Washington, DC (March and Addendum, March 1986).

_____. 1985b. "Economic Assessment of the Effects of Air Pollution on Agricultural Crops in the San Joaquin Valley." JAPCA. 35:728-734.

Rowe, R.D., R. d'Arge, D. Brookshire. 1980. "An Experiment on the Economic Value of Visibil-i ty." Journal of Environmental Economics and Management (March): 1-19.

Rowe, R.D., L.G. Chestnut, C. Miller, M. Treshow, R.M. Adams, R.E. Howitt, and J. Trijonis. 1985. "Economic Assessment of the Effects of Air Pollution on Agricultural Crops in the San Joaquin Valley." Report to the California Air Resources Board (Energy and Resource Consultants, Inc.) Boulder, CO.

Rowe, R.D., L.G. Chestnut, D.C. Peterson, C. Miller, R. Adams, W.R. Oliver, H. Hugo. 1986. "The Benefits of Air Pollution Control in California." Energy and Resource Consultants, Inc. Report to the California Air Resources Board. Boulder, CO.

Rowe, R.D., L.G. Chestnut and W.D. Shaw. 1985c. "Oxidants and Asthmatics in Los Angeles: A Benefit Analysis." In S.D. Lee (ed.) Evaluating the Scientific Basis for Ozone/Oxidants Standards. APCA Book, Pittsburgh, PA.

Salmon, R. L. 1970. Systems Analysis of the Effects of Air Pollution of Materials. Economic Effects Research Division, National Air Pollution Control Administration.

Salvin, V.S. 1969. Ozone Fading of Dyes." Textile Chemistry Colorist, 1:245-251.

Samet, J.M., Y. Bishop, F.E. Speizer, J.D. Spengler, and B.G. Ferris. 1981. "The Relationship Between Air Pollution and Emergency Room Visits in an Industrial Community." Journal of the Air Pollution-Control Association 31:236-40 (March).

Scott, J.T., T.G. Siccama, A.H. Johnson and A.R. Breisch. 1985. "Decline of Red Spruce in the Adirondacks." New York. Bull. Torrey Bot. Club. 111:438-44.

Schulze, W.D., D.S. Brookshire, E. Walther, K. Kelley. 1981. Methods Development for Environmental Control Benefits Assessment. Vol. X: The Benefits of Preserving Visibility in the National Parklands of the Southewest. U.S. Environmental Protection Agency, Office of Research and Development, Washington, D.C.

Schwartz, J. Pitcher, H., Levin, R., Ostro, B., and A. Nichols. 1985. Costs and Benefits of Reducing Lead in Gasoline: Final Regulatory Impact Analysis. U.S. Environmental Protection Agency, Office of Policy Analysis (February).

Schwartz, J., and A. Marcus. 1986. "Statistical Reanalysis of Data Relating Mortality to Air Pollution During London Winters 1958-72." Working paper, U.S. Environmental Protection Agency, Washington, DC (October).

Schwartz, J., H. Pitcher and V. Hasselblad. 1987. "Air Pollution and Morbidity: A Further Analysis of the Los Angeles Student Nurses Data." Mimeo. U.S. Environmental Protection Agency, Washington, DC.

Shafer, S.R. 1984. "Effects of Acid Rain on Soil Borne Plant Pathogens." Ph.D. Thesis, Department of Plant Pathology, North Carolina State University, 210 pp.

Shaver, C.L., G.R. Cass, J.R. Druzik. 1982. "Ozone and the Deterioration of Works of Art." Envir. Sci. and Technol, 17(12):748-752.

Sheffield, R.M., N.D. Cost, W.A. Bechtold and J. P. McClure, 1985. "Pine Grovth Reductions in the Southeast." Resour. Bull. SE-83, USDA Forest Service, Southeastern Forest Experiment Station, Asheville, NC.

Sherwin, R.P., J.C. Shih, R. Ransom and J.D. Lee. 1986. "Serotonim Content of the Lungs, Brains and Blood of Mice Exposed to 0.45 ppm Nitrogen Dioxide." J. Amer. Cell. Toxicology (December).

Siccama, T.G., M. Bliss, H.W. Vogelmann. 1982. "Decline of Red Spruce in the Green Mountains of Vermont." Bull. Torrey Bot. Club, 109:162-168.

Skelly, J.M., Y. Yang, B.I. Chevone, S.J. Long, J.E. Nellessen and W.E. Winner. 1983. "Ozone Concentrations and Their Influence on Forest Species in the Blue Ridge Mountains of Virginia." Air Pollution and Productivity of the Forest , pp. 143-59. Izaak Walton League, Washington, DC.

Speizer, F.E., B. Ferris, Y.M. Bishop and J.D. Spengler. 1980. "Respiratory Diesease Rates and Pulmonary Function in Children Associated with NO2 Exposure." Am Rev. Resp. Dis, 121:3-10.

Stankunas, A.R., F.E. Haynie, D. Rae. 1982. "Economic Analysis of Oxidant Damage to Rubber Tires.,, Unpublished.

Stankunas, A.R., D.F. Unites, E.F. McCarthy. 1983. Air Pollution Damage to Man-Made Materials: Physical and Economic Estimates. Electric Power Research Institute Report EA-2837.

Stephenson, S.L., and H.S. Adams. 1984. "The Spruce-Fir Forest on the Summit of Mount Rogers in Southwestern Virginia.,, Bull. Torrey Bot. Club, 111:69-75.

Tolley, G., et al. 1986. Valuation of Reductions in Human Health Symptoms and Risks. Final Report for the U.S. Environmental Protection Agency, Grant #CR-811053-01-0. University of Chicago (January).

Tolley, G.S., A. Randall, G. Blomquist , R. Fabian, G. Fishelson, A. Frankel, J. Hoehn, R. Krumm, E. Mensah, and T. Smith. 1986. "Establishing and Valuing the Effects of Improved Visibility in Eastern United States.,, Prepared for the U.S. Environmental Protection Agency.

Trijonis, John. 1987. "National Relationship Between Visibility and NO_2 Emissions." Santa Fe Research Corporation. Draft research report for the U.S. EPA-OPPE.

U.S. Environmental Protection Agency (EPA). 1986a. "Scientific Basis for U.S. EPA Particulate Matter NAAQS: Preliminary Assessment of Newly Available Health Effects Information.,, Research Triangle Park, NC.

_____. 1986b. Air Quality Criteria for Ozone and Other Photochemical Oxidants. Environmental Criteria and Assessment Office, Research Triangle Park, NC. EPA/600/8-84/0206F.

_____. 1985a. "The Science Advisory Board Review of the Forest Effects Research Program." Sponsored by the Acid Deposition Planning Staff, Washington, DC (June 6).

_____. 1985b. Air Quality Criteria for Ozone and Other Photochemical Oxidants, External Review Draft. Research Triangle Park, NC. EPA-600/8-84-020B.

_____. 1983. Air Quality Criteria for Ozone and Other Photochemical Oxidants. Office of Research and Development (April).

_____. 1982. Air Quality Criteria for Particulate Matter and Sulfur Oxides. EPA-600/8-82-029a. Research Triangle Park, NC (December).

Violette, D.V., L.G. Chestnut, and A. Fisher. 1986. "Valuing Risk: New Information on the Willingness to Pay for Changes in Fatal Risks.,, Air Pollution Content Association Annual Meeting, Paper #86-18.4 (June).

Vogelmann, H.W., G.J. Badger, M. Bliss, and R.M. Klein. 1985. "Forest Decline on Camels Hump, Vermont.,, Bull. Torrey Bot. Club, 112:274-287.

Wang, D., D.F. Karnosky and F.H. Bormann. 1986. "Effects of Ambient Ozone on Productivity of Populus Tremuloides Michx. Grown Under Field Conditions." Can. J. For. Res., 16:47-55.

Ware, J.H., D.W. Dockery, A. Spiro, et al. 1984. "Passive Smoking, Gas Cooking and Respiratory Health of Children Living in Six Cities." Amer. Rev. Respir. Dis. 129:366-374.

Westman, W.E. 1985. "Air Pollution Injury to Coastal Sage Scrub in the Santa Monica Mountains, Southern California." Water, Air, Soil Pollution, 26:190-41.

Whittemore, A.S. and E.L. Korn. '1980. "Asthma and Air Pollution in the Los Angeles Area. " American Journal of Public Health, 70:687-696.

Wilhour, R. 1986. 1986. "Benefits to Forests of Reducing Ambient Ozone Concentrations." Memorandum (September 22).

APPENDIXA

Additional Summary Tables

Tables 1-15 Basecase #1 Summaries By Effect Category

Tables 16-17 Basecase #2 Summary of $/Ton and Total $'s for all Effects Categories

Tables 18-19 Basecase #3 Summary of $/Ton and Total $'s for all Effects Categories

Tables 20-21 Basecase #4 Summary of $/Ton and Total $'s for all Effects Categories

Tables 22-23 Basecase #5 Summary of $/Ton and Total $'s for all Effects Categories

Tables 24-25 Basecase #6 Summary of $/Ton and Total $'s for all Effects Categories

Tables 26-27 Basecase #7 Summary of $/Ton and Total $'s for all Effects Categories

Tables 28-29 Basecase #8 Summary of $/Ton and Total $'s for all Effects Categories

Tables 30-31 Basecase #9 Summary of $/Ton and Total $'s for all Effects Categories

TABLE A-1
NOx CHANGES BY STATE
1000 SHORT TONS

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

FIPS	STATE	RURAL TONS	RURAL %	URBAN TONS	URBAN %	TOTAL TONS	TOTAL %
1	Alabama	22.4	.307	59.5	.394	81.9	.366
5	Arkansas	1.8	.049	0.0	.ooo	1.8	.046
9	Connecticut	1.6	.137	0.0	.ooo	1.6	.082
10	Delaware	4.7	.309	0.0	.ooo	4.7	.196
11	District of Columbia	0.0	.ooo	0.0	.ooo	0.0	.ooo
12	Florida	13.6	.115	6.6	.045	20.2	.076
13	Georgia	32.6	.180	8.8	.194	41.4	.183
17	Illinois	43.0	.132	48.1	.246	91.1	.175
18	Indiana	47.4	.172	37.8	.236	85.2	.195
19	Iowa	9.6	.212	33.7	.355	43.3	.309
21	Kentucky	66.6	.238	27.0	.369	93.6	.265
22	Louisiana	6.5	.085	0.0	.ooo	6.5	.057
23	Maine	0.3	.136	0.0	.ooo	0.3	.125
24	Maryland	0.4	.063	16.4	.297	16.8	.273
25	Massachusetts	2.2	.023	0.0	.ooo	2.2	.023
26	Michigan	19.8	.222	57.7	.275	77.5	.259
27	Minnesota	12.4	.307	20.2	.262	32.6	.277
28	Mississippi	2.0	.070	7.2	.286	9.2	.172
29	Missouri	11.2	.117	40.6	.213	51.8	.181
33	New Hampshire	0.0	.000	0.0	.ooo	0.0	.ooo
34	New Jersey	2.1	.124	3.3	.053	5.4	.068
36	New York	13.0	.160	3.7	.053	16.7	.110
37	North Carolina	30.2	.265	53.3	.382	83.5	.329
39	Ohio	98.9	.308	92.7	.362	191.6	.332
42	Pennsylvania	87.1	.351	48.4	.313	135.5	,337
44	Rhode Island	0.0	.ooo	0.1	.056	0.1	.056
45	South Carolina	9.5	.179	14.0	.329	23.5	.246
47	Tennessee	49.0	.402	19.0	.231	68.0	.333
50	Vermont	0.1	.063	0.0	.000	0.1	.045
51	Virginia	8.0	.283	9.9	.221	17.9	.245
54	West Virginia	60.0	.312	60.9	.336	120.9	,324
55	Wisconsin	25.3	.323	33.3	.286	58.6	.301
TOTAL ALL STATES		681.3	.222	702.2	,266	1383.5	.242

ALL VALUES ARE REDUCTIONS. IN TONS NOx

TABLE A-2
CHANGES IN OZONE VARIABLES*
(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

OZONE ANNUAL AVERAGE IN PPM

FIPS	STATE	RURAL		URBAN	
		%CHANGE	CHANGE	%CHANGE	CHANGE
1	Alabama	-0.0029	-.000129	-0.0394	-.001757
5	Arkansas	0.0054	0.000214	0.0000	0.000000
9	Connecticut	0.0150	0.001218	0.0000	0.000000
10	Delaware	0.0340	0.001883	0.0000	0.000000
11	District of Columbia	0.0000	0.000000	0.0000	0.000000
12	Florida	0.0086	0.000557	-0.0045	-.000291
13	Georgia	0.0019	0.000099	-0.0194	-.000988
17	Illinois	-0.0080	-.000341	-0.0246	-.001053
18	Indiana	-0.0028	-.000134	-0.0236	-.001138
19	Iowa	-0.0093	-.000348	-0.0355	-.001325
21	Kentucky	-0.0079	-.000343	-0.0369	-.001610
22	Louisiana	0.0093	0.000483	0.0000	0.000000
23	Maine	0.0150	0.000668	0.0000	0.000000
24	Maryland	-0.0199	-.001083	-0.0297	-.001615
25	Massachusetts	0.0026	0.000132	0.0000	0.000000
26	Michigan	-0.0009	-.000049	-0.0275	-.001449
27	Minnesota	0.0094	0.000326	-0.0262	-.000907
28	Mississippi	-0.0182	-.000899	-0.0286	-.001414
29	Missouri	-0.0065	-.000288	-0.0213	-.000939
33	New Hampshire	0.0000	0.000000	0.0000	0.000000
34	New Jersey	0.0089	0.000590	-0.0053	-.000352
36	New York	0.0128	0.000601	-0.0053	-.000246
37	North Carolina	-0.0063	-.000271	-0.0382	-.001651
39	Ohio	0.0001	0.000007	-0.0362	-.001858
42	Pennsylvania	0.0094	0.000514	-0.0313	-.001702
44	Rhode Island	-0.0050	-.000308	-0.0056	-.000342
45	South Carolina	-0.0105	-.000478	-0.0329	-.001497
47	Tennessee	0.0225	0.001277	-0.0231	-.001311
50	Vermont	0.0069	0.000291	0.0000	0.000000
51	Virginia	0.0105	0.000560	-0.0221	-.001176
54	West Virginia	0.0030	0.000153	-0.0336	-.001711
55	Wisconsin	0.0089	0.000395	-0.0286	-.001273

+ = 03 REDUCTION (BENEFIT): - = 03 INCREASE (DAMAGE)

TABLE A-2 CONTINUED
CHANGES IN OZONE VARIABLES*

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

OZONE PEAK IN PPM

FIPS	STATE	RURAL		URBAN	
		%CHANGE	CHANGE	%CHANGE	CHANGE
1	Alabama	0.0626	0.004183	-0.0394	-.003513
5	Arkansas	0.0074	0.000438	0.0000	0.000000
9	Connecticut	0.0205	0.002492	0.0000	0.000000
10	Delaware	0.0464	0.003851	0.0000	0.000000
11	District of Columbia	0.0000	0.000000	0.0000	0.000000
12	Florida	0.0191	0.001861	-0.0045	-.000583
13	Georgia	0.0349	0.002665	-0.0194	-.001976
17	Illinois	0.0298	0.001913	-0.0246	-.002106
18	Indiana	0.0354	0.002559	-0.0236	-.002275
19	Iowa	0.0465	0.002605	-0.0355	-.002650
21	Kentucky	0.0510	0.003341	-0.0369	-.003220
22	Louisiana	0.0127	0.000988	0.0000	0.000000
23	Maine	0.0205	0.001367	0.0000	0.000000
24	Maryland	0.0215	0.001756	-0.0297	-.003230
25	Massachusetts	0.0035	0.000270	0.0000	0.000000
26	Michigan	0.0447	0.003531	-0.0275	-.002897
27	Minnesota	0.0570	0.002962	-0.0262	-.001813
28	Mississippi	0.0221	0.001642	-0.0286	-.002829
29	Missouri	0.0262	0.001736	-0.0213	-.001878
33	New Hampshire	0.0000	0.000000	0.0000	0.000000
34	New Jersey	0.0208	0.002077	-0.0053	-.000703
36	New York	0.0262	0.001841	-0.0053	-.000492
37	North Carolina	0.0556	0.003602	-0.0382	-.003301
39	Ohio	0.0613	0.004717	-0.0362	-.003715
42	Pennsylvania	0.0659	0.005382	-0.0313	-.003405
44	Rhode Island	0.0022	0.000205	-0.0056	-.000685
45	South Carolina	0.0404	0.002755	-0.0329	-.002994
47	Tennessee	0.0701	0.005966	-0.0231	-.002621
50	Vermont	0.0094	0.000595	0.0000	0.000000
51	Virginia	0.0516	0.004113	-0.0221	-.002352
54	West Virginia	0.0609	0.004646	-0.0336	-.003422
55	Wisconsin	0.0604	0.004036	-0.0286	-.002547

+ = 03 REDUCTION (BENEFIT): - = 03 INCREASE (DAMAGE)

TABLE A-3
CHANGES IN NO2 VARIABLES

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995

NO2 DAILY HIGH

FIPS	STATE	RURAL %CHANGE	RURAL CHANGE	URBAN %CHANGE	URBAN CHANGE
1	Alabama	0.3073	0.007259	0.3943	0.016561
5	Arkansas	0.0492	0.000277	0.0000	0.000000
9	Connecticut	0.1368	0.003385	0.0000	0.000000
10	Delaware	0.3092	0.006957	0.0000	0.000000
11	District of Columbia	0.0000	0.000000	0.0000	0.000000
12	Florida	0.1154	0.001688	0.0450	0.001169
13	Georgia	0.1797	0.003033	0.1943	0.005828
17	Illinois	0.1319	0.005045	0.2463	0.016748
18	Indiana	0.1716	0.002123	0.2363	0.005198
19	Iowa	0.2124	0.004062	0.3547	0.012061
21	Kentucky	0.2383	0.005361	0.3689	0.014754
22	Louisiana	0.0849	0.001623	0.0000	0.000000
23	Maine	0.1364	0.000767	0.0000	0.000000
24	Maryland	0.0635	0.001643	0.2966	0.013642
25	Massachusetts	0.0234	0.000632	0.0000	0.000000
26	Michigan	0.2222	0.005500	0.2752	0.012107
27	Minnesota	0.3069	0.006215	0.2617	0.009420
28	Mississippi	0.0704	0.000951	0.2857	0.006857
29	Missouri	0.1172	0.001845	0.2129	0.005961
33	New Hampshire	0.0000	0.000000	0.0000	0.000000
34	New Jersey	0.1243	0.004194	0.0528	0.003168
36	New York	0.1605	0.004694	0.0526	0.002733
37	North Carolina	0.2647	0.004466	0.3821	0.011462
39	Ohio	0.3076	0.008652	0.3621	0.018105
42	Pennsylvania	0.3515	0.009490	0.3127	0.015008
44	Rhode Island	0.0000	0.000000	0.0556	0.002667
45	South Carolina	0.1792	0.004033	0.3294	0.013176
47	Tennessee	0.4023	0.012672	0.2311	0.012944
50	Vermont	0.0625	0.001055	0.0000	0.000000
51	Virginia	0.2827	0.006360	0.2215	0.008859
54	West Virginia	0.3122	0.005970	0.3365	0.011440
55	Wisconsin	0.3227	0.003630	0.2858	0.005717

+ = 03 REDUCTION (BENEFIT): - = 03 INCREASE (DAMAGE)

TABLE A-4
VISIBILITY VALUES - POINT ESTIMATES
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN VISIBILITY

FIPS	STATE	URBAN ($MILL)	RURAL ($ MILL)	REC ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	3.9196	0.7126	0.0370	4.6692	57.01
5	Arkansas	0.0000	0.1098	0.0069	0.1167	64.82
9	Connecticut	0.0000	0.0534	0.0219	0.0753	47.09
10	Delaware	0.0000	0.0964	0.0186	0.1151	24.48
11	District of Columbia	0.0000	0.0000	0.0000	0.0000	0.00
12	Florida	1.8260	0.1855	0.0555	2.0669	102.32
13	Georgia	2.8585	0.6193	0.0396	3.5175	84.96
17	Illinois	8.9820	0.4203	0.0819	9.4842	104.11
18	Indiana	3.3868	0.4610	0.0275	3.8753	45.48
19	Iowa	1.6611	0.5456	0.0553	2.2621	52.24
21	Kentucky	2.3620	0.7408	0.1051	3.2079	34.27
22	Louisiana	0.0000	0.1806	0.0017	0.1823	28.04
23	Maine	0.0000	0.1598	0.0164	0.1762	587.43
24	Maryland	4.7134	0.0349	0.0064	4.7546	283.01
25	Massachusetts	0.0000	0.0207	0.0075	0.0282	12.81
26	Michigan	7.6857	0.6178	0.1024	8.4060	108.46
27	Minnesota	2.7398	0.6898	0.0369	3.4666	106.34
28	Mississippi	0.8268	0.1983	0.0056	1.0307	112.03
29	Missouri	2.7036	0.3191	0.0258	3.0486	58.85
33	New Hampshire	0.0000	0.0000	0.0000	0.0000	0.00
34	New Jersey	1.5311	0.0000	0.0199	1.5510	287.22
36	New York	3.2124	0.4361	0.1093	3.7579	225.02
37	North Carolina	5.0008	1.1722	0.0372	6.2102	74.37
39	Ohio	11.7298	1.1174	0.3765	13.2237	69.02
42	Pennsylvania	12.0029	1.0236	0.3245	13.3511	98.53
44	Rhode Island	0.1950	0.0000	0.0000	0.1950	1950.20
45	South Carolina	2.5819	0.3722	0.0323	2.9865	127.08
47	Tennessee	2.8065	1.0047	0.2343	4.0455	59.49
50	Vermont	0.0000	0.0372	0.0000	0.0372	371.75
51	Virginia	3.4946	0.7268	0.1247	4.3461	242.80
54	West Virginia	0.8844	0.5804	0.0501	1.5149	12.53
55	Wisconsin	3.4753	0.8053	0.0712	4.3519	74.26
ALL STATES TOTAL		90.5802	13.4420	2.0321	106.0542	
ALL STATES $/TON		128.99	19.73	2.98	76.66	

*UPPER ESTIMATES = 1.5 BEST. LOWER ESTIMATES = .5 BEST ESTIMATES

TABLE A-5
MATERIALS VALUES - POINT ESTIMATES
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN MATERIAL DAMAGE

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-0.059	-0.003	-0.062	-0.751
5	Arkansas	0.000	0.004	0.004	2.265
9	Connecticut	0.000	0.004	0.004	2.534
10	Delaware	0.000	0.005	0.005	1.062
11	District of Columbia	0.000	0.000	0.000	0.000
12	Florida	-0.040	0.008	-0.033	-1.619
13	Georgia	-0.049	0.003	-0.046	-1.122
17	Illinois	-0.130	-0.009	-0.139	-1.531
18	Indiana	-0.055	-0.003	-0.058	-0.685
19	Iowa	-0.021	-0.008	-0.029	-0.660
21	Kentucky	-0.035	-0.009	-0.044	-0.469
22	Louisiana	0.000	0.009	0.009	1.348
23	Maine	0.000	0.007	0.007	22.239
24	Maryland	-0.087	-0.005	-0.092	-5.475
25	Massachusetts	0.000	0.001	0.001	0.453
26	Michigan	-0.137	-0.001	-0.138	-1.784
27	Minnesota	-0.032	0.006	-0.026	-0.796
28	Mississippi	-0.014	-0.022	-0.035	-3.853
29	Missouri	-0.040	-0.007	-0.047	-0.910
33	New Hampshire	0.000	0.000	0.000	0.000
34	New Jersey	-0.035	0.000	-0.035	-6.434
36	New York	-0.051	0.014	-0.037	-2.235
37	North Carolina	-0.073	-0.010	-0.083	-0.997
39	Ohio	-0.203	0.000	-0.203	-1.061
42	Pennsylvania	-0.221	0.013	-0.209	-1.539
44	Rhode Island	-0.004	0.000	-0.004	-44.169
45	South Carolina	-0.040	-0.008	-0.048	-2.049
47	Tennessee	-0.054	0.027	-0.027	-0.395
50	Vermont	0.000	0.001	0.001	14.744
51	Virginia	-0.063	0.012	-0.051	-2.833
54	West Virginia	-0.015	0.002	-0.013	-0.106
55	Wisconsin	-0.052	0.008	-0.044	-0.752
ALL STATES TOTAL		0.0398	0.0398	0.0796	
ALL STATES $/TON		0.06	0.06	0.06	

*UPPER = BEST. LOWER = .69 OF BEST
+ = BENEFIT, - = DAMAGE

TABLE A-6
AGRICULTURAL VALUES - POINT ESTIMATES
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995

VALUES FOR CHANGES IN AGRICULTURE

NOTE: AGRICULTURE STATISTICS SHOULD NOT BE EVALUATED BY STATE, BUT BY REGION. SEE REGION DEFINITIONS IN TEXT

FIPS	STATE	REGION	RURAL AREAS ONLY ($ MILLIONS)	$/TON
1	Alabama	4	-0.6421	-7.84
5	Arkansas	3	2.3330	1296.14
9	Connecticut	6	0.6021	376.34
10	Delaware	6	1.3615	289.68
11	District of Columbia	6	0.0000	0.00
12	Florida	4	1.9133	94.72
13	Georgia	4	0.4314	10.42
17	Illinois	2	-6.3430	-69.63
18	Indiana	2	-2.2205	-26.06
19	Iowa	2	-7.4012	-170.93
21	Kentucky	5	-1.4415	-15.40
22	Louisiana	3	4.0255	619.30
23	Maine	6	0.0000	0.00
24	Maryland	6	-0.7963	-47.40
25	Massachusetts	6	0.1031	46.84
26	Michigan	1	-0.3824	-4.93
27	Minnesota	1	3.8947	119.47
28	Mississippi	3	-7.8347	-851.60
29	Missouri	2	-5.1843	-100.08
33	New Hampshire	6	0.0000	0.00
34	New Jersey	6	0.3543	65.62
36	New York	6	1.6062	96.18
37	North Carolina	5	-1.1511	-13.79
39	Ohio	2	0.1158	0.60
42	Pennsylvania	6	1.1804	8.71
44	Rhode Island	6	-0.0500	-500.36
45	South Carolina	4	-2.3388	-99.52
47	Tennessee	5	4.1340	60.79
50	Vermont	6	0.2752	2752.00
51	Virginia	5	1.9345	108.08
54	West Virginia	5	0.5537	4.58
55	Wisconsin	1	3.6635	62.52

ALL STATES TOTAL $ -7.3036
ALL STATES $/TON -10.72 RURAL TONS ONLY
ALL STATES $/TON -5.28 ALL TONS IN STATE

TABLE A-7
FOREST LOSS POINT ESTIMATES
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

	SOUTHEAST	NORTHEAST	TOTAL
TOTAL GAIN	0.0192	-0.0304	-0.0112
$/TON - RURAL TONS ONLY	0.0001	-0.0001	0.0000
$/TON - ALL TONS	0.0000	0.0000	0.0000

VALUES PROBABLY UNDERSTATED DUE TO AGGREGATION

+ = BENEFIT, - = DAMAGE.

TABLE A-8
RRADS - POINT ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN RRADS

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-5.5618	-0.2391	-5.8009	-70.83
5	Arkansas	0.0000	0.4325	0.4325	240.28
9	Connecticut	0.0000	0.2103	0.2103	131.43
10	Delaware	0.0000	0.3789	0.3789	80.62
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	-2.6140	0.4946	-2.1194	-104.92
13	Georgia	-4.0768	0.2390	-3.8377	-92.70
17	Illinois	-12.7931	-0.9097	-13.7028	-150.42
18	Indiana	-4.8251	-0.2684	-5.0935	-59.78
19	Iowa	-2.3595	-0.8551	-3.2146	-74.24
21	Kentucky	-3.3537	-0.8730	-4.2267	-45.16
22	Louisiana	0.0000	0.7111	0.7111	109.40
23	Maine	0.0000	0.6291	0.6291	2096.97
24	Maryland	-6.7047	-0.3911	-7.0958	-422.37
25	Massachusetts	0.0000	0.0815	0.0815	37.06
26	Michigan	-10.9388	-0.0919	-11.0308	-142.33
27	Minnesota	-3.9008	0.7560	-3.1448	-96.47
28	Mississippi	-1.1764	-1.8314	-3.0078	-326.94
29	Missouri	-3.8541	-0.6356	-4.4897	-86.67
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	-2.1913	0.0000	-2.1913	-405.80
36	New York	-4.5978	1.2482	-3.3497	-200.58
37	North Carolina	-7.0982	-0.9928	-8.0910	-96.90
39	Ohio	-16.6579	0.0189	-16.6390	-86.84
42	Pennsylvania	-17.0672	0.9812	-16.0860	-118.72
44	Rhode Island	-0.2791	-0.0218	-0.3010	-3009.55
45	South Carolina	-3.6697	-0.7809	-4.4506	-189.39
47	Tennessee	-3.9988	2.0079	-1.9909	-29.28
50	Vermont	0.0000	0.1464	0.1464	1464.21
51	Virginia	-4.9805	0.9684	-4.0122	-224.14
54	West Virginia	-1.2568	0.2004	-1.0564	-8.74
55	Wisconsin	-4.9450	0.7895	-4.1555	-70.91
ALL STATES TOTAL		-128.9014	2.4030	-126.4985	
ALL STATES $/TON		-183.57	3.53	-91.43	

*UPPER = 1.48 BEST LOWER = .61 OF BEST WITH
.66 MRAD SPLIT AND EQUALS .2 * BEST WITH 100% MRAD SPLIT
+ = BENEFIT, - = DAMAGE

TABLE A-9
ASTHMA - POINT ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN ASTHMA ATTACKS
ASTHMATICS ONLY - DAYS IN EXCESS OF RRADS

FIPS	STATE	URBAN ($ MILL)	RURAL. ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-0.3631	-0.0156	-0.3787	-4.62
5	Arkansas	0.0000	0.0282	0.0282	15.69
9	Connecticut	0.0000	0.0137	0.0137	8.58
10	Delaware	0.0000	0.0247	0.0247	5.26
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	-0.1707	0.0323	-0.1384	-6.85
13	Georgia	-0.2662	0.0156	-0.2506	-6.05
17	Illinois	-0.8352	-0.0594	-0.8946	-9.82
18	Indiana	-0.3150	-0.0175	-0.3325	-3.90
19	Iowa	-0.1540	-0.0558	-0.2099	-4.85
21	Kentucky	-0.2190	-0.0570	-0.2760	-2.95
22	Louisiana	0.0000	0.0464	0.0464	7.14
23	Maine	0.0000	0.0411	0.0411	136.91
24	Maryland	-0.4377	-0.0255	-0.4633	-27.58
25	Massachusetts	0.0000	0.0053	0.0053	2.42
26	Michigan	-0.7142	-0.0060	-0.7202	-9.29
27	Minnesota	-0.2547	0.049.4	-0.2053	-6.30
28	Mississippi	-0.0768	-0.1196	-0.1964	-21.34
29	Missouri	-0.2516	-0.0415	-0.2931	-5.66
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	-0.1431	0.0000	-0.1431	-26.49
36	New York	-0.3002	0.0815	-0.2187	-13.10
37	North Carolina	-0.4634	-0.0648	-0.5282	-6.33
39	Ohio	-1.0876	0.0012	-1.0863	-5.67
42	Pennsylvania	-1.1143	0.0641	-1.0502	-7.75
44	Rhode Island	-0.0182	-0.0014	-0.0196	-196.49
45	South Carolina	-0.2396	-0.0510	-0.2906	-12.36
47	Tennessee	-0.2611	0.1311	-0.1300	-1.91
50	Vermont	0.0000	0.0096	0.0096	95.59
51	Virginia	-0.3252	0.0632	-0.2619	-14.63
54	West Virginia	-0.0821	0.0131	-0.0690	-0.57
55	Wisconsin	-0.3228	0.0515	-0.2713	-4.63
ALL STATES TOTAL		-8.4157	0.1569	-8.2588	
ALL STATES $/TON		-11.98	0.23	-5.97	

*UPPER =2.6 BEST LOWER = .15 OF BEST.
+ = BENEFITS, - = DAMAGES.

TABLE A-10
OZONE EYE IRRITATION - POINT ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN EYE IRRITATION,

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-2.9162	-0.1254	-3.0415	-37.14
5	Arkansas	0.0000	0.2268	0.2268	125.98
9	Connecticut	0.0000	0.1103	0.1103	68.91
10	Delaware	0.0000	0.1987	0.1987	42.27
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	-1.3706	0.2593	-1.1112	-55.01
13	Georgia	-2.1375	0.1253	-2.0122	-48.60
17	Illinois	-6.7077	-0.4770	-7.1847	-78.87
18	Indiana	-2.5299	-0.1407	-2.6706	-31.35
19	Iowa	-1.2371	-0.4483	-1.6855	-38.93
21	Kentucky	-1.7584	-0.4577	-2.2162	-23.68
22	Louisiana	0.0000	0.3728	0.3728	57.36
23	Maine	0.0000	0.3298	0.3298	1099.48
24	Maryland	-3.5154	-0.2051	-3.7205	-221.46
25	Massachusetts	0.0000	0.0428	0.0428	19.43
26	Michigan	-5.7354	-0.0482	-5.7836	-74.63
27	Minnesota	-2.0453	0.3964	-1.6489	-50.58
28	Mississippi	-0.6168	-0.9602	-1.5771	-171.42
29	Missouri	-2.0208	-0.3333	-2.3540	-45.44
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	-1.1490	0.0000	-1.1490	-212.77
36	New York	-2.4107	0.6544	-1.7563	-105.17
37	North Carolina	-3.7217	-0.5206	-4.2423	-50.81
39	Ohio	-8.7341	0.0099	-8.7242	-45.53
42	Pennsylvania	-8.9487	0.5145	-8.4342	-62.25
44	Rhode Island	-0.1463	-0.0115	-0.1578	-1577.97
45	South Carolina	-1.9241	-0.4094	-2.3335	-99.30
47	Tennessee	-2.0966	1.0528	-1.0439	-15.35
50	Vermont	0.0000	0.0768	0.0768	767.71
51	Virginia	-2.6114	0.5077	-2.1037	-117.52
54	West Virginia	-0.6590	0.1051	-0.5539	-4.58
55	Wisconsin	-2.5928	0.4140	-2.1788	-37.18
ALL STATES TOTAL		-67.5856	1.2599	-66.3256	
ALL STATES $/TON		-96.25	1.85	-47.94	

*UPPER =3.43 BEST LOWER = .92 OF BEST.
+ = BENEFITS, - = DAMAGES

TABLE A-11
COUGH - BEST ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN COUGH DAYS
ONLY DAYS IN EXCESS OF RRADS

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-0.6503	-0.0280	-0.6783	-8.28
5	Arkansas	0.0000	0.0506	0.0506	28.10
9	Connecticut	0.0000	0.0246	0.0246	15.37
10	Delaware	0.0000	0.0443	0.0443	9.43
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	-0.3057	0.0578	-0.2478	-12.27
13	Georgia	-0.4767	0.0280	-0.4487	-10.84
17	Illinois	-1.4959	-0.1064	-1.6023	-17.59
18	Indiana	-0.5642	-0.0314	-0.5956	-6.99
19	Iowa	-0.2759	-0.1000	-0.3759	-8.68
21	Kentucky	-0.3922	-0.1021	-0.4942	-5.28
22	Louisiana	0.0000	0.0831	0.0831	12.79
23	Maine	0.0000	0.0736	0.0736	245.20
24	Maryland	-0.7840	-0.0457	-0.8297	-49.39
25	Massachusetts	0.0000	0.0095	0.0095	4.33
26	Michigan	-1.2791	-0.0107	-1.2898	-16.64
27	Minnesota	-0.4561	0.0884	-0.3677	-11.28
28	Mississippi	-0.1376	-0.2141	-0.3517	-38.23
29	Missouri	-0.4507	-0.0743	-0.5250	-10.13
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	-0.2562	0.0000	-0.2562	-47.45
36	New York	-0.5376	0.1459	-0.3917	-23.45
37	North Carolina	-0.8300	-0.1161	-0.9461	-11.33
39	Ohio	-1.9478	0.0022	-1.9456	-10.15
42	Pennsylvania	-1.9957	0.1147	-1.8809	-13.88
44	Rhode Island	-0.0326	-0.0026	-0.0352	-351.90
45	South Carolina	-0.4291	-0.0913	-0.5204	-22.14
47	Tennessee	-0.4676	0.2348	-0.2328	-3.42
50	Vermont	0.0000	0.0171	0.0171	171.21
51	Virginia	-0.5824	0.1132	-0.4691	-26.21
54	West Virginia	-0.1470	0.0234	-0.1235	-1.02
55	Wisconsin	-0.5782	0.0923	-0.4859	-8.29
ALL STATES TOTAL		-15.0724	0.2810	-14.7914	
ALL STATES $/TON		-21.46	0.41	-10.69	

UPPER = 2 BEST LOWER = 0
+ = BENEFITS, - = DAMAGES

TABLE A-15
NO2 EYE IRRITATION - BEST ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN NO2 EYE IRR.

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	5.7572	1.3912	7.1485	87.28
5	Arkansas	0.0000	0.0512	0.0512	28.43
9	Connecticut	0.0000	0.1095	0.1095	68.42
10	Delaware	0.0000	0.1793	0.1793	38.15
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	1.6751	0.2246	1.8997	94.04
13	Georgia	3.0143	0.8647	3.8790	93.70
17	Illinois	21.4406	1.3309	22.7715	249.96
18	Indiana	2.6163	0.4720	3.0883	36.25
19	Iowa	1.9772	0.8631	2.8403	65.60
21	Kentucky	3.3063	1.3784	4.6846	50.05
22	Louisiana	0.0000	0.2860	0.2860	44.00
23	Maine	0.0000	0.0744	0.0744	248.08
24	Maryland	7.6013	0.0747	7.6761	456.91
25	Massachusetts	0.0000	0.0463	0.0463	21.05
26	Michigan	11.8625	1.2646	13.1271	169.38
27	Minnesota	3.4611	1.1543	4.6154	141.58
28	Mississippi	0.6959	0.2217	0.9176	99.74
29	Missouri	2.6597	0.4161	3.0758	59.38
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	3.2405	0.0000	3.2405	600.09
36	New York	5.8926	1.0557	6.9483	416.07
37	North Carolina	5.2483	1.6353	6.8836	82.44
39	Ohio	20.5277	2.5970	23.1248	120.69
42	Pennsylvania	20.1909	2.2828	22.4737	165.86
44	Rhode Island	0.3302	0.0000	0.3302	3301.94
45	South Carolina	3.6178	0.6929	4.3107	183.43
47	Tennessee	5.5191	2.6128	8.1319	119.59
50	Vermont	0.0000	0.0520	0.0520	519.65
51	Virginia	4.9101	1.3516	6.2616	349.81
54	West Virginia	1.0531	0.9172	1.9703	16.30
55	Wisconsin	2.4375	0.7485	3.1860	54.37
ALL STATES TOTAL		139.0352	24.3489	163.3841	
ALL STATES $/TON		198.00	35.74	118.09	

*UPPER = 2.4 * BEST LOWER = .9 * BEST.
+ = BENEFITS, - = DAMAGES

TABLE A-15
NO2 MATERIAL DAMAGE - BEST ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN NO2 MATERIALS DAMAGE

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	1.5379	0.7039	2.2418	27.37
5	Arkansas	0.0000	0.1087	0.1087	60.40
9	Connecticut	0.0000	0.0529	0.0529	33.04
10	Delaware	0.0000	0.0952	0.0952	20.27
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	0.7228	0.1836	0.9064	44.87
13	Georgia	1.1273	0.6125	1.7398	42.02
17	Illinois	3.5375	0.4159	3.9533	43.40
18	Indiana	1.3342	0.4559	1.7901	21.01
19	Iowa	0.6524	0.5394	1.1919	27.53
21	Kentucky	0.9274	0.7322	1.6596	17.73
22	Louisiana	0.0000	0.1787	0.1787	27.50
23	Maine	0.0000	0.1581	0.1581	527.13
24	Maryland	1.8539	0.0345	1.8885	112.41
25	Massachusetts	0.0000	0.0205	0.0205	9.32
26	Michigan	3.0247	0.6107	3.6354	46.91
27	Minnesota	1.0786	0.6813	1.7599	53.99
28	Mississippi	0.3253	0.1963	0.5216	56.70
29	Missouri	1.0657	0.3158	1.3815	26.67
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	0.6059	0.0000	0.6059	112.21
36	New York	1.2714	0.4314	1.7027	101.96
37	North Carolina	1.9627	1.1582	3.1210	37.38
39	Ohio	4.6061	1.1037	5.7098	29.80
42	Pennsylvania	4.7193	1.0106	5.7299	42.29
44	Rhode Island	0.0772	0.0000	0.0772	771.78
45	South Carolina	1.0147	0.3681	1.3828	58.84
47	Tennessee	1.1057	0.9914	2.0971	30.84
50	Vermont	0.0000	0.0368	0.0368	368.06
51	Virginia	1.3772	0.7180	2.0952	117.05
54	West Virginia	0.3475	0.5732	0.9207	7.62
55	Wisconsin	1.3674	0.7952	2.1626	36.90
ALL STATES TOTAL		35.6428	13.2827	48.9255	
ALL STATES $/TON		50.76	19.50	35.36	

*UPPER = BEST LOWER = .5 * BEST.
+ = BENEFITS, - = DAMAGES

TABLE A-14
CHRONIC - UPPER ESTIMATES*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN CHRONIC ILLNESS CASES IN FUTURE
ONLY DAYS IN EXCESS OF RRADS

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-0.3468	-0.0149	-0.3617	-4.42
5	Arkansas	0.0000	0.0270	0.0270	14.98
9	Connecticut	0.0000	0.0131	0.0131	8.20
10	Delaware	0.0000	0.0236	0.0236	5.03
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	-0.1630	0.0308	-0.1321	-6.54
13	Georgia	-0.2542	0.0149	-0.2393	-5.78
17	Illinois	-0.7977	-0.0567	-0.8544	-9.38
18	Indiana	-0.3009	-0.0167	-0.3176	-3.73
19	Iowa	-0.1471	-0.0533	-0.2004	-4.63
21	Kentucky	-0.2091	-0.0544	-0.2635	-2.82
22	Louisiana	0.0000	0.0443	0.0443	6.82
23	Maine	0.0000	0.0392	0.0392	130.75
24	Maryland	-0.4181	-0.0244	-0.4424	-26.34
25	Massachusetts	0.0000	0.0051	0.0051	2.31
26	Michigan	-0.6821	-0.0057	-0.6878	-8.87
27	Minnesota	-0.2432	0.0471	-0.1961	-6.01
28	Mississippi	-0.0734	-0.1142	-0.1875	-20.38
29	Missouri	-0.2403	-0.0396	-0.2799	-5.40
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	-0.1366	0.0000	-0.1366	-25.30
36	New York	-0.2867	0.0778	-0.2089	-12.51
37	North Carolina	-0.4426	-0.0619	-0.5045	-6.04
39	Ohio	-1.0386	0.0012	-1.0375	-5.41
42	Pennsylvania	-1.0642	0.0612	-1.0030	-7.40
44	Rhode Island	-0.0174	-0.0014	-0.0188	-187.65
45	South Carolina	-0.2288	-0.0487	-0.2775	-11.81
47	Tennessee	-0.2493	0.1252	-0.1241	-1.83
50	Vermont	0.0000	0.0091	0.0091	91.30
51	Virginia	-0.3105	0.0604	-0.2502	-13.98
54	West Virginia	-0.0784	0.0125	-0.0659	-0.54
55	Wisconsin	-0.3083	0.0492	-0.2591	-4.42
ALL STATES TOTAL		-8.0372	0.1498	-7.8874	
ALL STATES $/TON		-11.45	0.22	-5.70	

*UPPER RANGE VARIES BY A FACTOR OF 3
+ = BENEFITS, - = DAMAGES

TABLE A-12
MINOR SYMPTOM DAYS - TOTAL LOWER BOUND*
($1986)

(BASECASE #1: .5 LB NOx NSPS LIMITS IN 1995)

VALUES FOR CHANGES IN CHEST DISCOMFORT
ONLY DAYS IN EXCESS OF RRADS

FIPS	STATE	URBAN ($ MILL)	RURAL ($ MILL)	TOTAL ($ MILL)	$/TON ($/TON)
1	Alabama	-1.7528	-0.0754	-1.8282	-8.28
5	Arkansas	0.0000	0.1363	0.1363	28.10
9	Connecticut	0.0000	0.0663	0.0663	15.37
10	Delaware	0.0000	0.1194	0.1194	9.43
11	District of Columbia	0.0000	0.0000	0.0000	0.00
12	Florida	-0.8238	0.1559	-0.6679	-12.27
13	Georgia	-1.2848	0.0753	-1.2095	-10.84
17	Illinois	-4.0319	-0.2867	-4.3186	-17.59
18	Indiana	-1.5207	-0.0846	-1.6053	-6.99
19	Iowa	-0.7436	-0.2695	-1.0131	-8.68
21	Kentucky	-1.0570	-0.2751	-1.3321	"5.28
22	Louisiana	0.0000	0.2241	0.2241	12.79
23	Maine	0.0000	0.1983	0.1983	245.20
24	Maryland	-2.1131	-0.1233	-2.2363	-49.39
25	Massachusetts	0.0000	0.0257	0.0257	4.33
26	Michigan	-3.4475	-0.0290	-3.4764	-16.64
27	Minnesota	-1.2294	0.2383	-0.9911	-11.28
28	Mississippi	-0.3708	-0.5772	-0.9479	-38.23
29	Missouri	-1.2146	-0.2003	-1.4150	-10.13
33	New Hampshire	0.0000	0.0000	0.0000	0.00
34	New Jersey	-0.6906	0.0000	-0.6906	-47.45
36	New York	-1.4491	0.3934	-1.0557	-23.45
37	North Carolina	-2.2371	-0.3129	-2.5500	-11.33
39	Ohio	-5.2499	0.0060	-5.2439	-10.15
42	Pennsylvania	-5.3789	0.3092	-5.0697	-13.88
44	Rhode Island	-0.0880	-0.0069	-0.0948	-351.90
45	South Carolina	-1.1565	-0.2461	-1.4026	-22.14
47	Tennessee	-1.2603	0.6328	-0.6275	-3.42
50	Vermont	0.0000	0.0461	0.0461	171.21
51	Virginia	-1.5697	0.3052	-1.2645	-26.21
54	West Virginia	-0.3961	0.0632	-0.3329	-1.02
55	Wisconsin	-1.5585	0.2488	-1.3096	-8.29
ALL STATES TOTAL		-40.6244	0.7573	-39.8671	
ALL STATES $/TON		-57.85	1.11	-28.82	

LOWER BOUND ESTIMATE ONLY
+ = BENEFITS, - = DAMAGES

TABLE A-16
SUMMARY $/TON VALUES - $1986

(BASECASE #2: .4 LB NOx NSPS LIMITS IN 1995

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	23.36	129.52	75.10
	UPPER	35.04	194.27	112.65
	LOWER	11.68	64.76	37.55
NO2-EYE IRR	BEST	36.34	198.88	115.57
	UPPER	87.22	477.32	277.36
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	20.05	50.96	35.12
	UPPER	20.05	50.96	35.12
	LOWER	10.03	25.48	17.56
TOTAL NO2 EFFECTS				
	POINT	79.76	379.36	225.79
	LOWER	21.71	90.24	55.11
	UPPER	142.32	722.56	390.01
MATERIALS+ORNAMENTALS				
	BEST	0.22	0.23	0.23
	UPPER	0.22	0.23	0.23
	LOWER	0.15	0.16	0.16
AGRICULTURE	BEST	17.29	0.00	8.86
	UPPER	22.99	0.00	11.79
	LOWER	11.41	0.00	5.85
03-RRADS	BEST	11.32	-184.31	-84.03
	UPPER	16.75	-272.78	-124.37
	LOWER	2.26	-36.86	-16.81
03-ASTHMA	BEST	0.74	-12.03	-5.49
	UPPER	1.92	-31.29	-14.26
	LOWER	0.11	-1.80	-0.82
03-EYE IRR	BEST	5.94	-96.64	-44.06
	UPPER	15.43	-251.26	-114.55
	LOWER	5.46	-88.91	-40.53
03-COUGH	BEST	1.32	-21.55	-9.83
	UPPER	2.65	-43.10	-19.65
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	3.57	-58.09	-26.48
TOTAL NO2+OZONE				
	POINT	116.59	65.06	91.47
	LOWER	39.21	-6.35	11.15
	UPPER	202.29	124.36	129.19

TABLE A-16 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00	0.00	0.00
	LOWER	0.00	0.00	0.00
CHRONIC ILLNESS UPPER ONLY		0.71	-11.49	-5.24
TOTAL QUANTIFIED				
	POINT	116.59	65.06	91.47
	LOWER	39.21	-6.35	11.15
	UPPER	202.99	112.87	123.95

TABLE A-17
SUMMARY VALUES - MILLIONS $1986

(BASECASE #2: .4 LB NOx NSPS LIMITS IN 1995

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	17.2569	90.9719	108.2287
	UPPER	25.8853	136.4578	162.3431
	LOWER	8.6284	45.4859	54.1144
NO2-EYE IRR	BEST	26.8467	139.6956	166.5423
	UPPER	64.4320	335.2695	399.7015
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	14.8135	35.7972	50.6107
	UPPER	14.8135	35.7972	50.6107
	LOWER	7.4067	17.8986	25.3054
TOTAL NO2 EFFECTS				
	POINT	58.9170	266.4647	325.3817
	LOWER	16.0352	63.3845	79.4197
	UPPER	105.1308	507.5246	612.6553
MATERIALS + ORNAMENTALS				
	BEST	0.1636	0.1636	0.3272
	UPPER	0.1636	0.1636	0.3272
	LOWER	0.1129	0.1129	0.2258
AGRICULTURE	BEST	12.7707	0.0000	12.7707
	UPPER	22.5901	0.0000	22.5901
	LOWER	2.9024	0.0000	2.9024
03-RRADS	BEST	8.3622	-129.4596	-121.0974
	UPPER	12.3761	-191.6003	-179.2242
	LOWER	1.6724	-25.8919	-24.2195
03-ASTHMA	BEST	0.5460	-8.4521	-7.9062
	UPPER	1.4195	-21.9755	-20.5561
	LOWER	0.0819	-1.2678	-1.1859
03-EYE IRR	BEST	4.3845	-67.8783	-63.4938
	UPPER	11.3997	-176.4834	-165.0838
	LOWER	4.0337	-62.4480	-58.4143
03-COUGH	BEST	0.9778	-15.1376	-14.1598
	UPPER	1.9556	-30.2753	-28.3197
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	2.6354	-40.8003	-38.1649
TOTAL NO2+OZONE				
	POINT	85.9582	45.5371	131.4953
	LOWER	23.4402	-4.4627	16.0752
	UPPER	155.0353	87.3537	242.3890

TABLE A-17 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	**BEST**	**0.1058**	**0.0000**	**0.1058**
	UPPER	**0.2707**	**0.0000**	**0.2707**
	LOWER	**0.0000**	**0.0000**	**0.0000**
CHRONIC ILLNESS UPPER ONLY		**0.52**	**-8.07**	**-7.55**
TOTAL QUANTIFIED				
	POINT	**86.0639**	**45.5371**	**131.6010**
	LOWER	**23.4402**	**-4.4627**	**16.0752**
	UPPER	**155.8274**	**79.2816**	**235.1091**

TABLE A-18
SUMMARY $/TON VALUES - $1986

(BASECASE #3: .5 LB NOx NSPS LIMITS IN 2000)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	20.93	124.98	71.81
	UPPER	31.39	187.47	107.71
	LOWER	10.46	62.49	35.90
NO2-EYE IRR	BEST	32.67	191.91	110.54
	UPPER	78.41	460.58	265.29
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	17.98	49.18	33.24
	UPPER	17.98	49.18	33.24
	LOWER	8.99	24.59	16.62
TOTAL NO2 EFFECTS				
	POINT	71.58	366.07	215.58
	LOWER	19.45	87.08	52.52
	UPPER	127.78	697.23	373.01
MATERIALS+ORNAMENTALS				
	BEST	0.12	0.12	0.12
	UPPER	0.12	0.12	0.12
	LOWER	0.08	0.08	0.08
AGRICULTURE	BEST	-2.11	0.00	-1.08
	UPPER	-2.80	0.00	-1.43
	LOWER	-1.39	0.00	-0.71
03-RRADS	BEST	5.16	-177.85	-84.33
	UPPER	7.64	-263.22	-124.81
	LOWER	1.03	-35.57	-16.87
03-ASTHMA	BEST	0.34	-11.61	-5.51
	UPPER	0.88	-30.19	-14.32
	LOWER	0.05	-1.74	-0.83
03-EYE IRR	BEST	2.71	-93.25	-44.22
	UPPER	7.04	-242.46	-114.96
	LOWER	2.49	-85.79	-40.68
03-COUGH	BEST	0.60	-20.80	-9.86
	UPPER	1.21	-41.59	-19.72
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	1.63	-56.05	-26.58
TOTAL NO2+OZONE				
	POINT	78.40	62.67	70.71
	LOWER	20.86	-6.20	8.33
	UPPER	141.87	119.89	97.88

TABLE A-18 CONTINUED

SPECULATIVE CATEGORIES				
FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00	0.00	0.00
	LOWER	0.00	0.00	0.00
CHRONIC ILLNESS UPPER ONLY		0.32	-11.09	-5.26
TOTAL QUANTIFIED				
	POINT	78.40	62.67	70.71
	LOWER	20.86	-6.20	8.33
	UPPER	142.19	108.80	92.62

TABLE A-19
SUMMARY VALUES - MILLIONS $1986

(BASECASE #3: .5 LB NOx NSPS LIMITS IN 2000

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.8962	90.8345	106.7307
	UPPER	23.8443	136.2518	160.0961
	LOWER	7.9481	45.4173	53.3654
NO2-EYE IRR	BEST	24.8134	139.4796	164.2930
	UPPER	59.5522	334.7509	394.3032
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.6558	35.7431	49.3989
	UPPER	13.6558	35.7431	49.3989
	LOWER	6.8279	17.8716	24.6995
TOTAL NO2 EFFECTS				
	POINT	54.3655	266.0572	320.4226
	LOWER	14.7760	63.2888	78.0648
	UPPER	97.0524	506.7458	603.7982
MATERIALS + ORNAMENTALS				
	BEST	0.0875	0.0875	0.1751
	UPPER	0.0875	0.0875	0.1751
	LOWER	0.0604	0.0604	0.1208
AGRICULTURE	BEST	-1.6000	0.0000	-1.6000
	UPPER	-2.8302	0.0000	-2.8302
	LOWER	-0.3526	0.0000	-0.3526
03-RRADS	BEST	3.9228	-129.2641	-125.3413
	UPPER	5.8057	-191.3108	-185.5051
	LOWER	0.7846	-25.8528	-25.0683
03-ASTHMA	BEST	0.2561	-8.4394	-8.1833
	UPPER	0.6659	-21.9423	-21.2765
	LOWER	0.0384	-1.2659	-1.2275
03-EYE IRR	BEST	2.0568	-67.7757	-65.7189
	UPPER	5.3476	-176.2168	-170.8692
	LOWER	1.8922	-62.3537	-60.4614
03-COUGH	BEST	0.4587	-15.1148	-14.6561
	UPPER	0.9174	-30.2295	-29.3122
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	1.2363	-40.7387	-39.5024
TOTAL NO2+OZONE				
	POINT	59.4598	45.4633	104.9231
	LOWER	16.5431	-4.5082	12.3875
	UPPER	107.0462	87.1339	194.1801

TABLE A-19 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	0.0208	0.0000	0.0208
	UPPER	0.0532	0.0000	0.0532
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS UPPER ONLY		0.24	-8.06	-7.82
TOTAL QUANTIFIED				
	POINT	59.4806	45.4633	104.9439
	LOWER	16.5431	-4.5082	12.3875
	UPPER	107.3440	79.0741	186.4181

TABLE A-20

SUMMARY $/TON VALUES - $1986

(BASECASE #4: .4 LB NOx NSPS LIMITS IN 2000)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	21.61	125.34	68.92
	UPPER	32.42	188.76	103.39
	LOWER	10.81	62.92	34.46
NO2-EYE IRR	BEST	33.16	193.36	105.88
	UPPER	79.58	464.07	254.11
	LOWER	0.00	0.00	-0.00
NO2-MATERIALS	BEST	18.58	49.52	32.62
	UPPER	18.58	49.52	32.62
	LOWER	9.29	24.76	16.31
TOTAL NO2 EFFECTS				
	POINT	73.35	368.72	207.43
	LOWER	20.10	87.68	50.77
	UPPER	130.58	702.35	357.50
MATERIALS+ORNAMENTALS				
	BEST	0.30	0.36	0.33
	UPPER	0.30	0.36	0.33
	LOWER	0.21	0.25	0.23
AGRICULTURE	BEST	37.00	0.00	20.20
	UPPER	49.21	0.00	26.87
	LOWER	24.42	0.00	13.34
03-RRADS	BEST	16.03	-179.08	-72.53
	UPPER	23.72	-265.03	-107.35
	LOWER	3.21	-35.82	-14.51
03-ASTHMA	BEST	1.05	-11.69	-4.74
	UPPER	2.72	-30.40	-12.31
	LOWER	0.16	-1.75	-0.71
03-EYE IRR	BEST	8.41	-93.89	-38.03
	UPPER	21.85	-244.12	-98.88
	LOWER	7.73	-86.38	-34.99
03-COUGH	BEST	1.87	-20.94	-8.48
	UPPER	3.75	-41.88	-16.96
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	5.05	-56.44	-22.86
TOTAL NO2+OZONE				
	POINT	138.01	63.48	104.18
	LOWER	53.14	-6.08	12.92
	UPPER	232.13	121.28	149.19

TABLE A-21

SUMMARY VALUES - MILLIONS $1986

(BASECASE #4: . 4 LB NOx NSPS LIMITS IN 2000

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	18.9045	91.4991	110.4036
	UPPER	28.3567	137.2486	165.6054
	LOWER	9.4522	45.7495	55.2018
NO2-EYE IRR	BEST	29.0030	140.5940	169.5970
	UPPER	69.6073	337.4255	407.0328
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	16.2511	36.0036	52.2547
	UPPER	16.2511	36.0036	52.2547
	LOWER	8.1255	18.0018	26.1273
TOTAL NO2 EFFECTS				
	POINT	64.1586	268.0966	332.2552
	LOWER	17.5778	63.7513	81.3291
	UPPER	114.2151	510.6778	624.8928
MATERIALS + ORNAMENTALS				
	BEST	0.2624	0.2624	0.5248
	UPPER	0.2624	0.2624	0.5248
	LOWER	0.1810	-0.1810	0.3621
AGRICULTURE	BEST	32.3642	0.0000	32.3642
	UPPER	57.2491	0.0000	57.2491
	LOWER	6.6175	0.0000	6.6175
03-RRADS	BEST	14.0217	-130.2061	-116.1843
	UPPER	20.7521	-192.7050	-171.9528
	LOWER	2.8043	-26.0412	-23.2369
03-ASTHMA	BEST	0.9154	-8.5009	-7.5854
	UPPER	2.3802	-22.1022	-19.7221
	LOWER	0.1373	-1.2751	-1.1378
03-EYE IRR	BEST	7.3519	-68.2696	-60.9178
	UPPER	19.1148	-177.5010	-158.3862
	LOWER	6.7637	-62.8080	-56.0443
03-COUGH	BEST	1.6395	-15.2249	-13.5854
	UPPER	3.2791	-30.4498	-27.1707
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	4.4191	-41.0356	-36.6165
TOTAL NO2+OZONE				
	POINT	120.4514	45.8952	166.3466
	LOWER	31.7370	-4.4195	20.7000
	UPPER	217.2527	88.1822	305.4348

TABLE A-20 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00	0.00	0.00
	LOWER	0.00	0.00	0.00
CHRONIC ILLNESS UPPER ONLY		1.00	-11.17	-4.52
TOTAL QUANTIFIED				
	POINT	138.01	63.48	104.18
	LOWER	53.14	-6.08	12.92
	UPPER	233.13	110.11	14'4.67

TABLE A-21 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	0.2351	0.0000	0.2351
	UPPER	0.6020	0.0000	0.6020
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS UPPER ONLY		0.87	-8.12	-7.24
TOTAL QUANTIFIED				
	POINT	120.6865	45.8952	166.5817
	LOWER	31.7370	-4.4195	20.7000
	UPPER	218.7290	80.0636	298.7925

TABLE A-22
SUMMARY $/TON VALUES - $1986

(CASE #5: DAILY PEAKS ADJUSTMENT ON BASECASE #1

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	22.71	128.99	76.66
	UPPER	34.07	193.49	114.98
	LOWER	11.36	64.50	38.33
NO2-EYE IRR	BEST	35.74	198.00	118.09
	UPPER	85.77	475.20	283.43
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	19.50	50.76	35.36
	UPPER	19.50	50.76	35.36
	LOWER	9.75	25.38	17.68
TOTAL NO2 EFFECTS				
	POINT	77.95	377.75	230.11
	LOWER	21.10	89.88	56.01
	UPPER	139.34	719.45	398.41
MATERIALS+ORNAMENTALS				
	BEST	0.09	0.08	0.09
	UPPER	0.09	0.08	0.09
	LOWER	0.06	0.06	0.06
AGRICULTURE	BEST	166.66	0.00	82.07
	UPPER	221.66	0.00	109.16
	LOWER	110.00	0.00	54.17
03-RRADS	BEST	49.58	-183.57	-68.76
	UPPER	73.38	-271.68	-101.76
	LOWER	9.92	-36.71	-13.75
03-ASTHMA	BEST	3.24	-11.98	-4.49
	UPPER	8.42	-31.16	-11.67
	LOWER	0.49	-1.80	-0.67
03-EYE IRR	BEST	26.00	-96.25	-36.05
	UPPER	67.59	-250.25	-93.73
	LOWER	23.92	-88.55	-33.17
03-COUGH	BEST	5.80	-21.46	-8.04
	UPPER	11.59	-42.93	-16.08
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	15.63	-57.85	-21.67
TOTAL NO2+OZONE				
	POINT	329.31	64.57	194.94
	LOWER	157.19	-6.43	19.98
	UPPER	522.06	123.52	284.42

TABLE A-22 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00	0.00	0.00
	LOWER	0.00	0.00	0.00
CHRONIC ILLNESS UPPER ONLY		3.09	-11.4.5	-4.29
TOTAL QUANTIFIED				
	POINT	329.31	64.57	194.94
	LOWER	157.19	-6.43	19.98
	UPPER	525.15	112.07	280.13

TABLE A-23
SUMMARY VALUES - MILLIONS $1986

(CASE #5: DAILY PEAKS ADJUSTMENT ON BASECASE #1

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.4740	90.5802	106.0542
	UPPER	23.2111	135.8703	159.0813
	LOWER	7.7370	45.2901	53.0271
NO2-EYE IRR	BEST	24.3489	139.0352	163.3841
	UPPER	58.4373	333.6846	392.1219
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.2827	35.6428	48.9255
	UPPER	13.2827	35.6428	48.9255
	LOWER	6.6413	17.8214	24.4628
TOTAL NO2 EFFECTS				
	POINT	53.1056	265.2583	318.3639
	LOWER	14.3784	63.1115	77.4899
	UPPER	94.9310	505.1978	600.1288
MATERIALS + ORNAMENTALS				
	BEST	0.0597	0.0597	0.1193
	UPPER	0.0597	0.0597	0.1193
	LOWER	0.0412	0.0412	0.0824
AGRICULTURE	BEST	113.5474	0.0000	113.5474
	UPPER	200.8541	0.0000	200.8541
	LOWER	26.8803	0.0000	26.8803
03-RRADS	BEST	33.7783	-128.9014	-95.1231
	UPPER	49.9919	-190.7741	-140.7822
	LOWER	6.7557	-25.7803	-19.0246
03-ASTHMA	BEST	2.2053	-8.4157	-6.2104
	UPPER	5.7338	-21.8808	-16.1470
	LOWER	0.3308	-1.2624	-0.9316
03-EYE IRR	BEST	17.7106	-67.5856	-49.8749
	UPPER	46.0477	-175.7225	-129.6748
	LOWER	16.2938	-62.1787	-45.8849
03-COUGH	BEST	3.9497	-15.0724	-11.1227
	UPPER	7.8994	-30.1447	-22.2454
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	10.6455	-40.6244	-29.9789
TOTAL NO2+OZONE				
	POINT	224.2970	45.2833	269.5803
	LOWER	59.0318	-4.5143	27.6372
	UPPER	405.5175	86.7354	492.2529

TABLE A-23 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	-0.0112	0.0000	-0.0112
	UPPER	-0.0286	0.0000	-0.0286
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS UPPER ONLY		2.11	-8.04	-5.93
TOTAL QUANTIFIED				
	POINT	224.2858	45.2833	269.5691
	LOWER	59.0318	-4.5143	27.6372
	UPPER	407.5951	78.6982	486.2932

TABLE A-24
SUMMARY $/TON VALUES - $1986

(CASE #6: NOx TO 03 UPPER CONVERSION LIMITS ON BASECASE)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	22.71	128.99	76.66
	UPPER	34.07	193.49	114.98
	LOWER	11.36	64.50	38.33
NO2-EYE IRR	BEST	35.74	198.00	118.09
	UPPER	85.77	475.20	283.43
	LOWER	0.00	0.00	'0.00
NO2-MATERIALS	BEST	19.50	50.76	35.36
	UPPER	19.50	50.76	35.36
	LOWER	9.75	25.38	17.68
TOTAL NO2 EFFECTS				
	POINT	77.95	377.75	230.11
	LOWER	21.10	89.88	56.01
	UPPER	139.34	719.45	398.41
MATERIALS+ORNAMENTALS				
	BEST	-0.62	-0.60	-0.61
	UPPER	-0.62	-0.60	-0.61
	LOWER	-0.43	-0.42	-0.42
AGRICULTURE	BEST	-159.30	0.00	-78.45
	UPPER	-211.87	0.00	-104.34
	LOWER	-105.14	0.00	-51.78
03-RRADS	BEST	-37.73	-550.70	-298.09
	UPPER	-55.83	-815.04	-441.17
	LOWER	-7.55	-110.14	-59.62
03-ASTHMA	BEST	-2.46	-35.95	-19.46
	UPPER	-6.40	-93.48	-50.60
	LOWER	-0.37	-5.39	-2.92
03-EYE IRR	BEST	-19.78	-288.74	-156.29
	UPPER	-51.43	-750.74	-406.37
	LOWER	-18.20	-265.65	-143.79
03-COUGH	BEST	-4.41	-64.39	-34.86
	UPPER	-8.82	-128.79	-69.71
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	-11.89	-173.56	-93.95
TOTAL NO2+OZONE				
	POINT	-146.36	-562.64	-357.64
	LOWER	-104.27	-199.63	-100.89
	UPPER	-195.64	-1069.20	-674.38

TABLE A-24 CONTINUED

SPECULATIVE CATEGORIES				
FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00	0.00	0.00
	LOWER	0.00	0.00	0.00
CHRONIC ILLNESS UPPER ONLY		-2.35	-34.34	-18.59
TOTAL QUANTIFIED				
	POINT	-146.36	-562.64	-357.65
	LOWER	-104.27	-199.63	-100.89
	UPPER	-198.00	-1103.54	-692.97

TABLE A-25

SUMMARY VALUES - MILLIONS $1986

(CASE #6: NOx TO 03 UPPER CONVERSION LIMITS ON BASECASE)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.4740	90.5802	106.0542
	UPPER	23.2111	135.8703	159.0813
	LOWER	7.7370	45.2901	53.0271
NO2-EYE IRR	BEST	24.3489	139.0352	163.3841
	UPPER	58.4373	333.6846	392.1219
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.2827	35.6428	48.9255
	UPPER	13.2827	35.6428	48.9255
	LOWER	6.6413	17.8214	24.4628
TOTAL NO2 EFFECTS				
	POINT	53.1056	265.2583	318.3639
	LOWER	14.3784	63.1115	77.4899
	UPPER	**94.9310**	**505.1978**	**600.1288**
MATERIALS + ORNAMENTALS				
	BEST	-0.4224	-0.4224	-0.8448
	UPPER	-0.4224	-0.4224	-0.8448
	LOWER	-0.2915	-0.2915	-0.5829
AGRICULTURE	BEST	-108.5323	0.0000	-108.5323
	UPPER	-191.9828	0.0000	-191.9828
	LOWER	-25.6931	0.0000	-25.6931
03-RRADS	BEST	-25.7029	-386.7043	-412.4072
	UPPER	-38.0403	-572.3223	-610.3626
	LOWER	-5.1406	-77.3409	-82.4814
03-ASTHMA	BEST	-1.6781	-25.2470	-26.9251
	UPPER	-4.3630	-65.6423	-70.0053
	LOWER	-0.2517	-3.7871	-4.0388
03-EYE IRR	BEST	-13.4765	-202.7567	-216.2332
	UPPER	-35.0390	-527.1674	-562.2064
	LOWER	-12.3984	-186.5362	-198.9346
03-COUGH	BEST	-3.0054	-45.2171	-48.2225
	UPPER	-6.0108	-90.4342	-96.4450
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	-8.1005	-121.8732	-129.9737
TOTAL NO2+OZONE				
	POINT	-99.2897	-394.6668	-493.9565
	LOWER	-25.0990	-140.1811	-139.5869
	UPPER	-180.9274	-750.7908	-931.7181

TABLE A-25 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	-0.7704	0.0000	-0.7704
	UPPER	-1.9721	0.0000	-1.9721
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS UPPER ONLY		-1.60	-24.11	-25.71
TOTAL QUANTIFIED				
	POINT	-100.0600	-394.6668	-494.7268
	LOWER	-25.0990	-140.1811	-139.5869
	UPPER	-184.5021	-774.9025	-959.4045

TABLE A-26
SUMMARY $/TON VALUES - $1986

(CASE #7: NOx TO 03 LOWER CONVERSION LIMITS ON BASECASE #1)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	22.71	128.99	76.66
	UPPER	34.07	193.49	114.98
	LOWER	11.36	64.50	38.33
NO2-EYE IRR	BEST	35.74	198.00	118.09
	UPPER	85.77	475.20	28.3.43
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	19.50	50.76	35.36
	UPPER	19.50	50.76	35.36
	LOWER	9.75	25.38	17.68
TOTAL NO2 EFFECTS				
	POINT	77.95	377.75	230.11
	LOWER	21.10	89.88	56.01
	UPPER	139.34	719.45	398.41
MATERIALS+ORNAMENTALS				
	BEST	1.15	1.11	1.13
	UPPER	1.15	1.11	1.13
	LOWER	0.79	0.77	0.78
AGRICULTURE	BEST	212.15	0.00	104.47
	UPPER	282.16	0.00	138.95
	LOWER	140.02	0.00	68.95
03-RRADS	BEST	65.41	-91.78	-14.38
	UPPER	96.80	-135.84	-21.28
	LOWER	13.08	-18.36	-2.88
03-ASTHMA	BEST	4.27	-5.99	-0.94
	UPPER	11.10	-15.58	-2.44
	LOWER	0.64	-0.90	-0.14
03-EYE IRR	BEST	34.29	-48.12	-7.54
	UPPER	89.16	-125.12	-19.60
	LOWER	31.55	-44.27	-6.93
03-COUGH	BEST	7.65	-10.73	-1.68
	UPPER	15.30	-21.46	-3.36
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	20.61	-28.93	-4.53
TOTAL NO2+OZONE				
	POINT	402.87	22.2.24	311.19
	LOWER	196.25	42.46	49.24
	UPPER	635.02	422.56	491.82

TABLE A-26 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	0.00	0.00	0.00
	UPPER	0.00		
	LOWER	0.00	0.00 0.00	0.00 0.00
CHRONIC ILLNESS UPPER ONLY		4.08	-5.72	-0.90
TOTAL QUANTIFIED				
	POINT	402.87	222.24	311.19
	LOWER	196.25	42.46	49.24
	UPPER	639.10	416.83	490.92

TABLE A-27

SUMMARY VALUES - MILLIONS $1986

(CASE #7: NOx TO 03 LOWER CONVERSION LIMITS ON BASECASE #1)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.4740	90.5802	106.0542
	UPPER	23.2111	135.8703	159.0813
	LOWER	7.7370	45.2901	53.0271
NO2-EYE IRR	BEST	24.3489	139.0352	163.3841
	UPPER	58.4373	333.6846	392.1219
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.28.27	35.6428	48.9255
	UPPER	13.2827	35.6428	48.9255
	LOWER	6.6413	17.8214	24.4628
TOTAL NO2 EFFECTS				
	POINT	53.1056	265.2583	318.3639
	LOWER	14.3784	63.1115	77.4899
	UPPER	94.9310	505.1978	600.1288
MATERIALS + ORNAMENTALS				
	BEST	0.7828	0.7828	1.5656
	UPPER	0.7828	0.7828	1.5656
	LOWER	0.5401	0.5401	1.0803
AGRICULTURE	BEST	144.5395	0.0000	144.5395
	UPPER	255.6759	0.0000	255.6759
	LOWER	34.2171	0.0000	34.2171
03-RRADS	BEST	44.5617	-64.4507	-19.8890
	UPPER	65.9513	-95.3870	-29.4357
	LOWER	8.9123	-12.8901	-3.9778
03-ASTHMA	BEST	2.9093	-4.2078	-1.2985
	UPPER	7.5643	-10.9404	-3.3761
	LOWER	0.4364	-0.6312	-0.1948
03-EYE IRR	BEST	23.3646	-33.7928	-10.4282
	UPPER	60.7479	-87.8612	-27.1133
	LOWER	21.4954	-31.0894	-9.5939
03-COUGH	BEST	5.2106	-7.53.62	-2.3256
	UPPER	10.4212	-15.0724	-4.6512
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	14.0440	-20.3122	-6.2682
TOTAL NO2+OZONE				
	POINT	273.6913	155.2708	428.9621
	LOWER	72.5284	29.8181	68.1294
	UPPER	496.0744	296.7195	792.7941

TABLE k-27 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	1.1276	0.0000	1.1276
	UPPER	2.8867	0.0000	2.8867
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS	UPPER ONLY	2.78	-4.02	-1.24
TOTAL QUANTIFIED				
	POINT	274.8189	155.2708	430.0897
	LOWER	72.5284	29.8181	68.1294
	UPPER	501.7396	292.7009	794.4406

TABLE A-28
SUMMARY $/TON VALUES - $1986

(CASE #8: MRADS ADJUSTMENT ON BASECASE #1)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	22.71	128.99	76.66
	UPPER	34.07	193.49	114.98
	LOWER	11.36	64.50	38.33
NO2-EYE IRR	BEST	35.74	198.00	118.09
	UPPER	85.77	475.20	283.43
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	19.50	50.76	35.36
	UPPER	19.50	50.76	35.36
	LOWER	9.75	25.38	17.68
TOTAL NO2 EFFECTS				
	POINT	77.95	377.75	230.11
	LOWER	21.10	89.88	56.01
	UPPER	139.34	719.45	398.41
MATERIALS+ORNAMENTALS				
	BEST	0.09	0.08	0.09
	UPPER	0.09	0.08	0.09
	LOWER	0.06	0.06	0.06
AGRICULTURE	BEST	-10.72	0.00	-5.28
	UPPER	-14.26	0.00	-7.02
	LOWER	-7.08	0.00	-3.48
03-RRADS	BEST	1.92	-100.13	-49.87
	UPPER	2.89	-150.19	-74.81
	LOWER	0.96	-50.06	-24.94
03-ASTHMA	BEST	0.26	-13.71	-6.83
	UPPER	0.68	-35.65	-17.76
	LOWER	0.04	-2.06	-1.02
03-EYE IRR	BEST	1.85	-96.25	-47.94
	UPPER	4.81	-250.25	-124.65
	LOWER	1.70	-88.55	-44.11
03-COUGH	BEST	0.56	-29.05	-14.47
	UPPER	1.12	-58.10	-28.94
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS DAYS LOWER		1.55	-80.61	-40.15
TOTAL NO2+OZONE				
	POINT	71.91	138.70	105.81
	LOWER	16.64	-42.79	-10.04
	UPPER	134.66	225.35	145.33

TABLE A-28 CONTINUED

SPECULATIVE CATEGORIES				
FORESTS	**BEST**	**0.00**	**0.00**	**0.00**
	UPPER	**0.00**	**0.00**	**0.00**
	LOWER	**0.00**	**0.00**	**0.00**
CHRONIC ILLNESS UPPER ONLY		0.22	-11.45	-5.70
TOTAL QUANTIFIED				
	POINT	**71.91**	**138.70**	**105.81**
	LOWER	16.64	**-42.79**	-10.04
	UPPER	**134.88**	**213.90**	**139.63**

TABLE A-29
SUMMARY VALUES - MILLIONS $1986

(CASE #8: MRADS ADJUSTMENT ON BASECASE #1

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.4740	90.5802	106.0542
	UPPER	23.2111	135.8703	159.0813
	LOWER	7.7370	45.2901	53.0271
NO2-EYE IRR	BEST	24.3489	139.0352	163.3841
	UPPER	58.4373	333.6846	392.1219
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.2827	35.6428	48.9255
	UPPER	13.2827	35.6428	48.9255
	LOWER	6.6413	17.8214	24.4628
TOTAL NO2 EFFECTS				
	POINT	53.1056	265.2583	318.3639
	LOWER	14.3784	63.1115	77.4899
	UPPER	94.9310	505.1978	600.1288
MATERIALS + ORNAMENTALS				
				0.1193
	UPPER BEST	0.0597 0.0597	0.0597 0.0597	0.1193
	LOWER	0.0412	0.0412	0.0824
AGRICULTURE	BEST	-7.3036	0.0000	-7.3036
				-12.9193
	UPPER LOWER	-12.9193 -1.7290	0.0000 0.0000	-1.7290
03-RRADS	BEST	1.3107	-70.3099	-68.9992
	UPPER	1.9661	-105.4648	-103.4987
	LOWER	0.6554	-35.1549	-34.4996
03-ASTHMA	BEST	0.1795	-9.6275	-9.4480
	UPPER	0.4666	-25.0314	-24.5648
	LOWER	0.0269	-1.4441	-1.4172
03-EYE IRR	BEST	1.2599	-67.5856	-66.3256
	UPPER	3.2758	-175.7225	-172.4467
	LOWER	1.1591	-62.1787	-61.0196
03-COUGH	BEST	0.3803	-20.3989	-20.0186
	UPPER	0.7605	-40.7977	-40.0372
MINOR SYMPTOMS	DAYS LOWERLOWER	1.0552 0.0000	-56.6039 0.0000	0.0000
				-55.5487
TOTAL NO2+OZONE				
	POINT	48.9324	97.3365	146.2689
	LOWER	14.4280	-30.0503	-13.8933
	UPPER	88.5404	158.2410	246.7815

TABLE A-29 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	-0.0112	0.0000	-0.0112
	UPPER	-0.0286	0.0000	-0.0286
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS	UPPER ONLY	0.15	-8.04	-7.89
TOTAL QUANTIFIED				
	POINT	48.9212	97.3365	146.2578
	LOWER	14.4280	-30.0503	-13.8933
	UPPER	88.6617.	150.2038	238.8655

TABLE A-30

SUMMARY $/TON VALUES - $1986

(CASE #9: NO2 TO EYE IRRITATION ADJUSTMENT ON BASECASE #1)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	22.71	128.99	76.66
	UPPER	34.07	193.49	114.98
	LOWER	11.36	64.50	38.33
NO2-EYE IRR	BEST	17.87	99.00	59.05
	UPPER	42.89	237.60	141.71
	LOWER	0.00	0.00	0.00
NO2-MATERIALS	BEST	19.50	50.76	35.36
	UPPER	19.50	50.76	35.36
	LOWER	9.75	25.38	17.68
TOTAL NO2 EFFECTS				
	POINT	60.08	278.75	171.07
	LOWER	21.10	89.88	56.01
	UPPER	96.45	481.85	256.70
MATERIALS+ORNAMENTALS				
	BEST	0.09	0.08	0.09
	UPPER	0.09	0.08	0.09
	LOWER	0.06	0.06	0.06
AGRICULTURE	BEST	-10.72	0.00	-5.28
	UPPER	-14.26	0.00	-7.02
	LOWER	-7.08	0.00	-3.48
03-RRADS	BEST	3.53	-183.57	-91.43
	UPPER	5.22	-271.68	-135.32
	LOWER	0.71	-36.71	-18.29
03-ASTHMA	BEST	0.23	-11.98	-5.97
	UPPER	0.60	-31.16	-15.52
	LOWER	0.03	-1.80	-0.90
03-EYE IRR	BEST	1.85	-96.25	-47.94
	UPPER	4.81	-250.25	-124.65
	LOWER	1.70	-88.55	-44.11
03-COUGH	BEST	0.41	-21.46	-10.69
	UPPER	0.82	-42.93	-21.38
	LOWER	0.00	0.00	0.00
MINOR SYMPTOMS	DAYS LOWER	1.11	-57.85	-28.82
TOTAL NO2+OZONE				
	POINT	55.46	-34.43	9.84
	LOWER	15.94	-6.43	8.07
	UPPER	93.73	-114.08	-47.11

TABLE A-30 CONTINUED

SPECULATIVE CATEGORIES				
FORESTS	**BEST**	**0.00**	**0.00**	**0.00**
	UPPER	**0.00**	**0.00**	**0.00**
	LOWER	**0.00**	**0.00**	**0.00**
CHRONIC ILLNESS UPPER ONLY		0.22	-11.45	-5.70
TOTAL QUANTIFIED				
	POINT	55.46	-34.43	9.84
	LOWER	15.94	-6.43	8.07
	UPPER	93.95	-125.53	-52.81

TABLE A-31
SUMMARY VALUES - MILLIONS $1986

(CASE #9: NO2 TO EYE IRRITATION ADJUSTMENT ON BASECASE #1)

CATEGORY	ESTIMATE	RURAL	URBAN	TOTAL
QUANTIFIED EFFECTS				
VISIBILITY	BEST	15.4740	90.5802	106.0542
	UPPER	23.2111	135.8703	159.0813
	LOWER	7.7370	45.2901	53.0271
NO2-EYE IRR	BEST.	12.1744	69.5176	81.6921
	UPPER	29.2187	166.8423	196.0610
	LOWER	0.0000	0.0000	0.0000
NO2 MATERIAL	BEST	13.2827	35.6428	48.9255
	UPPER	13.2827	35.6428	48.9255
	LOWER	6.6413	17.8214	24.4628
TOTAL NO2 EFFECTS				
	POINT	40.9312	195.7407	236.6718
	LOWER	14.3784	63.1115	77.4899
	UPPER	65.7124	338.3554	404.0678
MATERIALS + ORNAMENTALS				
	BEST	0.0597	0.0597	0.1193
	UPPER	0.0597	0.0597	0.1193
	LOWER	0.0412	0.0412	0.0824
AGRICULTURE	BEST	-7.3036	0.0000	-7.3036
	UPPER	-12.9193	0.0000	-12.9193
	LOWER	-1.7290	0.0000	-1.7290
03-RRADS	BEST	2.4030	-128.9014	-126.4985
	UPPER	3.5564	-190.7741	-187.2177
	LOWER	0.4806	-25.7803	-25.2997
03-ASTHMA	BEST	0.1569	-8.4157	-8.2588
	UPPER	0.4079	-21.8808	-21.4729
	LOWER	0.0235	-1.2624	-1.2388
03-EYE IRR	BEST	1.2599	-67.5856	-66.3256
	UPPER	3.2758	-175.7225	-172.4467
	LOWER	1.1591	-62.1787	-61.0196
03-COUGH	BEST	0.2810	-15.0724	-14.7914
	UPPER	0.5620	-30.1447	-29.5828
	LOWER	0.0000	0.0000	0.0000
MINOR SYMPTOMS	DAYS LOWER	0.7573	-40.6244	-39.8671
TOTAL NO2+OZONE				
	POINT	37.7283	-24.2344	13.4940
	LOWER	13.9520	-4.5143	11.1666
	UPPER	60.6548	-80.1069	-19.4522

TABLE A-31 CONTINUED

SPECULATIVE CATEGORIES

FORESTS	BEST	-0.0112	0.0000	-0.0112
	UPPER	-0.0286	0.0000	-0.0286
	LOWER	0.0000	0.0000	0.0000
CHRONIC ILLNESS UPPER ONLY		0.15	-8.04	-7.89
TOTAL QUANTIFIED				
	POINT	37.7171	-24.2344	13.4828
	LOWER	13.9520	-4.5143	11.1666
	UPPER	60.7760	-88.1441	-27.3681