Appendix A. Air Quality Assessment: The PM Data

Appendix A. Air Quality Assessment: The PM Data

This Appendix describes the PM data for the urban counties used in the risk assessment (see Section 3 for selection of locations). The average ambient PM concentration in an assessment location on a given day is represented by the *average* of 24-hour average PM levels at the different monitors in that location that reported on that day. This approach is consistent with what has been done in epidemiological studies estimating PM C-R functions. Also, because people are often quite mobile (e.g., living in one part of a county and working in another), an area-wide average PM level may be a more meaningful measure of ambient PM concentration than PM levels at individual monitors. Ito et al. (1995), for example, found that averaging PM_{10} concentrations reported at monitors in different places generally improved the significance of the association between PM_{10} and mortality in Chicago, compared with using individual monitors.

In order for an urban area to be included in the $PM_{2.5}$ or $PM_{10-2.5}$ risk assessment the location must contain at least one monitor (for the $PM_{10-2.5}$ risk assessment, at least one pair of co-located PM_{10} and $PM_{2.5}$ monitors) with 11 or more observations per quarter. Because there are substantially more monitoring data for $PM_{2.5}$ than for PM_{10}, we added the additional criterion for the $PM_{2.5}$ risk assessment that there be at least 122 observations per year (1 in 3 day monitoring). Once the criteria for inclusion were met, all monitors with at least 11 observations per quarter were used for each location. The cutoff of 11 observations per quarter is based on EPA guidance on measuring attainment of the daily and annual particulate matter standards outlined in Appendix N of the July 18, 1997 Federal Register Notice (available on the web at www.epa.gov/ttn/oarpg/t1pfpr.html). The guidance requires that at least 75 percent of the scheduled sampling days for each quarter have valid data. Based on a one in six day sampling protocol, the minimum required number of observations would be 11 per quarter.

The numbers of days of observations by monitor and at the composite monitor, by quarter and for the year, along with annual averages and 98th and 99th percentile concentrations, are given in the exhibits below. In these exhibits the first five digits, which denote the FIPS code designation, are omitted in the legends. The annual average at each monitor, and at the composite monitor, is the average of the four quarterly averages at the monitor. The 98th and 99th percentiles at each monitor, and at the composite monitor, are calculated using the method used by EPA, as described in Appendix N of the July 18, 1997 Federal Register Notice (available on the web at www.epa.gov/ttn/oarpg/t1pfpr.html). The only difference between the method used in calculating the monitor-specific annual averages and 98th and 99th percentile values shown in the exhibits in this appendix and the standard EPA convention in calculating annual averages and 98th and 99th percentile values is that the EPA convention uses three years of data whereas the calculations here are based on only a single year of data.

A.1. The $PM_{2.5}$ data

$PM_{2.5}$ data for each of the urban areas identified in Section 3 for the $PM_{2.5}$ risk assessment (Boston, Detroit, Los Angeles, Philadelphia, Phoenix, Pittsburgh, San Jose, Seattle, and St. Louis) were obtained for the years 1999 through 2003 from EPA's Aerometric Information Retrieval System (AIRS). For all urban areas except Phoenix, year 2003 data were used. For Phoenix there were no monitors in 2003 and only two monitors in 2002 that met the inclusion criterion. The number of days covered by the two 2002 monitors in Phoenix is 178 compared with 362 days covered in 2003. Because the annual averages in those two years in Phoenix were comparable and the 2001 data provided much better coverage of the year, we used the year 2001 data. The numbers of days of observations by monitor and at the composite monitor, by quarter and for the year, along with annual averages and 98th and 99th percentile concentrations, are given in Exhibits A.1 through A.9.

EPA design values (described in Section 2.3 of the report) are used to determine the percent rollback necessary to just meet annual, 98th percentile daily, and 99th percentile daily standards. Although the composite monitor is not used in determining the percent rollback in the PM risk assessment, the percent rollback to simulate just meeting alternative standards is applied to the composite monitor.

Exhibit A.1. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Boston, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 250250027881011	17	12	22	24	75	12.0	41.3	53.7
AIRS 250250042881011	47	49	91	83	270	11.4	30.6	39.6
AIRS 250250043881011	22	30	25	29	106	13.6	35.5	42.5
Composite[1]	62	63	91	86	302	12.1	34.1	41.1
Design Values**	–	–	–	–	–	14.4	44	60

*All concentrations are in $\mu g/m^3$; includes Middlesex, Norfolk and Suffolk Counties.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.2. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Detroit, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 261630001881011	80	86	80	80	326	15.2	40.5	48.3
AIRS 261630015881011	27	27	30	27	111	16.6	33.6	34.3
AIRS 261630016881011	85	85	86	71	327	15.8	46.2	50.4
AIRS 261630019881011	27	30	30	29	116	14.6	37.1	39.2
AIRS 261630025881011	27	28	31	27	113	14.1	38.1	38.5
AIRS 261630033881011	29	27	27	28	111	19.1	42.8	44.1
AIRS 261630036881011	25	24	28	29	106	16.3	34.8	36.0
Composite[1]	88	90	90	89	357	15.7	41.5	48.5
Design Values**	–	–	–	–	–	19.5	44.0	48

*All concentrations are in $\mu g/m^3$; includes Wayne County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.3. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Los Angeles, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 060370002881011	87	79	80	68	314	19.3	55.5	63.9
AIRS 060371002881011	30	23	28	11	92	22.1	60.1	120.6
AIRS 060371103881011	80	85	85	75	325	21.4	61.3	68.9
AIRS 060371201881011	29	30	31	25	115	16.5	44.7	45.0
AIRS 060371301881011	29	29	31	28	117	20.3	52.4	53.3
AIRS 060371601881011	29	27	27	28	111	20.5	50.4	51.1
AIRS 060372005881011	29	28	29	24	110	18.6	48.4	51.3
AIRS 060374002881011	81	84	78	81	324	18.0	46.5	51.4
AIRS 060379033881011	30	30	31	29	120	9.4	17.0	21.0
Composite[1]	90	91	92	92	365	19.1	55.0	60.4
Design Values**	–	–	–	–	–	23.6	62.0	96

*All concentrations are in $\mu g/m^3$; includes Los Angeles County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.4. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Philadelphia, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 421010004881011	12	76	82	92	322	14.8	39.9	40.7
AIRS 421010014881011	11	15	26	21	73	13.3	39.3	60.7
AIRS 421010020881011	24	28	27	29	108	13.7	39.3	39.9
AIRS 421010024881011	21	24	23	40	108	13.2	38.7	40.9
AIRS 421010047881011	15	18	23	14	70	16.1	42.3	56.5
AIRS 421010136881011	63	69	81	83	296	14.0	35.6	44.9
Composite[1]	82	89	86	92	349	14.3	38.4	42.2
Design Values**	–	–	–	–	–	16.4	51.0	89

*All concentrations are in $\mu g/m^3$; includes Philadelphia County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.5. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Phoenix, 2001*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 040130019881011	50	85	91	86	312	10.9	30.4	36.5
AIRS 040139990881011	27	31	28	30	116	9.4	22.7	25
AIRS 040139992881011	77	87	85	87	336	10.9	35.3	40.5
AIRS 040139997881011	75	75	91	73	314	9.2	25.0	28.2
Composite[1]	88	90	92	92	362	10.4	28.9	36.4
Design Values**	–	–	–	–	–	11.5	35.0	41

*All concentrations are in $\mu g/m^3$; includes Maricopa County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.6. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Pittsburgh, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 420030008881011	84	90	88	90	352	15.2	35.9	39.5
AIRS 420030021881011	23	29	26	30	108	14.6	30.7	40.0
AIRS 420030064881011	86	91	90	92	359	20.2	66.6	76.1
AIRS 420030067881011	26	28	19	26	99	13.2	42.1	52.0
AIRS 420030095881011	12	12	15	14	53	15.7	38.6	53.7
AIRS 420030116881011	26	27	28	27	108	15.3	42.9	45.9
AIRS 420031008881011	25	27	29	30	111	15.5	41.9	44.5
AIRS 420031301881011	20	28	30	26	104	16.8	38.3	50.4
AIRS 420033007881011	15	14	16	15	60	12.0	58.8	59.3
AIRS 420039002881011	13	13	16	15	57	16.0	33.4	58.6
Composite[1]	89	91	91	92	363	16.9	43.9	55.1
Design Values**	–	–	–	–	–	21.2	63.0	70

*All concentrations are in $\mu g/m^3$; includes Allegheny County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.7. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. San Jose, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 60850005881011	87	14	17	87	205	11.7	40.1	45.5
AIRS 60852003881011	85	19	18	79	201	10.1	36.9	37.5
Composite[1]	89	19	19	91	218	11.1	37.6	41
Design Values**	–	–	–	–	–	14.6	47.0	53

*All concentrations are in $\mu g/m^3$; includes Santa Clara County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.8. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. Seattle, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 530330017881011	18	15	16	14	63	10.3	10.9	12.6
AIRS 530330024881011	30	28	30	29	117	10.8	28.2	31.7
AIRS 530330037881011	17	12	14	15	58	7.8	17.6	30.7
AIRS 530330057881011	34	30	31	28	123	8.3	28.4	28.6
AIRS 530330080881011	88	85	92	92	357	8.6	20.5	22.9
AIRS 530332004881011	29	30	29	28	116	10.3	28.4	30.2
Composite[1]	89	87	92	92	360	8.3	21.7	23.8
Design Values**	–	–	–	–	–	11.1	41.0	48

*All concentrations are in $\mu g/m^3$; includes King County.

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.9. Number of Days on which $PM_{2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{2.5}$ Concentrations. St. Louis, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 171191007881011	29	30	26	28	113	17.5	40.8	41.7
AIRS 171192009881011	29	29	30	29	117	14.0	31.5	36.1
AIRS 171193007881011	29	29	30	29	117	14.0	31.6	32.7
AIRS 171630010881011	26	28	31	25	110	14.8	32.6	32.9
AIRS 171634001881011	29	22	31	30	112	14.3	34.2	36.2
AIRS 290990012881011	85	87	88	88	348	13.9	34.2	36.3
AIRS 291831002881011	30	29	31	30	120	14.0	35.5	37.9
AIRS 291890004881011	29	28	30	29	116	13.0	30.5	36.2
AIRS 291892003881011	88	89	82	89	348	13.6	31.5	32.4
AIRS 295100007881011	88	87	86	90	351	14.4	33.2	34.8
AIRS 295100085881011	90	91	89	92	362	14.1	32.0	33.5
AIRS 295100086881011	90	91	88	86	355	13.5	31.5	33.8
AIRS 295100087881011	82	91	90	90	353	14.7	33.2	34.5
Composite[1]	90	91	92	92	365	14.0	30.6	33.7
Design Values**	–	–	–	–	–	17.5	42	46

*All concentrations are in $\mu g/m^3$; includes St. Louis (MO), Franklin (MO), Jefferson (MO), St. Charles (MO), Clinton (IL), Madison (IL), Monroe (IL), and St. Clair (IL) Counties and St. Louis City (MO).

** The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

A.2. The $PM_{10\text{-}2.5}$ data

$PM_{10\text{-}2.5}$ data for each of the urban areas identified in Section 3 for the $PM_{10\text{-}2.5}$ risk assessment (Detroit, Seattle, and St. Louis) were calculated based on data obtained from EPA's Aerometric Information Retrieval System (AIRS) for 1999-2003. PM_{10} and $PM_{2.5}$ monitoring data collected on the same day at the same site were used to calculate $PM_{10\text{-}2.5}$ levels. Year 2003 data were used for all three locations because not only is this the most recent year for which we have data, but data in 2003 were more complete for each location than in any of the other years.

In the AIRS database, $PM_{2.5}$ data is collected and reported at local temperature and pressure. In order to calculate $PM_{10\text{-}2.5}$ levels using comparable data, PM_{10} local condition data were obtained, when available, and PM_{10} standard condition data were converted to PM_{10} local condition data using site-specific algorithms.

The numbers of days of observations by monitor and at the composite monitor, by quarter and for the year, along with annual averages and maximum concentrations, are given in Exhibits A.10 through A.12 for each of the urban locations in the $PM_{10-2.5}$ risk assessment. Since $PM_{10-2.5}$ data are based on co-located monitors at a single site, the data are presented by site, rather than by monitor. As with the $PM_{2.5}$ data, the annual average at each site, and at the composite site, is the average of the four quarterly averages at the site.

Exhibit A.10. Number of Days on which $PM_{10-2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{10-2.5}$ Concentrations. Detroit, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 261630015	13	12	16	12	53	10.9	40.2	48.7
AIRS 261630033	29	27	27	28	111	20.1	105.9	122.4
Composite[1]	30	27	29	29	115	21.7	105.9	122.4
Design Values**	–	–	–	–	–	–	70.0	77.0

*All concentrations are in $\mu g/m^3$; includes Wayne County.

**The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.11. Number of Days on which $PM_{10-2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{10-2.5}$ Concentrations. Seattle, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 530330057	15	14	16	13	58	12.6	30.3	45.0
AIRS 530332004	14	15	14	13	56	10.0	25.4	30.1
Composite[1]	15	16	16	14	61	11.4	26.2	30.3
Design Values**	–	–	–	–	–	–	31.0	39.0

*All concentrations are in $\mu g/m^3$; includes King County.

**The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit A.12. Number of Days on which $PM_{10-2.5}$ Concentration Data are Available, by Monitor and by Quarter, and $PM_{10-2.5}$ Concentrations. St. Louis, 2003*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile	99th Percentile
AIRS 171193007	13	15	15	15	58	10.6	24.2	42.8
AIRS 295100086	15	15	16	14	60	10.1	24.7	34.9
AIRS 295100087	15	15	15	15	60	14.9	33.3	47.0
Composite[1]	15	15	16	15	61	12.0	24.1	41.6
Design Values**	–	–	–	–	–	–	33.0	47.0

*All concentrations are in $\mu g/m^3$; includes St. Louis (MO), Franklin (MO), Jefferson (MO), St. Charles (MO), Clinton (IL), Madison (IL), Monroe (IL), and St. Clair (IL) Counties and St. Louis City (MO).

**The calculation of design values is described in Section 2.3 of this report.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Appendix B. Linear Trends in Historical $PM_{2.5}$ Data in Philadelphia and Los Angeles

Abt

memorandum

Environmental Research Area

4800 Montgomery Lane, Suite 600 ■ Bethesda, MD 20814-5341 ■ (301) 913-0500

Abt Associates Inc.

Date May 8, 2002

To Harvey Richmond, U.S. EPA/OAQPS

From Ellen Post, Abt Associates Inc.

Subject **Linear Trends in Historical $PM_{2.5}$ Data in Philadelphia and Los Angeles: Revision of November 26, 2001 Memo**

The method used to simulate just meeting a standard in the 1995/96 PM risk analysis and proposed for the current risk analysisis to "roll back" the anthropogenic portion of PM levels (i.e., the portion above background level) by the same percentage on each day. This method assumes that, all else held constant:

$$(y_i - B) = \beta * (x_i - B) \quad ,$$

where[1]

- x_i is the ith $PM_{2.5}$ concentration in a location before the standard is met,
- y_i is the ith $PM_{2.5}$ concentration in that location when the standard is just met,
- B is the background concentration in that location, and
- $\beta < 1$.

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[1] We first examined the plausibility of this assumption in preparation for the PM risk analysis carried out in 1995/1996. At that time, we examined pairs of years of $PM_{2.5}$ data in several locations, but none of the data reflected efforts to meet $PM_{2.5}$ standards, because this exercise (and the data it used) preceded the setting of $PM_{2.5}$ standards. That investigation, however, found that the change in the distribution of $PM_{2.5}$ concentrations from one year to another year in the same location tended to be linear. This is described in Section 8.2 of Abt Associates Inc., 1996. "A Particulate Matter Risk Assessment for Philadelphia and Los Angeles."

We don't have data on $PM_{2.5}$ concentrations in any location before and after the $PM_{2.5}$ standards have just been met, so we cannot directly test whether this "rollback" assumption accurately models how $PM_{2.5}$ concentrations would change if a standard were just met. We can, however, examine historical changes in $PM_{2.5}$ concentrations for any location for which we have sufficient data to determine if the proportional rollback model is consistent with these historical changes. We currently have sufficient data in each of two locations, Philadelphia and Los Angeles, to compare the distribution of daily $PM_{2.5}$ concentrations in the year 2000 with the distribution in an earlier year. In each location, we compared the two distributions to see if the change was well described as proportional. The method and results are described below.

In Philadelphia we have 353 days of observations in a year which crosses calendar years 1992 and 1993, and 296 days of observations in the year 2000. In Los Angeles we have 214 days of observations in 1995 and 357 days of observations in 2000. We first grouped the $PM_{2.5}$ concentrations in each distribution into deciles and averaged the concentrations within each decile.[2] These average concentrations within deciles are shown in Exhibit B.1 and in graph form in Exhibits B.2 and B.3, for Philadelphia and Los Angeles, respectively.

[2] We considered using the decile points themselves rather than the averages within deciles. However, the decile points would be expected to be less stable from one year to another than the averages of the concentrations within deciles. A comparison of the averages within deciles from one year to another is therefore likely to give a more accurate picture of how the distribution has changed from one year to another. This is the method that was used in the earlier comparison for the 1995/96 PM risk assessment.

Exhibit B.1. Average $PM_{2.5}$ Concentrations ($\mu g/m^3$) in Each Decile of Earlier Year and Year 2000 Distributions at Composite Monitors in Philadelphia and Los Angeles*

Decile*	Philadelphia		Los Angeles	
	1992/93	2000	1995	2000
1	5.91	4.62	10.02	6.67
2	7.94	6.58	14.62	10.19
3	9.71	8.82	18.50	12.39
4	11.19	10.25	21.06	14.59
5	13.07	12.07	24.19	16.59
6	14.87	13.72	28.40	18.55
7	17.23	16.01	32.96	21.27
8	20.67	19.4	39.72	24.22
9	25.34	23.77	54.77	28.27
10	37.90	32.58	87.12	50.50

*The first decile is the tenth percentile, the second decile is the twentieth percentile, and so on. The average concentration in the nth decile is the average of those values that are greater than the (n-1)st decile point and less than or equal to the nth decile point.

Exhibit B.2

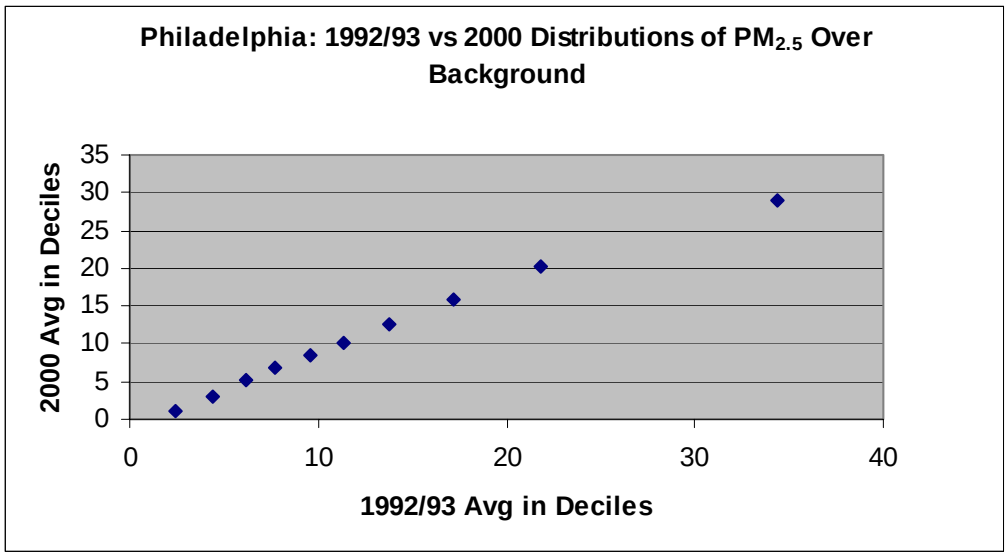
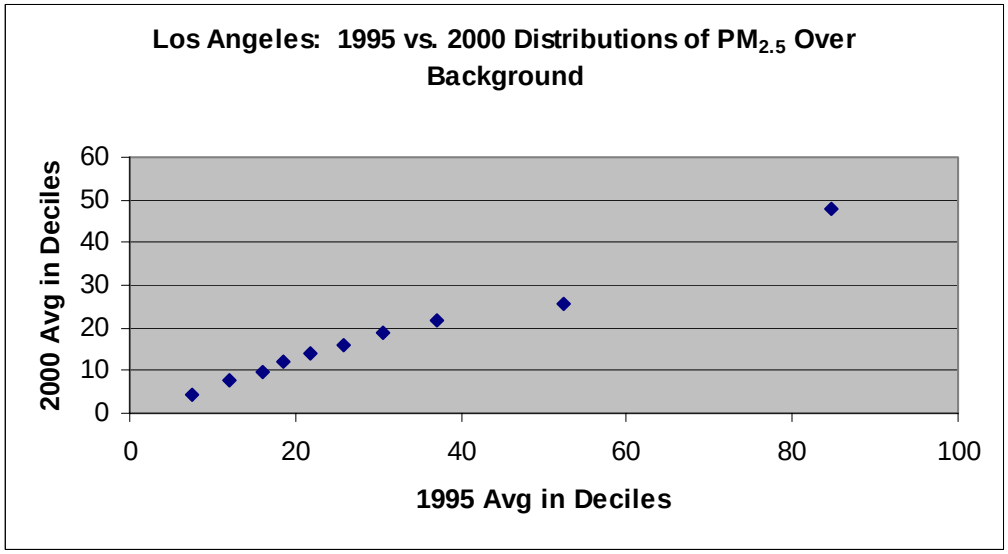


Exhibit B.3



To examine how reasonable the proportional rollback hypothesis is we estimated the following regression equation separately for Philadelphia and for Los Angeles:

$$(y_i - B) = \alpha + \beta * (x_i - B) + \varepsilon_i$$

where now,

- y_i is the average $PM_{2.5}$ concentration in the ith decile of the distribution of $PM_{2.5}$ concentrations in the location in the year 2000,
- x_i is the average $PM_{2.5}$ concentration in the ith decile of the distribution of $PM_{2.5}$ concentrations in that location in an earlier year (1995 for Los Angeles and 1992/93 for Philadelphia),
- B is the background concentration in that location (2.5 $\mu g/m^3$ in Los Angeles and 3.5 $\mu g/m^3$ in Philadelphia), and
- ε_i is an error term.

If the change in $PM_{2.5}$ concentrations from the earlier year to the year 2000 is consistent with a proportional rollback model, we would expect

- the linear fit to be good,
- the slope (β) to be less than one, and
- the intercept (α) to be close to zero

The results of the regressions in Philadelphia and Los Angeles do support the hypothesis underlying the proportional rollback method, as shown in Exhibit B.4. In both cases, the linear fit is very good (R^2 = 0.992 in Philadelphia and 0.986 in Los Angeles), the slopes are less than 1.0, and the intercepts are close to zero.[3] This supports the hypothesis that, at least in these two locations, the change in daily $PM_{2.5}$ concentrations that would result if a $PM_{2.5}$ standard were just met is reasonably modeled as a proportional rollback.

[3] Because decile points are not independent observations, the usual test of statistical significance are not valid. What is most important, however, is that the linear relationship is very good and the intercept is near zero.

Exhibit B.4. Results of Regressions of Year 2000 Average $PM_{2.5}$ Concentrations over Background on Earlier Year Average $PM_{2.5}$ Concentrations over Background.

	Philadelphia	Los Angeles
Intercept	-0.136	1.387
Slope	0.886	0.537
R^2	0.992	0.986

Appendix C. Study-Specific Information for the $PM_{2.5}$ and $PM_{10-2.5}$ Risk Assessments

C.1. The $PM_{2.5}$ data

Exhibit C.1. Study-Specific Information for $PM_{2.5}$ Studies in Boston, MA

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Total Mortality -- Single Pollutant Models												
Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	< 800	all	log-linear, GAM (stringent)	none	0	70.8	mean of lag 0 & 1	2-day avg	0.00206	0.00139	0.00273
Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	< 800	all	log-linear, GAM (stringent)	none	0	174	mean of lag 0 & 1	2-day avg	0.00137	0.00098	0.00176
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	490-492, 494-496	all	log-linear, GAM (stringent)	none	0	70.8	0 day	2-day avg	0.00276	-0.00131	0.00658
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	410-414	all	log-linear, GAM (stringent)	none	0	70.8	0 day	2-day avg	0.00266	0.00149	0.00383
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	480-487	all	log-linear, GAM (stringent)	none	0	70.8	0 day	2-day avg	0.00573	0.00257	0.00871
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	490-492, 494-496	all	log-linear, GAM (stringent)	none	0	174	0 day	2-day avg	0.00227	0.00010	0.00440
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	410-414	all	log-linear, GAM (stringent)	none	0	174	0 day	2-day avg	0.00178	0.00109	0.00247
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	480-487	all	log-linear, GAM (stringent)	none	0	174	0 day	2-day avg	0.00402	0.00188	0.00602

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Respiratory Symptoms and Illnesses -- Single Pollutant Models**												
Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	n/a	7-14	logistic	none	N/A	N/A	1 day	1-day avg	0.01901	0.00696	0.03049
Schwartz and Neas (2000) -- 6 cities	Cough	n/a	7-14	logistic	none	N/A	N/A	0 day	3-day avg	0.00989	-0.00067	0.02050
Respiratory Symptoms and Illnesses -- Multi-Pollutant Models**												
Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	n/a	7-14	logistic	PM10-2.5	N/A	N/A	1 day	1-day avg	0.01698	0.00388	0.03007
Schwartz and Neas (2000) -- 6 cities	Cough	n/a	7-14	logistic	PM10-2.5	N/A	N/A	0 day	3-day avg	0.00451	-0.00702	0.01541
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - Six Cities	All cause	all	25+	log-linear	none	11	29.6	n/a	annual mean	0.01243	0.00414	0.02071
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - Six Cities	Cardiopulmonary	400-440, 485-495	25+	log-linear	none	11	29.6	n/a	annual mean	0.01693	0.00561	0.02789
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

**The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Exhibit C.2. Study-Specific Information for $PM_{2.5}$ Studies in Detroit, MI

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Total Mortality -- Single Pollutant Models												
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Non-accidental	<800	all	log-linear, GAM (stringent)	none	4	86	3 day	1-day avg	0.00074	-0.00073	0.00221
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Circulatory	390-459	all	log-linear, GAM (stringent)	none	4	86	1 day	1-day avg	0.00087	-0.00131	0.00305
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Respiratory	460-519	all	log-linear, GAM (stringent)	none	4	86	0 day	1-day avg	0.00090	-0.00438	0.00618
Hospital Admissions -- Single Pollutant Models												
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Pneumonia	480-486	65+	log-linear, GAM (stringent)	none	4	86	1 day	1-day avg	0.00398	0.00074	0.00725
Ito (2003) [reanalysis of Lippmann et al. (2000)]	COPD	490-496	65+	log-linear, GAM (stringent)	none	4	86	3 day	1-day avg	0.00117	-0.00287	0.00523
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Ischemic heart disease	410-414	65+	log-linear, GAM (stringent)	none	4	86	2 day	1-day avg	0.00143	-0.00082	0.00371
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Congestive heart failure	428	65+	log-linear, GAM (stringent)	none	4	86	1 day	1-day avg	0.00307	0.00055	0.00561
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Dysrhythmias	427	65+	log-linear, GAM (stringent)	none	4	86	1 day	1-day avg	0.00125	-0.00274	0.00523

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

Exhibit C.3. Study-Specific Information for $PM_{2.5}$ Studies in Los Angeles, CA

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Total Mortality -- Single Pollutant Models												
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 100 df	none	4	86	0 day	1-day avg	0.00032	-0.00023	0.00086
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 100 df	none	4	86	1 day	1-day avg	0.00010	-0.00046	0.00066
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 30 df	none	4	86	0 day	1-day avg	0.00054	-0.00007	0.00114
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GLM, 30 df	none	4	86	0 day	1-day avg	0.00040	-0.00034	0.00113
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 100 df	none	4	86	0 day	1-day avg	0.00032	-0.00023	0.00086
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GLM, 100 df	none	4	86	0 day	1-day avg	0.00030	-0.00043	0.00102
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 30 df	none	4	86	1 day	1-day avg	0.00059	0.00000	0.00117
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GLM, 30 df	none	4	86	1 day	1-day avg	0.00055	-0.00017	0.00126
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 100 df	none	4	86	1 day	1-day avg	0.00010	-0.00046	0.00066
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GLM, 100 df	none	4	86	1 day	1-day avg	-0.00001	-0.00099	0.00097

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GAM (stringent), 30 df	none	4	86	0 day	1-day avg	0.00099	0.00010	0.00187
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GAM (stringent), 100 df	none	4	86	0 day	1-day avg	0.00097	0.00014	0.00179
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GLM, 100 df	none	4	86	0 day	1-day avg	0.00097	-0.00002	0.00195
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GAM (stringent), 30 df	none	4	86	1 day	1-day avg	0.00103	0.00016	0.00189
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GAM (stringent), 100 df	none	4	86	1 day	1-day avg	0.00080	-0.00003	0.00162
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GLM, 100 df	none	4	86	1 day	1-day avg	0.00069	-0.00032	0.00169
Short-Term Exposure Total Mortality -- Multi-Pollutant Models												
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 30 df	CO	4	86	1 day	1-day avg	-0.00053	-0.00132	0.00025
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GAM (stringent), 100 df	CO	4	86	1 day	1-day avg	-0.00033	-0.00105	0.00039
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	<800	all	log-linear, GLM, 100 df	CO	4	86	1 day	1-day avg	-0.00033	-0.00118	0.00051

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Cause-Specific Mortality -- Multi-Pollutant Models												
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GAM (stringent), 100 df	CO	4	86	0 day	1-day avg	0.00178	0.00076	0.00279
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GLM, 100 df	CO	4	86	0 day	1-day avg	0.00188	0.00068	0.00306
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GAM (stringent), 100 df	CO	4	86	1 day	1-day avg	0.00091	-0.00012	0.00193
Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	390-429	all	log-linear, GLM, 100 df	CO	4	86	1 day	1-day avg	0.00091	-0.00034	0.00215
Hospital Admissions -- Single Pollutant Models												
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GAM (stringent), 30 df	none	4	86	0 day	1-day avg	0.00158	0.00091	0.00224
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GAM (stringent), 100 df	none	4	86	0 day	1-day avg	0.00116	0.00051	0.00181
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GLM, 100 df	none	4	86	0 day	1-day avg	0.00126	0.00045	0.00206
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GAM (stringent), 30 df	none	4	86	1 day	1-day avg	0.00139	0.00070	0.00208
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GAM (stringent), 100 df	none	4	86	1 day	1-day avg	0.00113	0.00047	0.00179
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GLM, 100 df	none	4	86	1 day	1-day avg	0.00120	0.00039	0.00200
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 30 df	none	4	86	0 day	1-day avg	0.00167	0.00069	0.00264

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 100 df	none	4	86	0 day	1-day avg	0.00138	0.00052	0.00223
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GLM, 100 df	none	4	86	0 day	1-day avg	0.00149	0.00042	0.00255
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 30 df	none	4	86	1 day	1-day avg	0.00119	0.00023	0.00214
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 100 df	none	4	86	1 day	1-day avg	0.00075	-0.00011	0.00160
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GLM, 100 df	none	4	86	1 day	1-day avg	0.00077	-0.00027	0.00180
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 30 df	none	4	86	2 day	1-day avg	0.00185	0.00084	0.00285
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 100 df	none	4	86	2 day	1-day avg	0.00114	0.00022	0.00205
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GLM, 100 df	none	4	86	2 day	1-day avg	0.00103	-0.00011	0.00216
Hospital Admissions -- Single City, Multi-Pollutant Models												
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GAM (stringent), 100 df	CO	4	86	0 day	1-day avg	0.00039	-0.00044	0.00121
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GLM, 100 df	CO	4	86	0 day	1-day avg	0.00058	-0.00041	0.00156
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GAM (stringent), 100 df	CO	4	86	1 day	1-day avg	0.00024	-0.00065	0.00112
Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	390-429	65+	log-linear, GLM, 100 df	CO	4	86	1 day	1-day avg	0.00027	-0.00075	0.00128

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 100 df	NO2	4	86	0 day	1-day avg	0.00042	-0.00091	0.00173
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 100 df	NO2	4	86	1 day	1-day avg	-0.00004	-0.00162	0.00152
Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	490-496	all	log-linear, GAM (stringent), 100 df	NO2	4	86	2 day	1-day avg	0.00035	-0.00103	0.00171
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

Exhibit C.4. Study-Specific Information for Studies $PM_{2.5}$ in Philadelphia, PA

Study*	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.**	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Lipfert et al. (2000) -- 7 counties	Cardiovascular	390-448	all	linear	none	-0.6	72.6	1 day	1-day avg	0.10440	0.04983	0.15897
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*The Lipfert et al. (2000) study does not provide the statistical uncertainties surrounding the PM2.5 non-accidental mortality coefficients and the cardiovascular mortality multi-pollutant coefficient.

**Used only for mortality in the sensitivity analyses of hypothetical threshold models.

Exhibit C.5. Study-Specific Information for $PM_{2.5}$ Studies in Phoenix, AZ

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	390-448.9	65+	log-linear, GAM (stringent)	none	0	42	0 day	1-day avg	0.00371	-0.00101	0.00843
Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	390-448.9	65+	log-linear, GAM (stringent)	none	0	42	1 day	1-day avg	0.00661	0.00193	0.01129
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

Exhibit C.6. Study-Specific Information for $PM_{2.5}$ Studies in Pittsburgh, PA

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Total Mortality -- Single Pollutant Models												
Chock et al. (2000)	Non-accidental	<800	<75	log-linear	none	3	86	0 day	1-day avg	0.00101	-0.00079	0.00281
Chock et al. (2000)	Non-accidental	<800	75+	log-linear	none	3	86	0 day	1-day avg	0.00059	-0.00125	0.00243
Short-Term Exposure Total Mortality -- Multi-Pollutant Models												
Chock et al. (2000)	Non-accidental	<800	<75	log-linear	CO, O3, SO2, NO2, PM10-2.5	3	86	0 day	1-day avg	0.00130	-0.00086	0.00346
Chock et al. (2000)	Non-accidental	<800	75+	log-linear	CO, O3, SO2, NO2, PM10-2.5	3	86	0 day	1-day avg	0.00040	-0.00178	0.00258
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

Exhibit C.7. Study-Specific Information for $PM_{2.5}$ Studies in San Jose, CA

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Total Mortality -- Single Pollutant Models												
Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	<800	all	log-linear, GAM (stringent)	none	2	105	0 day	1-day avg	0.00314	0.00064	0.00567
Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	<800	all	log-linear, GAM (stringent)	none	2	105	1 day	1-day avg	-0.00153	-0.00380	0.00071
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	11, 35, 472-519, 710.0, 710.2, 710.4	all	log-linear, GAM (stringent)	none	2	105	0 day	1-day avg	0.00446	-0.00416	0.01307
Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	390-459	all	log-linear, GAM (stringent)	none	2	105	0 day	1-day avg	0.00248	-0.00168	0.00666
Short-Term Exposure Total Mortality -- Multi-Pollutant Models												
Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	<800	all	log-linear, GAM (stringent)	NO2	2	105	0 day	1-day avg	0.00402	0.00106	0.00698
Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	<800	all	log-linear, GAM (stringent)	CO	2	105	0 day	1-day avg	0.00363	0.00085	0.00636
Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	<800	all	log-linear, GAM (stringent)	O3 - 8hr	2	105	0 day	1-day avg	0.00340	0.00085	0.00594
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

Exhibit C.8. Study-Specific Information for $PM_{2.5}$ Studies in Seattle, WA

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Hospital Admissions -- Single Pollutant Models												
Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	493	<65	log-linear, GAM (stringent)	none	2.5	96	1 day	1-day avg	0.00332	0.00084	0.00494
Long-Term Exposure Mortality -- Single Pollutant Models												
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

**Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily PM2.5 values obtained from nephelometry measurements rather than from air quality monitors.

Exhibit C.9. Study-Specific Information for $PM_{2.5}$ Studies in St. Louis, MO

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Short-Term Exposure Total Mortality -- Single Pollutant Models												
Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	< 800	all	log-linear, GAM (stringent)	none	0.9	88.9	mean of lag 0 & 1	2-day avg	0.00102	0.00037	0.00167
Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	< 800	all	log-linear, GAM (stringent)	none	0	174	mean of lag 0 & 1	2-day avg	0.00137	0.00098	0.00176
Short-Term Exposure Cause-Specific Mortality -- Single Pollutant Models												
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	490-492, 494-496	all	Log-linear, GAM (stringent)	none	0.9	88.9	0 day	2-day avg	0.00060	-0.00294	0.00411
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	410-414	all	Log-linear, GAM (stringent)	none	0.9	88.9	0 day	2-day avg	0.00129	0.00030	0.00237
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	480-487	all	Log-linear, GAM (stringent)	none	0.9	88.9	0 day	2-day avg	0.00109	-0.00253	0.00459
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	490-492, 494-496	all	Log-linear, GAM (stringent)	none	0	174	0 day	2-day avg	0.00227	0.00010	0.00440
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	410-414	all	Log-linear, GAM (stringent)	none	0	174	0 day	2-day avg	0.00178	0.00109	0.00247
Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	480-487	all	Log-linear, GAM (stringent)	none	0	174	0 day	2-day avg	0.00402	0.00188	0.00602
Respiratory Symptoms and Illnesses -- Single Pollutant Models**												
Schwartz and Neas (2000) - - 6 cities	Lower respiratory symptoms	n/a	7-14	logistic	none	N/A	N/A	1 day	1-day avg	0.01901	0.00696	0.03049
Schwartz and Neas (2000) - - 6 cities	Cough	n/a	7-14	logistic	none	N/A	N/A	0 day	3-day avg	0.00989	-0.00067	0.02050

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Respiratory Symptoms and Illnesses -- Multi-Pollutant Models**												
Schwartz and Neas (2000) - - 6 cities	Lower respiratory symptoms	n/a	7-14	logistic	PM10-2.5	N/A	N/A	1 day	1-day avg	0.01698	0.00388	0.03007
Schwartz and Neas (2000) - - 6 cities	Cough	n/a	7-14	logistic	PM10-2.5	N/A	N/A	0 day	3-day avg	0.00451	-0.00702	0.01541
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - Six Cities	All cause	all	25+	log-linear	none	11	29.6	n/a	annual mean	0.01243	0.00414	0.02071
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.00463	0.00238	0.00710
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.00583	0.00198	0.01044
Krewski et al. (2000) - Six Cities	Cardiopulmonary	400-440, 485-495	25+	log-linear	none	11	29.6	n/a	annual mean	0.01693	0.00561	0.02789
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.00943	0.00606	0.01315
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.00862	0.00296	0.01484
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.01310	0.00392	0.02070
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.00812	0.00426	0.01164
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.00676	0.00389	0.00976
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.00121	-0.00209	0.00499

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

**The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Exhibit C.10. Study-Specific Information for Studies on Mortality Associated with Long-Term Exposure to $PM_{2.5}$

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM2.5 Coeff.	Lower Bound	Upper Bound
Long-Term Exposure Mortality -- Single Pollutant Models												
Krewski et al. (2000) - Six Cities	All cause	all	25+	log-linear	none	11	29.6	n/a	annual mean	0.012425	0.004138	0.020713
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	none	10	38	n/a	annual mean	0.004626	0.002378	0.007100
Pope et al. (2002) - ACS extended	All cause	all	30+	log-linear	none	7.5	30	n/a	annual mean	0.005827	0.001980	0.010436
Krewski et al. (2000) - Six Cities	Cardiopulmonary	400-440, 485-495	25+	log-linear	none	11	29.6	n/a	annual mean	0.016925	0.005611	0.027892
Krewski et al. (2000) - ACS	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	10	38	n/a	annual mean	0.009433	0.006058	0.013146
Pope et al. (2002) - ACS extended	Cardiopulmonary	401-440, 460-519	30+	log-linear	none	7.5	30	n/a	annual mean	0.008618	0.002956	0.014842
Pope et al. (2002) - ACS extended	Lung cancer	162	30+	log-linear	none	7.5	30	n/a	annual mean	0.013103	0.003922	0.020701
Long-Term Exposure Mortality -- Multi-Pollutant Models												
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	CO	10	38	n/a	annual mean	0.006756	0.003890	0.009756
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	NO2	10	38	n/a	annual mean	0.008116	0.004260	0.011640
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	O3	10	38	n/a	annual mean	0.006756	0.003890	0.009756
Krewski et al. (2000) - ACS	All cause	all	30+	log-linear	SO2	10	38	n/a	annual mean	0.001206	-0.002094	0.004988

*Used only for mortality in the sensitivity analyses of hypothetical threshold models.

C.2. The $PM_{10-2.5}$ data

Exhibit C.11. Study-Specific Information for $PM_{10-2.5}$ Studies in Detroit, MI

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM Coarse Coefficient	Lower Bound	Upper Bound
Hospital Admissions -- Single Pollutant Models												
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Pneumonia	480-486	65+	log-linear, GAM (stringent)	none	1	50	1 day	1-day avg	0.0037814	-0.0004188	0.0079769
Ito (2003) [reanalysis of Lippmann et al. (2000)]	COPD+	490-496	65+	log-linear, GAM (stringent)	none	1	50	3 day	1-day avg	0.0033223	-0.0019622	0.0085917
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Ischemic heart disease	410-414	65+	log-linear, GAM (stringent)	none	1	50	2 day	1-day avg	0.0038954	0.0009475	0.0068258
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Dysrhythmias	427	65+	log-linear, GAM (stringent)	none	1	50	0 day	1-day avg	0.0000416	-0.0052791	0.0053863
Ito (2003) [reanalysis of Lippmann et al. (2000)]	Congestive heart failure	428	65+	log-linear, GAM (stringent)	none	1	50	0 day	1-day avg	0.0017142	-0.0016142	0.0050924

*Used only in the sensitivity analyses of hypothetical threshold models.

Exhibit C.12. Study-Specific Information for $PM_{10-2.5}$ Studies in Seattle, WA

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	max.*	Lag	Exposure Metric	PM Coarse Coefficient	Lower Bound	Upper Bound
Hospital Admissions -- Single Pollutant Models												
Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	493	<65	log-linear, GAM (stringent)	none	N/A	88	1 day	1-day avg	0.0021293	0.0000000	0.0052463

*Used only in the sensitivity analyses of hypothetical threshold models.

**Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily PM2.5 values obtained from nephelometry measurements rather than from air quality monitors.

Exhibit C.13. Study-Specific Information for Studies in St. Louis, MO

Study	Health Effect	ICD-9 Codes	Ages	Model	Other Pollutants in Model	Observed Concentrations min.	Observed Concentrations max.*	Lag	Exposure Metric	PM Coarse Coefficient	Lower Bound	Upper Bound
Respiratory Symptoms and Illnesses -- Single Pollutant Models**												
Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	N/A	7-14	logistic	none	0	121	0 day	3-day avg	0.0163785	-0.0025253	0.0633522
Schwartz and Neas, 2000 -- 6 cities	Cough	N/A	7-14	logistic	none	0	121	0 day	3-day avg	0.0227902	0.0084573	0.0375131
Respiratory Symptoms and Illnesses -- Multi-Pollutant Models**												
Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	N/A	7-14	logistic	PM2.5	0	121	0 day	3-day avg	0.0060988	-0.0131701	0.0258768
Schwartz and Neas, 2000 -- 6 cities	Cough	N/A	7-14	logistic	PM2.5	0	121	0 day	3-day avg	0.0206893	0.0049026	0.0365837

*Used only in the sensitivity analyses of hypothetical threshold models.

**The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Appendix D. Estimated Annual Health Risks Associated with "As Is" PM Concentrations

D.1 The $PM_{2.5}$ data: Primary analysis

Exhibit D.1. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations Boston, MA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	1.8% (1.2% - 2.4%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	1.2% (0.9% - 1.5%)
	Single Pollutant Models (Cause-Specific Mortality)						
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	2.4% (-1.2% - 5.6%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	2.3% (1.3% - 3.3%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	4.9% (2.2% - 7.3%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	2.0% (0.1% - 3.8%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	1.6% (1.0% - 2.1%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	3.5% (1.6% - 5.1%)
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	1.4% (0.5% - 2.3%)
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	1.0% (0.5% - 1.5%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	1.9% (0.6% - 3.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	2.0% (1.3% - 2.8%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	2.7% (0.9% - 4.7%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	3.9% (1.4% - 6.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	5.9% (1.8% - 9.1%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	1.4% (0.8% - 2.1%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	1.7% (0.9% - 2.4%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	1.4% (0.8% - 2.1%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	0.3% (-0.5% - 1.1%)
Respiratory Symptoms* **	**Single Pollutant Models**						
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	15.1% (7.3% - 27.9%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	8.3% (-0.6% - 16.1%)
	Multi-Pollutant Models						
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	13.7% (4.2% - 27.6%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	3.9% (-6.5% - 12.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.2a. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
							Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		450 (-56 - 945)	0.8% (-0.1% - 1.7%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		491 (1 - 971)	0.9% (0.0% - 1.8%)
	Single Pollutant Models (Cause-Specific Mortality)							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		292 (30 - 547)	1.5% (0.2% - 2.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		304 (47 - 554)	1.5% (0.2% - 2.8%)
	Multi-Pollutant Models (Total Mortality)							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-447 (-1123 - 211)	-0.8% (-2.0% - 0.4%)
	Multi-Pollutant Models (Cause-Specific Mortality)							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	0 day	CO	521 (226 - 806)	2.6% (1.2% - 4.1%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	1 day	CO	269 (-37 - 564)	1.4% (-0.2% - 2.9%)

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
							Incidence	Percent of Total Incidence
Long-Term Exposure Mortality	**Single Pollutant Models**							
	Krewski et al. (2000) - ACS	All cause	30+	log-linear			2325 (1208 - 3529)	4.1% (2.2% - 6.3%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+	log-linear			2460 (1604 - 3371)	8.3% (5.4% - 11.3%)
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear			3684 (1280 - 6426)	6.6% (2.3% - 11.4%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+	log-linear			2842 (1007 - 4725)	9.5% (3.4% - 15.9%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear			450 (142 - 681)	14.1% (4.5% - 21.4%)
	Multi-Pollutant Models							
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		CO	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		NO2	4016 (2145 - 5669)	7.1% (3.8% - 10.1%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		O3	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		SO2	616 (-1085 - 2504)	1.1% (-1.9% - 4.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.2b. Estimated Annual Health Risks of Hospital Admissions Associated with "As Is" PM2.5 Concentrations
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study (4 ug/m3)**	
							Incidence	Percent of Total Incidence
Hospital Admissions	**Single Pollutant Models**							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		1627 (949 - 2291)	2.4% (1.4% - 3.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		1435 (724 - 2130)	2.1% (1.0% - 3.1%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		750 (315 - 1171)	2.5% (1.0% - 3.9%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		538 (105 - 957)	1.8% (0.4% - 3.2%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		829 (380 - 1264)	2.7% (1.3% - 4.2%)
	Multi-Pollutant Models							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	0 day	CO	407 (-466 - 1256)	0.6% (-0.7% - 1.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	1 day	CO	251 (-687 - 1161)	0.4% (-1.0% - 1.7%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	0 day	NO2	192 (-422 - 778)	0.6% (-1.4% - 2.6%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	1 day	NO2	-18 (-758 - 682)	-0.1% (-2.5% - 2.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	2 day	NO2	160 (-476 - 767)	0.5% (-1.6% - 2.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. The lowest measured level in both Moolgavkar studies in this exhibit was 4 ug/m3. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.3. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
Philadelphia, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**						
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		412 (197 - 628)	2.5% (1.2% - 3.9%)
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+			330 (171 - 504)	2.0% (1.0% - 3.0%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			296 (192 - 410)	4.0% (2.6% - 5.5%)
	Pope et al. (2002) - ACS extended	All cause	30+			650 (224 - 1146)	3.9% (1.3% - 6.9%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			424 (148 - 714)	5.7% (2.0% - 9.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			94 (29 - 144)	8.6% (2.6% - 13.2%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+		CO	480 (278 - 689)	2.9% (1.7% - 4.1%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	575 (304 - 818)	3.4% (1.8% - 4.9%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	480 (278 - 689)	2.9% (1.7% - 4.1%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	87 (-152 - 356)	0.5% (-0.9% - 2.1%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit D.4. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
Phoenix, AZ, 2001

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**						
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	2.9% (-0.8% - 6.3%)
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	5.0% (1.5% - 8.3%)
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0.2% (0.1% - 0.3%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0.4% (0.2% - 0.5%)
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	1.7% (0.6% - 3.0%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	2.5% (0.9% - 4.2%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	3.7% (1.1% - 5.8%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0.3% (0.2% - 0.4%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0.3% (0.2% - 0.5%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0.3% (0.2% - 0.4%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0.1% (-0.1% - 0.2%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.5. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
Pittsburgh, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Chock et al. (2000)	Non-accidental	<75	0 day		69 (-55 - 188)	1.4% (-1.1% - 3.7%)
	Chock et al. (2000)	Non-accidental	75+	0 day		77 (-166 - 311)	0.8% (-1.7% - 3.2%)
	Multi-Pollutant Models (Total Mortality)						
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	88 (-60 - 230)	1.7% (-1.2% - 4.5%)
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	52 (-238 - 330)	0.5% (-2.4% - 3.4%)
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+			482 (250 - 733)	3.2% (1.6% - 4.8%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			465 (302 - 640)	6.3% (4.1% - 8.7%)
	Pope et al. (2002) - ACS extended	All cause	30+			816 (282 - 1430)	5.4% (1.9% - 9.4%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			574 (202 - 960)	7.8% (2.8% - 13.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			116 (36 - 177)	11.6% (3.6% - 17.8%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+		CO	698 (406 - 998)	4.6% (2.7% - 6.6%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	835 (444 - 1183)	5.5% (2.9% - 7.8%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	698 (406 - 998)	4.6% (2.7% - 6.6%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	127 (-223 - 519)	0.8% (-1.5% - 3.4%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.6. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
San Jose, CA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	2.6% (0.5% - 4.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	1 day		-110 (-278 - 50)	-1.3% (-3.4% - 0.6%)
	Single Pollutant Models (Cause-Specific Mortality)						
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	3.7% (-3.7% - 10.2%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	2.1% (-1.5% - 5.4%)
	Multi-Pollutant Models (Total Mortality)						
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	3.3% (0.9% - 5.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	3.0% (0.7% - 5.2%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	2.8% (0.7% - 4.9%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	0.5% (0.3% - 0.8%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	1.0% (0.6% - 1.4%)
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	2.1% (0.7% - 3.6%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	3.0% (1.1% - 5.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	4.6% (1.4% - 7.1%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	0.7% (0.4% - 1.0%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	0.9% (0.5% - 1.2%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	0.7% (0.4% - 1.0%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	0.1% (-0.2% - 0.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.7. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
Seattle, WA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Long-Term Exposure Mortality***	**Single Pollutant Models**						
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	0.5% (0.2% - 0.8%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	0.7% (0.2% - 1.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	1.0% (0.3% - 1.6%)
Hospital Admissions	**Single Pollutant Models**						
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]****	Asthma	<65	1 day		30 (8 - 45)	1.9% (0.5% - 2.8%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

***The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

****Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily PM2.5 values obtained from nephelometer measurements rather than from air quality monitors.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.8. Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		233 (86 - 379)	1.1% (0.4% - 1.7%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		312 (224 - 401)	1.4% (1.0% - 1.8%)
	Single Pollutant Models (Cause-Specific Mortality)						
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		6 (-31 - 42)	0.6% (-3.2% - 4.2%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		70 (16 - 127)	1.4% (0.3% - 2.5%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		8 (-18 - 31)	1.1% (-2.7% - 4.7%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		23 (1 - 44)	2.4% (0.1% - 4.5%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		96 (59 - 132)	1.9% (1.1% - 2.6%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		28 (13 - 41)	4.1% (2.0% - 6.1%)
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - Six Cities	All cause	25+			839 (283 - 1381)	3.7% (1.2% - 6.1%)
	Krewski et al. (2000) - ACS	All cause	30+			416 (215 - 635)	1.8% (1.0% - 2.8%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			490 (165 - 794)	5.0% (1.7% - 8.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			411 (266 - 568)	3.7% (2.4% - 5.1%)
	Pope et al. (2002) - ACS extended	All cause	30+			842 (290 - 1486)	3.7% (1.3% - 6.6%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			603 (211 - 1018)	5.5% (1.9% - 9.2%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			125 (38 - 192)	8.2% (2.5% - 12.6%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+		CO	605 (350 - 868)	2.7% (1.6% - 3.8%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	725 (383 - 1032)	3.2% (1.7% - 4.6%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	605 (350 - 868)	2.7% (1.6% - 3.8%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	109 (-191 - 448)	0.5% (-0.8% - 2.0%)
Respiratory Symptoms* **	**Single Pollutant Models**						
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		10800 (4300 - 16300)	19.2% (7.7% - 28.9%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		17600 (-1300 - 34000)	10.7% (-0.8% - 20.7%)
	Multi-Pollutant Models						
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	9800 (2500 - 16100)	17.4% (4.4% - 28.6%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	8300 (-14000 - 26400)	5.1% (-8.5% - 16.0%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.9. Estimated Annual Health Risks Associated with "As Is" $PM_{10-2.5}$ Concentrations Seattle, WA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with $PM_{10-2.5}$ Above Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Hospital Admissions	**Single Pollutant Models**						
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]***	Asthma	<65	1 day		27 (0 - 65)	1.7% (0.0% - 4.1%)

*Health effects are associated with short-term exposure to $PM_{10-2.5}$ unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM coarse is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

***Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily $PM_{10-2.5}$ values obtained from nephelometer measurements rather than from air quality monitors.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

Exhibit D.10. Estimated Annual Health Risks Associated with "As Is" $PM_{10-2.5}$ Concentrations
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with $PM_{10-2.5}$ Above Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Respiratory Symptoms***	**Single Pollutant Models**						
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day		6900 (-1200 - 20800)	12.3% (-2.2% - 36.9%)
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day		27000 (11000 - 40900)	16.4% (6.7% - 24.9%)
	Multi-Pollutant Models						
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day	PM2.5	2800 (-6900 - 10300)	4.9% (-12.2% - 18.3%)
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day	PM2.5	24800 (6500 - 40100)	15.1% (4.0% - 24.4%)

*Health effects are associated with short-term exposure to $PM_{10-2.5}$ unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below background level. Average background PM coarse is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.11. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Boston, MA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						2 ug/m3		3.5 ug/m3		5 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	Single Pollutant Models (Total Mortality)										
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		455 (310 - 600)	2.1% (1.4% - 2.8%)	390 (265 - 514)	1.8% (1.2% - 2.4%)	325 (221 - 428)	1.5% (1.0% - 2.0%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		304 (218 - 390)	1.4% (1.0% - 1.8%)	261 (186 - 334)	1.2% (0.9% - 1.5%)	217 (155 - 278)	1.0% (0.7% - 1.3%)
	Single Pollutant Models (Cause-Specific Mortality)										
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		28 (-14 - 66)	2.8% (-1.4% - 6.5%)	24 (-12 - 56)	2.4% (-1.2% - 5.6%)	20 (-10 - 47)	2.0% (-1.0% - 4.6%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		92 (52 - 131)	2.7% (1.5% - 3.8%)	79 (44 - 112)	2.3% (1.3% - 3.3%)	66 (37 - 93)	1.9% (1.1% - 2.7%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		42 (19 - 62)	5.7% (2.6% - 8.5%)	36 (16 - 53)	4.9% (2.2% - 7.3%)	30 (14 - 44)	4.1% (1.9% - 6.1%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		23 (1 - 45)	2.3% (0.1% - 4.4%)	20 (1 - 38)	2.0% (0.1% - 3.8%)	17 (1 - 32)	1.6% (0.1% - 3.1%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		62 (38 - 85)	1.8% (1.1% - 2.5%)	53 (33 - 73)	1.6% (1.0% - 2.1%)	44 (27 - 61)	1.3% (0.8% - 1.8%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		30 (14 - 44)	4.0% (1.9% - 5.9%)	25 (12 - 37)	3.5% (1.6% - 5.1%)	21 (10 - 31)	2.9% (1.4% - 4.3%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						2 ug/m3		3.5 ug/m3		5 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	1.4% (0.5% - 2.3%)	313 (105 - 519)	1.4% (0.5% - 2.3%)	313 (105 - 519)	1.4% (0.5% - 2.3%)
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	1.0% (0.5% - 1.5%)	219 (113 - 335)	1.0% (0.5% - 1.5%)	219 (113 - 335)	1.0% (0.5% - 1.5%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	1.9% (0.6% - 3.1%)	157 (52 - 257)	1.9% (0.6% - 3.1%)	157 (52 - 257)	1.9% (0.6% - 3.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	2.0% (1.3% - 2.8%)	193 (124 - 268)	2.0% (1.3% - 2.8%)	193 (124 - 268)	2.0% (1.3% - 2.8%)
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	2.7% (0.9% - 4.7%)	594 (204 - 1053)	2.7% (0.9% - 4.7%)	594 (204 - 1053)	2.7% (0.9% - 4.7%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	3.9% (1.4% - 6.6%)	380 (132 - 645)	3.9% (1.4% - 6.6%)	380 (132 - 645)	3.9% (1.4% - 6.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	5.9% (1.8% - 9.1%)	91 (28 - 141)	5.9% (1.8% - 9.1%)	91 (28 - 141)	5.9% (1.8% - 9.1%)
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	1.4% (0.8% - 2.1%)	319 (184 - 459)	1.4% (0.8% - 2.1%)	319 (184 - 459)	1.4% (0.8% - 2.1%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	1.7% (0.9% - 2.4%)	382 (201 - 546)	1.7% (0.9% - 2.4%)	382 (201 - 546)	1.7% (0.9% - 2.4%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	1.4% (0.8% - 2.1%)	319 (184 - 459)	1.4% (0.8% - 2.1%)	319 (184 - 459)	1.4% (0.8% - 2.1%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	0.3% (-0.5% - 1.1%)	57 (-100 - 236)	0.3% (-0.5% - 1.1%)	57 (-100 - 236)	0.3% (-0.5% - 1.1%)
Respiratory Symptoms* **	**Single Pollutant Models**										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory	7-14	1 day		9100 (4400 - 16700)	17.4% (8.5% - 32.1%)	7900 (3800 - 14500)	15.1% (7.3% - 27.9%)	6700 (3200 - 12300)	12.8% (6.1% - 23.6%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14500 (-1100 - 28100)	9.6% (-0.7% - 18.6%)	12500 (-900 - 24300)	8.3% (-0.6% - 16.1%)	10500 (-800 - 20500)	6.9% (-0.5% - 13.5%)
	Multi-Pollutant Models										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory	7-14	1 day	PM10-2.5	8200 (2500 - 16500)	15.8% (4.8% - 31.7%)	7100 (2200 - 14300)	13.7% (4.2% - 27.6%)	6000 (1800 - 12100)	11.6% (3.5% - 23.3%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6900 (-11600 - 21800)	4.5% (-7.6% - 14.4%)	5900 (-9900 - 18900)	3.9% (-6.5% - 12.5%)	4900 (-8200 - 15800)	3.3% (-5.4% - 10.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.12a. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
							1 ug/m3		2.5 ug/m3		4 ug/m3	
							Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		450 (-56 - 945)	0.8% (-0.1% - 1.7%)	450 (-56 - 945)	0.8% (-0.1% - 1.7%)	450 (-56 - 945)	0.8% (-0.1% - 1.7%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		491 (1 - 971)	0.9% (0.0% - 1.8%)	491 (1 - 971)	0.9% (0.0% - 1.8%)	491 (1 - 971)	0.9% (0.0% - 1.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		450 (-56 - 945)	0.8% (-0.1% - 1.7%)	450 (-56 - 945)	0.8% (-0.1% - 1.7%)	450 (-56 - 945)	0.8% (-0.1% - 1.7%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		491 (1 - 971)	0.9% (0.0% - 1.8%)	491 (1 - 971)	0.9% (0.0% - 1.8%)	491 (1 - 971)	0.9% (0.0% - 1.8%)
	Single Pollutant Models (Cause-Specific Mortality)											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		292 (30 - 547)	1.5% (0.2% - 2.8%)	292 (30 - 547)	1.5% (0.2% - 2.8%)	292 (30 - 547)	1.5% (0.2% - 2.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		304 (47 - 554)	1.5% (0.2% - 2.8%)	304 (47 - 554)	1.5% (0.2% - 2.8%)	304 (47 - 554)	1.5% (0.2% - 2.8%)
	Multi-Pollutant Models (Total Mortality)											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-447 (-1123 - 211)	-0.8% (-2.0% - 0.4%)	-447 (-1123 - 211)	-0.8% (-2.0% - 0.4%)	-447 (-1123 - 211)	-0.8% (-2.0% - 0.4%)
	Multi-Pollutant Models (Cause-Specific Mortality)											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	0 day	CO	521 (226 - 806)	2.6% (1.2% - 4.1%)	521 (226 - 806)	2.6% (1.2% - 4.1%)	521 (226 - 806)	2.6% (1.2% - 4.1%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	1 day	CO	269 (-37 - 564)	1.4% (-0.2% - 2.9%)	269 (-37 - 564)	1.4% (-0.2% - 2.9%)	269 (-37 - 564)	1.4% (-0.2% - 2.9%)

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
							1 ug/m3		2.5 ug/m3		4 ug/m3	
							Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Long-Term Exposure Mortality	**Single Pollutant Models**											
	Krewski et al. (2000) - ACS	All cause	30+	log-linear			2325 (1208 - 3529)	4.1% (2.2% - 6.3%)	2325 (1208 - 3529)	4.1% (2.2% - 6.3%)	2325 (1208 - 3529)	4.1% (2.2% - 6.3%)
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear			2460 (1604 - 3371)	8.3% (5.4% - 11.3%)	2460 (1604 - 3371)	8.3% (5.4% - 11.3%)	2460 (1604 - 3371)	8.3% (5.4% - 11.3%)
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear			3684 (1280 - 6426)	6.6% (2.3% - 11.4%)	3684 (1280 - 6426)	6.6% (2.3% - 11.4%)	3684 (1280 - 6426)	6.6% (2.3% - 11.4%)
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear			2842 (1007 - 4725)	9.5% (3.4% - 15.9%)	2842 (1007 - 4725)	9.5% (3.4% - 15.9%)	2842 (1007 - 4725)	9.5% (3.4% - 15.9%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear			450 (142 - 681)	14.1% (4.5% - 21.4%)	450 (142 - 681)	14.1% (4.5% - 21.4%)	450 (142 - 681)	14.1% (4.5% - 21.4%)
	Multi-Pollutant Models											
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		CO	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		NO2	4016 (2145 - 5669)	7.1% (3.8% - 10.1%)	4016 (2145 - 5669)	7.1% (3.8% - 10.1%)	4016 (2145 - 5669)	7.1% (3.8% - 10.1%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		O3	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)	3363 (1962 - 4792)	6.0% (3.5% - 8.5%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		SO2	616 (-1085 - 2504)	1.1% (-1.9% - 4.5%)	616 (-1085 - 2504)	1.1% (-1.9% - 4.5%)	616 (-1085 - 2504)	1.1% (-1.9% - 4.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.12b. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study (4 ug/m3) or Policy Relevant Background of: **					
							1 ug/m3		2.5 ug/m3		4 ug/m3	
							Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Hospital Admissions	**Single Pollutant Models**											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		1627 (949 - 2291)	2.4% (1.4% - 3.3%)	1627 (949 - 2291)	2.4% (1.4% - 3.3%)	1627 (949 - 2291)	2.4% (1.4% - 3.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		1435 (724 - 2130)	2.1% (1.0% - 3.1%)	1435 (724 - 2130)	2.1% (1.0% - 3.1%)	1435 (724 - 2130)	2.1% (1.0% - 3.1%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		750 (315 - 1171)	2.5% (1.0% - 3.9%)	750 (315 - 1171)	2.5% (1.0% - 3.9%)	750 (315 - 1171)	2.5% (1.0% - 3.9%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		538 (105 - 957)	1.8% (0.4% - 3.2%)	538 (105 - 957)	1.8% (0.4% - 3.2%)	538 (105 - 957)	1.8% (0.4% - 3.2%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		829 (380 - 1264)	2.7% (1.3% - 4.2%)	829 (380 - 1264)	2.7% (1.3% - 4.2%)	829 (380 - 1264)	2.7% (1.3% - 4.2%)
	Multi-Pollutant Models											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	0 day	CO	407 (-466 - 1256)	0.6% (-0.7% - 1.8%)	407 (-466 - 1256)	0.6% (-0.7% - 1.8%)	407 (-466 - 1256)	0.6% (-0.7% - 1.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	1 day	CO	251 (-687 - 1161)	0.4% (-1.0% - 1.7%)	251 (-687 - 1161)	0.4% (-1.0% - 1.7%)	251 (-687 - 1161)	0.4% (-1.0% - 1.7%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	0 day	NO2	192 (-422 - 778)	0.6% (-1.4% - 2.6%)	192 (-422 - 778)	0.6% (-1.4% - 2.6%)	192 (-422 - 778)	0.6% (-1.4% - 2.6%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	1 day	NO2	-18 (-758 - 682)	-0.1% (-2.5% - 2.3%)	-18 (-758 - 682)	-0.1% (-2.5% - 2.3%)	-18 (-758 - 682)	-0.1% (-2.5% - 2.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	2 day	NO2	160 (-476 - 767)	0.5% (-1.6% - 2.5%)	160 (-476 - 767)	0.5% (-1.6% - 2.5%)	160 (-476 - 767)	0.5% (-1.6% - 2.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). The lowest measured level in both Moolgavkar studies shown in this exhibit was 4 ug/m3. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.13. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Philadelphia, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						2 ug/m3		3.5 ug/m3		5 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**										
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		469 (224 - 714)	2.9% (1.4% - 4.4%)	412 (197 - 628)	2.5% (1.2% - 3.9%)	357 (170 - 544)	2.2% (1.1% - 3.4%)
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			330 (171 - 504)	2.0% (1.0% - 3.0%)	330 (171 - 504)	2.0% (1.0% - 3.0%)	330 (171 - 504)	2.0% (1.0% - 3.0%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			296 (192 - 410)	4.0% (2.6% - 5.5%)	296 (192 - 410)	4.0% (2.6% - 5.5%)	296 (192 - 410)	4.0% (2.6% - 5.5%)
	Pope et al. (2002) - ACS extended	All cause	30+			650 (224 - 1146)	3.9% (1.3% - 6.9%)	650 (224 - 1146)	3.9% (1.3% - 6.9%)	650 (224 - 1146)	3.9% (1.3% - 6.9%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			424 (148 - 714)	5.7% (2.0% - 9.6%)	424 (148 - 714)	5.7% (2.0% - 9.6%)	424 (148 - 714)	5.7% (2.0% - 9.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			94 (29 - 144)	8.6% (2.6% - 13.2%)	94 (29 - 144)	8.6% (2.6% - 13.2%)	94 (29 - 144)	8.6% (2.6% - 13.2%)
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	480 (278 - 689)	2.9% (1.7% - 4.1%)	480 (278 - 689)	2.9% (1.7% - 4.1%)	480 (278 - 689)	2.9% (1.7% - 4.1%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	575 (304 - 818)	3.4% (1.8% - 4.9%)	575 (304 - 818)	3.4% (1.8% - 4.9%)	575 (304 - 818)	3.4% (1.8% - 4.9%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	480 (278 - 689)	2.9% (1.7% - 4.1%)	480 (278 - 689)	2.9% (1.7% - 4.1%)	480 (278 - 689)	2.9% (1.7% - 4.1%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	87 (-152 - 356)	0.5% (-0.9% - 2.1%)	87 (-152 - 356)	0.5% (-0.9% - 2.1%)	87 (-152 - 356)	0.5% (-0.9% - 2.1%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit D.14. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Phoenix, AZ, 2001

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						1 ug/m3		2.5 ug/m3		4 ug/m3	
						Incidence**	Percent of Total Incidence**	Incidence**	Percent of Total Incidence**	Incidence**	Percent of Total Incidence**
Short-Term Exposure Mortality	Single Pollutant Models (Cause-Specific Mortality)										
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		219 (-62 - 483)	3.4% (-1.0% - 7.5%)	185 (-52 - 407)	2.9% (-0.8% - 6.3%)	150 (-42 - 331)	2.3% (-0.7% - 5.1%)
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		383 (115 - 636)	5.9% (1.8% - 9.9%)	323 (97 - 536)	5.0% (1.5% - 8.3%)	262 (79 - 435)	4.1% (1.2% - 6.7%)
Long-Term Exposure Mortality	Single Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0.2% (0.1% - 0.3%)	39 (20 - 60)	0.2% (0.1% - 0.3%)	39 (20 - 60)	0.2% (0.1% - 0.3%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0.4% (0.2% - 0.5%)	37 (24 - 51)	0.4% (0.2% - 0.5%)	37 (24 - 51)	0.4% (0.2% - 0.5%)
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	1.7% (0.6% - 3.0%)	349 (119 - 620)	1.7% (0.6% - 3.0%)	349 (119 - 620)	1.7% (0.6% - 3.0%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	2.5% (0.9% - 4.2%)	237 (82 - 405)	2.5% (0.9% - 4.2%)	237 (82 - 405)	2.5% (0.9% - 4.2%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	3.7% (1.1% - 5.8%)	48 (14 - 74)	3.7% (1.1% - 5.8%)	48 (14 - 74)	3.7% (1.1% - 5.8%)
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0.3% (0.2% - 0.4%)	57 (33 - 82)	0.3% (0.2% - 0.4%)	57 (33 - 82)	0.3% (0.2% - 0.4%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0.3% (0.2% - 0.5%)	68 (36 - 98)	0.3% (0.2% - 0.5%)	68 (36 - 98)	0.3% (0.2% - 0.5%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0.3% (0.2% - 0.4%)	57 (33 - 82)	0.3% (0.2% - 0.4%)	57 (33 - 82)	0.3% (0.2% - 0.4%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0.1% (-0.1% - 0.2%)	10 (-18 - 42)	0.1% (-0.1% - 0.2%)	10 (-18 - 42)	0.1% (-0.1% - 0.2%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.15. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Pittsburgh, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						2 ug/m3		3.5 ug/m3		5 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Chock et al. (2000)	Non-accidental	<75	0 day		71 (-57 - 195)	1.4% (-1.1% - 3.8%)	69 (-55 - 188)	1.4% (-1.1% - 3.7%)	61 (-49 - 168)	1.2% (-1.0% - 3.3%)
	Chock et al. (2000)	Non-accidental	75+	0 day		80 (-172 - 322)	0.8% (-1.8% - 3.3%)	77 (-166 - 311)	0.8% (-1.7% - 3.2%)	69 (-148 - 277)	0.7% (-1.5% - 2.8%)
	Multi-Pollutant Models (Total Mortality)										
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	92 (-62 - 238)	1.8% (-1.2% - 4.7%)	88 (-60 - 230)	1.7% (-1.2% - 4.5%)	79 (-53 - 205)	1.5% (-1.0% - 4.0%)
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	54 (-247 - 342)	0.6% (-2.5% - 3.5%)	52 (-238 - 330)	0.5% (-2.4% - 3.4%)	47 (-212 - 294)	0.5% (-2.2% - 3.0%)
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			482 (250 - 733)	3.2% (1.6% - 4.8%)	482 (250 - 733)	3.2% (1.6% - 4.8%)	482 (250 - 733)	3.2% (1.6% - 4.8%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			465 (302 - 640)	6.3% (4.1% - 8.7%)	465 (302 - 640)	6.3% (4.1% - 8.7%)	465 (302 - 640)	6.3% (4.1% - 8.7%)
	Pope et al. (2002) - ACS extended	All cause	30+			816 (282 - 1430)	5.4% (1.9% - 9.4%)	816 (282 - 1430)	5.4% (1.9% - 9.4%)	816 (282 - 1430)	5.4% (1.9% - 9.4%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			574 (202 - 960)	7.8% (2.8% - 13.1%)	574 (202 - 960)	7.8% (2.8% - 13.1%)	574 (202 - 960)	7.8% (2.8% - 13.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			116 (36 - 177)	11.6% (3.6% - 17.8%)	116 (36 - 177)	11.6% (3.6% - 17.8%)	116 (36 - 177)	11.6% (3.6% - 17.8%)
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	698 (406 - 998)	4.6% (2.7% - 6.6%)	698 (406 - 998)	4.6% (2.7% - 6.6%)	698 (406 - 998)	4.6% (2.7% - 6.6%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	835 (444 - 1183)	5.5% (2.9% - 7.8%)	835 (444 - 1183)	5.5% (2.9% - 7.8%)	835 (444 - 1183)	5.5% (2.9% - 7.8%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	698 (406 - 998)	4.6% (2.7% - 6.6%)	698 (406 - 998)	4.6% (2.7% - 6.6%)	698 (406 - 998)	4.6% (2.7% - 6.6%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	127 (-223 - 519)	0.8% (-1.5% - 3.4%)	127 (-223 - 519)	0.8% (-1.5% - 3.4%)	127 (-223 - 519)	0.8% (-1.5% - 3.4%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.16. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
San Jose, CA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						1 ug/m3		2.5 ug/m3		4 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		231 (48 - 409)	2.8% (0.6% - 4.9%)	218 (45 - 387)	2.6% (0.5% - 4.7%)	181 (37 - 320)	2.2% (0.5% - 3.9%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	1 day		-117 (-295 - 53)	-1.4% (-3.6% - 0.6%)	-110 (-278 - 50)	-1.3% (-3.4% - 0.6%)	-91 (-230 - 41)	-1.1% (-2.8% - 0.5%)
	Single Pollutant Models (Cause-Specific Mortality)										
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		34 (-34 - 93)	3.9% (-3.9% - 10.8%)	32 (-32 - 88)	3.7% (-3.7% - 10.2%)	26 (-26 - 73)	3.1% (-3.0% - 8.4%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		76 (-53 - 199)	2.2% (-1.5% - 5.7%)	72 (-50 - 188)	2.1% (-1.5% - 5.4%)	60 (-42 - 155)	1.7% (-1.2% - 4.5%)
	Multi-Pollutant Models (Total Mortality)										
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	293 (79 - 499)	3.5% (1.0% - 6.0%)	277 (74 - 472)	3.3% (0.9% - 5.7%)	229 (62 - 390)	2.8% (0.7% - 4.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	266 (63 - 457)	3.2% (0.8% - 5.5%)	251 (60 - 432)	3.0% (0.7% - 5.2%)	208 (49 - 357)	2.5% (0.6% - 4.3%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	250 (63 - 428)	3.0% (0.8% - 5.2%)	236 (60 - 404)	2.8% (0.7% - 4.9%)	195 (49 - 335)	2.4% (0.6% - 4.0%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						1 ug/m3		2.5 ug/m3		4 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	0.5% (0.3% - 0.8%)	41 (21 - 63)	0.5% (0.3% - 0.8%)	41 (21 - 63)	0.5% (0.3% - 0.8%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	1.0% (0.6% - 1.4%)	41 (27 - 57)	1.0% (0.6% - 1.4%)	41 (27 - 57)	1.0% (0.6% - 1.4%)
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	2.1% (0.7% - 3.6%)	172 (59 - 306)	2.1% (0.7% - 3.6%)	172 (59 - 306)	2.1% (0.7% - 3.6%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	3.0% (1.1% - 5.1%)	125 (43 - 213)	3.0% (1.1% - 5.1%)	125 (43 - 213)	3.0% (1.1% - 5.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	4.6% (1.4% - 7.1%)	23 (7 - 35)	4.6% (1.4% - 7.1%)	23 (7 - 35)	4.6% (1.4% - 7.1%)
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	0.7% (0.4% - 1.0%)	60 (34 - 86)	0.7% (0.4% - 1.0%)	60 (34 - 86)	0.7% (0.4% - 1.0%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	0.9% (0.5% - 1.2%)	72 (38 - 103)	0.9% (0.5% - 1.2%)	72 (38 - 103)	0.9% (0.5% - 1.2%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	0.7% (0.4% - 1.0%)	60 (34 - 86)	0.7% (0.4% - 1.0%)	60 (34 - 86)	0.7% (0.4% - 1.0%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	0.1% (-0.2% - 0.5%)	11 (-19 - 44)	0.1% (-0.2% - 0.5%)	11 (-19 - 44)	0.1% (-0.2% - 0.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.17. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
Seattle, WA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						1 ug/m3		2.5 ug/m3		4 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Long-Term Exposure Mortality***	Single Pollutant Models										
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	0.5% (0.2% - 0.8%)	50 (17 - 89)	0.5% (0.2% - 0.8%)	50 (17 - 89)	0.5% (0.2% - 0.8%)
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+			33 (11 - 57)	0.7% (0.2% - 1.1%)	33 (11 - 57)	0.7% (0.2% - 1.1%)	33 (11 - 57)	0.7% (0.2% - 1.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	1.0% (0.3% - 1.6%)	8 (2 - 12)	1.0% (0.3% - 1.6%)	8 (2 - 12)	1.0% (0.3% - 1.6%)
Hospital Admission	Single Pollutant Models										
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]****	Asthma	<65	1 day		30 (8 - 45)	1.9% (0.5% - 2.8%)	30 (8 - 45)	1.9% (0.5% - 2.8%)	23 (6 - 34)	1.4% (0.4% - 2.1%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

***The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

****Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily PM2.5 values obtained from nephelometer measurements rather than from air quality monitors.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.18. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{2.5}$ Concentrations, Using Different Policy Relevant Background Levels
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						2 ug/m3		3.5 ug/m3		5 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		266 (98 - 433)	1.2% (0.5% - 2.0%)	233 (86 - 379)	1.1% (0.4% - 1.7%)	200 (74 - 326)	0.9% (0.3% - 1.5%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		357 (255 - 457)	1.6% (1.2% - 2.1%)	312 (224 - 401)	1.4% (1.0% - 1.8%)	268 (192 - 344)	1.2% (0.9% - 1.6%)
	Single Pollutant Models (Cause-Specific Mortality)										
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		7 (-36 - 47)	0.7% (-3.6% - 4.8%)	6 (-31 - 42)	0.6% (-3.2% - 4.2%)	5 (-27 - 36)	0.5% (-2.7% - 3.6%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		80 (19 - 145)	1.5% (0.4% - 2.8%)	70 (16 - 127)	1.4% (0.3% - 2.5%)	60 (14 - 109)	1.2% (0.3% - 2.1%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		9 (-21 - 36)	1.3% (-3.1% - 5.3%)	8 (-18 - 31)	1.1% (-2.7% - 4.7%)	7 (-16 - 27)	1.0% (-2.3% - 4.0%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		27 (1 - 51)	2.7% (0.1% - 5.1%)	23 (1 - 44)	2.4% (0.1% - 4.5%)	20 (1 - 38)	2.0% (0.1% - 3.9%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		110 (68 - 151)	2.1% (1.3% - 2.9%)	96 (59 - 132)	1.9% (1.1% - 2.6%)	83 (51 - 114)	1.6% (1.0% - 2.2%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		31 (15 - 46)	4.7% (2.2% - 6.9%)	28 (13 - 41)	4.1% (2.0% - 6.1%)	24 (11 - 35)	3.5% (1.7% - 5.2%)
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - Six Cities	All cause	25+			839 (283 - 1381)	3.7% (1.2% - 6.1%)	839 (283 - 1381)	3.7% (1.2% - 6.1%)	839 (283 - 1381)	3.7% (1.2% - 6.1%)
	Krewski et al. (2000) - ACS	All cause	30+			416 (215 - 635)	1.8% (1.0% - 2.8%)	416 (215 - 635)	1.8% (1.0% - 2.8%)	416 (215 - 635)	1.8% (1.0% - 2.8%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			490 (165 - 794)	5.0% (1.7% - 8.1%)	490 (165 - 794)	5.0% (1.7% - 8.1%)	490 (165 - 794)	5.0% (1.7% - 8.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			411 (266 - 568)	3.7% (2.4% - 5.1%)	411 (266 - 568)	3.7% (2.4% - 5.1%)	411 (266 - 568)	3.7% (2.4% - 5.1%)
	Pope et al. (2002) - ACS extended	All cause	30+			842 (290 - 1486)	3.7% (1.3% - 6.6%)	842 (290 - 1486)	3.7% (1.3% - 6.6%)	842 (290 - 1486)	3.7% (1.3% - 6.6%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			603 (211 - 1018)	5.5% (1.9% - 9.2%)	603 (211 - 1018)	5.5% (1.9% - 9.2%)	603 (211 - 1018)	5.5% (1.9% - 9.2%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			125 (38 - 192)	8.2% (2.5% - 12.6%)	125 (38 - 192)	8.2% (2.5% - 12.6%)	125 (38 - 192)	8.2% (2.5% - 12.6%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Policy Relevant Background of: **					
						2 ug/m3		3.5 ug/m3		5 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	605 (350 - 868)	2.7% (1.6% - 3.8%)	605 (350 - 868)	2.7% (1.6% - 3.8%)	605 (350 - 868)	2.7% (1.6% - 3.8%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	725 (383 - 1032)	3.2% (1.7% - 4.6%)	725 (383 - 1032)	3.2% (1.7% - 4.6%)	725 (383 - 1032)	3.2% (1.7% - 4.6%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	605 (350 - 868)	2.7% (1.6% - 3.8%)	605 (350 - 868)	2.7% (1.6% - 3.8%)	605 (350 - 868)	2.7% (1.6% - 3.8%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	109 (-191 - 448)	0.5% (-0.8% - 2.0%)	109 (-191 - 448)	0.5% (-0.8% - 2.0%)	109 (-191 - 448)	0.5% (-0.8% - 2.0%)
Respiratory Symptoms* **	**Single Pollutant Models**										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		12100 (4900 - 18100)	21.4% (8.6% - 32.1%)	10800 (4300 - 16300)	19.2% (7.7% - 28.9%)	9500 (3800 - 14400)	16.9% (6.7% - 25.6%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		19700 (-1400 - 37900)	12.0% (-0.9% - 23.0%)	17600 (-1300 - 34000)	10.7% (-0.8% - 20.7%)	15400 (-1100 - 29900)	9.4% (-0.7% - 18.2%)
	Multi-Pollutant Models										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	11000 (2800 - 17900)	19.4% (4.9% - 31.7%)	9800 (2500 - 16100)	17.4% (4.4% - 28.6%)	8600 (2200 - 14300)	15.3% (3.8% - 25.3%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	9400 (-15900 - 29500	5.7% (-9.7% - 18.0%)	8300 (-14000 - 26400	5.1% (-8.5% - 16.0%)	7200 (-12100 - 23200	4.4% (-7.4% - 14.1%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East (with a range from 2.0 to 5.0 ug/m3) and 2.5 ug/m3 in the West (with a range from 1.0 to 4.0 ug/m3). Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.19. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
Boston, MA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***			
						BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
Short-Term Exposure Mortality	Single Pollutant Models (Total Mortality)								
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		1.8% (1.2% - 2.4%)	0.8% (0.5% - 1.1%)	0.4% (0.3% - 0.5%)	0.2% (0.1% - 0.2%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		1.2% (0.9% - 1.5%)	0.5% (0.4% - 0.6%)	0.2% (0.2% - 0.3%)	0.1% (0.1% - 0.1%)
Long-Term Exposure Mortality						BASE CASE: Lowest Measured Level in Study****	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	
	Single Pollutant Models								
	Krewski et al. (2000) - Six Cities	All cause	25+			1.4% (0.5% - 2.3%)	1.3% (0.4% - 2.2%)	0.2% (0.1% - 0.3%)	
	Krewski et al. (2000) - ACS	All cause	30+			1.0% (0.5% - 1.5%)	1.0% (0.5% - 1.5%)	0.1% (0.0% - 0.1%)	
	Pope et al. (2002) - ACS extended	All cause	30+			2.7% (0.9% - 4.7%)	1.4% (0.5% - 2.5%)	0.1% (0.0% - 0.2%)	

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***			
						BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	1.4% (0.8% - 2.1%)	1.4% (0.8% - 2.1%)	0.1% (0.1% - 0.1%)	
	Krewski et al. (2000) - ACS	All cause	30+		NO2	1.7% (0.9% - 2.4%)	1.7% (0.9% - 2.4%)	0.1% (0.1% - 0.2%)	
	Krewski et al. (2000) - ACS	All cause	30+		O3	1.4% (0.8% - 2.1%)	1.4% (0.8% - 2.1%)	0.1% (0.1% - 0.1%)	
	Krewski et al. (2000) - ACS	All cause	30+		SO2	0.3% (-0.5% - 1.1%)	0.3% (-0.5% - 1.1%)	0.0% (0.0% - 0.1%)	

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.

****The lowest measured levels in Krewski et al. (2000) - Six Cities, Krewski et al. (2000) - ACS, and Pope et al. (2002) - ACS extended are 11, 10 and 7.5 ug/m3, respectively.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.20. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***			
							BASE CASE: Lowest Measured Level in Study =4 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		0.8% (-0.1% - 1.7%)	0.6% (-0.1% - 1.2%)	0.4% (-0.1% - 0.8%)	0.3% (0.0% - 0.6%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		0.9% (0.0% - 1.8%)	0.6% (0.0% - 1.2%)	0.4% (0.0% - 0.8%)	0.3% (0.0% - 0.6%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		0.8% (-0.1% - 1.7%)	0.6% (-0.1% - 1.2%)	0.4% (-0.1% - 0.8%)	0.3% (0.0% - 0.6%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		0.9% (0.0% - 1.8%)	0.6% (0.0% - 1.2%)	0.4% (0.0% - 0.8%)	0.3% (0.0% - 0.6%)
	Multi-Pollutant Models (Total Mortality)									
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-0.8% (-2.0% - 0.4%)	-0.6% (-1.4% - 0.3%)	-0.4% (-1.0% - 0.2%)	-0.3% (-0.7% - 0.1%)
Long-Term Exposure Mortality							BASE CASE: Lowest Measured Level in Study****	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	
	Single Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+	log-linear			4.1% (2.2% - 6.3%)	4.1% (2.2% - 6.3%)	3.5% (1.8% - 5.3%)	
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear			6.6% (2.3% - 11.4%)	5.8% (2.0% - 10.2%)	5.1% (1.8% - 8.9%)	
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		CO	6.0% (3.5% - 8.5%)	6.0% (3.5% - 8.5%)	5.1% (2.9% - 7.2%)	
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		NO2	7.1% (3.8% - 10.1%)	7.1% (3.8% - 10.1%)	6.0% (3.2% - 8.6%)	
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		O3	6.0% (3.5% - 8.5%)	6.0% (3.5% - 8.5%)	5.1% (2.9% - 7.2%)	
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		SO2	1.1% (-1.9% - 4.5%)	1.1% (-1.9% - 4.5%)	0.9% (-1.6% - 3.8%)	

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.

****The lowest measured levels in Krewski et al. (2000) - ACS and Pope et al. (2002) - ACS extended are 10 ug/m3 and 7.5 ug/m3, respectively.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.21. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***		
						BASE CASE: Lowest Measured Level in Study****	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
Long-Term Exposure Mortality	**Single Pollutant Models**							
	Krewski et al. (2000) - ACS	All cause	30+			2.0% (1.0% - 3.0%)	2.0% (1.0% - 3.0%)	1.2% (0.6% - 1.8%)
	Pope et al. (2002) - ACS extended	All cause	30+			3.9% (1.3% - 6.9%)	2.8% (1.0% - 4.9%)	1.7% (0.6% - 3.0%)
	Multi-Pollutant Models							
	Krewski et al. (2000) - ACS	All cause	30+		CO	2.9% (1.7% - 4.1%)	2.9% (1.7% - 4.1%)	1.7% (1.0% - 2.4%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	3.4% (1.8% - 4.9%)	3.4% (1.8% - 4.9%)	2.0% (1.1% - 2.9%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	2.9% (1.7% - 4.1%)	2.9% (1.7% - 4.1%)	1.7% (1.0% - 2.4%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	0.5% (-0.9% - 2.1%)	0.5% (-0.9% - 2.1%)	0.3% (-0.5% - 1.2%)

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.

****The lowest measured levels in Krewski et al. (2000) - ACS and Pope et al. (2002) - ACS extended are 10 ug/m3 and 7.5 ug/m3, respectively.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.22. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
Phoenix, AZ, 2001

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***		
						BASE CASE: Lowest Measured Level in Study****	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
Long-Term Exposure Mortality	**Single Pollutant Models**							
	Krewski et al. (2000) - ACS	All cause	30+			0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.3%)	0.0% (0.0% - 0.0%)
	Pope et al. (2002) - ACS extended	All cause	30+			1.7% (0.6% - 3.0%)	0.3% (0.1% - 0.5%)	0.0% (0.0% - 0.0%)
	Multi-Pollutant Models							
	Krewski et al. (2000) - ACS	All cause	30+		CO	0.3% (0.2% - 0.4%)	0.3% (0.2% - 0.4%)	0.0% (0.0% - 0.0%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	0.3% (0.2% - 0.5%)	0.3% (0.2% - 0.5%)	0.0% (0.0% - 0.0%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	0.3% (0.2% - 0.4%)	0.3% (0.2% - 0.4%)	0.0% (0.0% - 0.0%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	0.1% (-0.1% - 0.2%)	0.1% (-0.1% - 0.2%)	0.0% (0.0% - 0.0%)

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.

****The lowest measured levels in Krewski et al. (2000) - ACS and Pope et al. (2002) - ACS extended are 10 ug/m3 and 7.5 ug/m3, respectively.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.23. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***			
						BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Chock et al. (2000)	Non-accidental	<75	0 day		1.4% (-1.1% - 3.7%)	0.8% (-0.7% - 2.3%)	0.5% (-0.4% - 1.5%)	0.4% (-0.3% - 1.0%)
	Chock et al. (2000)	Non-accidental	75+	0 day		0.8% (-1.7% - 3.2%)	0.5% (-1.1% - 2.0%)	0.3% (-0.7% - 1.3%)	0.2% (-0.4% - 0.8%)
	Multi-Pollutant Models (Total Mortality)								
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	1.7% (-1.2% - 4.5%)	1.1% (-0.7% - 2.8%)	0.7% (-0.5% - 1.8%)	0.5% (-0.3% - 1.2%)
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	0.5% (-2.4% - 3.4%)	0.3% (-1.5% - 2.1%)	0.2% (-1.0% - 1.4%)	0.1% (-0.6% - 0.9%)
Long-Term Exposure Mortality						BASE CASE: Lowest Measured Level in Study****	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	
	Single Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+			3.2% (1.6% - 4.8%)	3.2% (1.6% - 4.8%)	2.4% (1.3% - 3.7%)	
	Pope et al. (2002) - ACS extended	All cause	30+			5.4% (1.9% - 9.4%)	4.5% (1.5% - 7.8%)	3.5% (1.2% - 6.2%)	
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	4.6% (2.7% - 6.6%)	4.6% (2.7% - 6.6%)	3.5% (2.1% - 5.1%)	
	Krewski et al. (2000) - ACS	All cause	30+		NO2	5.5% (2.9% - 7.8%)	5.5% (2.9% - 7.8%)	4.2% (2.2% - 6.0%)	
	Krewski et al. (2000) - ACS	All cause	30+		O3	4.6% (2.7% - 6.6%)	4.6% (2.7% - 6.6%)	3.5% (2.1% - 5.1%)	
	Krewski et al. (2000) - ACS	All cause	30+		SO2	0.8% (-1.5% - 3.4%)	0.8% (-1.5% - 3.4%)	0.6% (-1.1% - 2.6%)	

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.
***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.
****The lowest measured levels in Krewski et al. (2000) - ACS and Pope et al. (2002) - ACS extended are 10 ug/m3 and 7.5 ug/m3, respectively.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.24. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
San Jose, CA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***			
						BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		2.6% (0.5% - 4.7%)	1.0% (0.2% - 1.7%)	0.5% (0.1% - 0.9%)	0.3% (0.1% - 0.6%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	1 day		-1.3% (-3.4% - 0.6%)	-0.5% (-1.2% - 0.2%)	-0.3% (-0.7% - 0.1%)	-0.2% (-0.4% - 0.1%)
	Multi-Pollutant Models (Total Mortality)								
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	3.3% (0.9% - 5.7%)	1.2% (0.3% - 2.1%)	0.7% (0.2% - 1.1%)	0.4% (0.1% - 0.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	3.0% (0.7% - 5.2%)	1.1% (0.3% - 1.9%)	0.6% (0.2% - 1.0%)	0.4% (0.1% - 0.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	2.8% (0.7% - 4.9%)	1.0% (0.3% - 1.8%)	0.6% (0.2% - 1.0%)	0.4% (0.1% - 0.6%)
Long-Term Exposure Mortality						**BASE CASE: Lowest Measured Level in Study******	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**	
	Single Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+			0.5% (0.3% - 0.8%)	0.5% (0.3% - 0.8%)	0.0% (0.0% - 0.0%)	
	Pope et al. (2002) - ACS extended	All cause	30+			2.1% (0.7% - 3.6%)	0.7% (0.2% - 1.2%)	0.0% (0.0% - 0.0%)	
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	0.7% (0.4% - 1.0%)	0.7% (0.4% - 1.0%)	0.0% (0.0% - 0.0%)	
	Krewski et al. (2000) - ACS	All cause	30+		NO2	0.9% (0.5% - 1.2%)	0.9% (0.5% - 1.2%)	0.0% (0.0% - 0.0%)	
	Krewski et al. (2000) - ACS	All cause	30+		O3	0.7% (0.4% - 1.0%)	0.7% (0.4% - 1.0%)	0.0% (0.0% - 0.0%)	
	Krewski et al. (2000) - ACS	All cause	30+		SO2	0.1% (-0.2% - 0.5%)	0.1% (-0.2% - 0.5%)	0.0% (0.0% - 0.0%)	

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.
***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.
****The lowest measured levels in Krewski et al. (2000) - ACS and Pope et al. (2002) - ACS extended are 10 ug/m3 and 7.5 ug/m3, respectively.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.25. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*
Seattle, WA, 2003

Health Effects	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5**		
						BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
Long-Term Exposure Mortality	Single Pollutant Models							
	Pope et al. (2002) - ACS extended	All cause	30+			0.5% (0.2% - 0.8%)	0.0% (0.0% - 0.0%)	0.0% (0.0% - 0.0%)

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit D.26. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations, in the Base Case and Using Alternative Hypothetical Threshold Models*

St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	Percent of Total Incidence Associated with PM-2.5***			
						BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		1.1% (0.4% - 1.7%)	0.5% (0.2% - 0.8%)	0.3% (0.1% - 0.4%)	0.1% (0.0% - 0.2%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		1.4% (1.0% - 1.8%)	0.7% (0.5% - 0.9%)	0.3% (0.2% - 0.4%)	0.1% (0.1% - 0.2%)
Long-Term Exposure Mortality						BASE CASE: Lowest Measured Level in Study****	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	
	Single Pollutant Models								
	Krewski et al. (2000) - Six Cities	All cause	25+			3.7% (1.2% - 6.1%)	3.5% (1.2% - 5.8%)	2.6% (0.9% - 4.3%)	
	Krewski et al. (2000) - ACS	All cause	30+			1.8% (1.0% - 2.8%)	1.8% (1.0% - 2.8%)	1.0% (0.5% - 1.5%)	
	Pope et al. (2002) - ACS extended	All cause	30+			3.7% (1.3% - 6.6%)	2.6% (0.9% - 4.6%)	1.5% (0.5% - 2.6%)	
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	2.7% (1.6% - 3.8%)	2.7% (1.6% - 3.8%)	1.5% (0.8% - 2.1%)	
	Krewski et al. (2000) - ACS	All cause	30+		NO2	3.2% (1.7% - 4.6%)	3.2% (1.7% - 4.6%)	1.8% (0.9% - 2.5%)	
	Krewski et al. (2000) - ACS	All cause	30+		O3	2.7% (1.6% - 3.8%)	2.7% (1.6% - 3.8%)	1.5% (0.8% - 2.1%)	
	Krewski et al. (2000) - ACS	All cause	30+		SO2	0.5% (-0.8% - 2.0%)	0.5% (-0.8% - 2.0%)	0.3% (-0.5% - 1.1%)	

*This sensitivity analysis was performed only for those studies which reported highest measured levels in the study. See text for an explanation of the slope adjustment method.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Percents are rounded to the nearest tenth.

****The lowest measured levels in Krewski et al. (2000) - Six Cities, Krewski et al. (2000) - ACS, and Pope et al. (2002) - ACS extended are 11, 10 and 7.5 ug/m3, respectively.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.27. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations With Adjustments for the Estimated Increases in Incidence if Distributed Lag Models Had Been Estimated Boston, MA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM-2.5 Above Policy Relevant Background:**			
						Single Lag		Adjusted for Distributed Lag	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	Single Pollutant Models (Total Mortality)								
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	1.8% (1.2% - 2.4%)	761 (519 - 999)	3.5% (2.4% - 4.6%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	1.2% (0.9% - 1.5%)	511 (367 - 654)	2.4% (1.7% - 3.0%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.28. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations With Adjustments for the Estimated Increases in Incidence if Distributed Lag Models Had Been Estimated Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study (4 ug/m3)**			
							Single Lag		Adjusted for Distributed Lag	
							Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		450 (-56 - 945)	0.8% (-0.1% - 1.7%)	884 (-111 - 1846)	1.6% (-0.2% - 3.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		491 (1 - 971)	0.9% (0.0% - 1.8%)	965 (3 - 1895)	1.7% (0.0% - 3.4%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		450 (-56 - 945)	0.8% (-0.1% - 1.7%)	884 (-111 - 1846)	1.6% (-0.2% - 3.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		491 (1 - 971)	0.9% (0.0% - 1.8%)	965 (3 - 1895)	1.7% (0.0% - 3.4%)
	Multi-Pollutant Models (Total Mortality)									
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-447 (-1123 - 211)	-0.8% (-2.0% - 0.4%)	-891 (-2259 - 416)	-1.6% (-4.1% - 0.8%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.29. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations With Adjustments for the Estimated Increases in Incidence if Distributed Lag Models Had Been Estimated
Pittsburgh, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Policy Relevant Background**			
						Single Lag		Adjusted for Distributed Lag	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Chock et al. (2000)	Non-accidental	<75	0 day		69 (-55 - 188)	1.4% (-1.1% - 3.7%)	135 (-109 - 361)	2.6% (-2.1% - 7.1%)
	Chock et al. (2000)	Non-accidental	75+	0 day		77 (-166 - 311)	0.8% (-1.7% - 3.2%)	151 (-332 - 600)	1.6% (-3.4% - 6.2%)
	Multi-Pollutant Models (Total Mortality)								
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	88 (-60 - 230)	1.7% (-1.2% - 4.5%)	172 (-119 - 439)	3.4% (-2.3% - 8.6%)
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	52 (-238 - 330)	0.5% (-2.4% - 3.4%)	103 (-480 - 635)	1.1% (-4.9% - 6.5%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. The lowest measured level in Chock et al. (2000) was 3 ug/m3. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.30. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations With Adjustments for the Estimated Increases in Incidence if Distributed Lag Models Had Been Estimated San Jose, CA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Policy Relevant Background**			
						Single Lag		Adjusted for Distributed Lag	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	2.6% (0.5% - 4.7%)	422 (89 - 736)	5.1% (1.1% - 8.9%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	1 day		-110 (-278 - 50)	-1.3% (-3.4% - 0.6%)	-221 (-567 - 98)	-2.7% (-6.8% - 1.2%)
	Multi-Pollutant Models (Total Mortality)								
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	3.3% (0.9% - 5.7%)	533 (146 - 890)	6.4% (1.8% - 10.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	3.0% (0.7% - 5.2%)	485 (118 - 818)	5.8% (1.4% - 9.8%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	2.8% (0.7% - 4.9%)	456 (118 - 768)	5.5% (1.4% - 9.3%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. The lowest measured level in Fairley (2003) was 2 ug/m3. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.31. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations With Adjustments for the Estimated Increases in Incidence if Distributed Lag Models Had Been Estimated
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Ppolicy Relevant Background**			
						Single Lag		Adjusted for Distributed Lag	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	Single Pollutant Models (Total Mortality)								
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		230 (90 - 380)	1.1% (0.4% - 1.7%)	460 (170 - 740)	2.1% (0.8% - 3.4%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		310 (220 - 400)	1.4% (1.0% - 1.8%)	610 (440 - 780)	2.8% (2.0% - 3.6%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.32. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
Boston, MA, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
	Single Pollutant Models						
Long-Term Exposure Mortality	Krewski et al. (2000) - Six Cities	All cause	25+		1.4% (0.5% - 2.3%)	0.9% (0.3% - 1.5%)	0.7% (0.2% - 1.2%)
	Krewski et al. (2000) - ACS	All cause	30+		1.0% (0.5% - 1.5%)	0.7% (0.3% - 1.0%)	0.5% (0.3% - 0.8%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+		1.9% (0.6% - 3.1%)	1.3% (0.4% - 2.1%)	1.0% (0.3% - 1.6%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		2.0% (1.3% - 2.8%)	1.3% (0.9% - 1.8%)	1.0% (0.6% - 1.4%)
	Pope et al. (2002) - ACS extended	All cause	30+		2.7% (0.9% - 4.7%)	1.8% (0.6% - 3.2%)	1.3% (0.5% - 2.4%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		3.9% (1.4% - 6.6%)	2.6% (0.9% - 4.5%)	2.0% (0.7% - 3.4%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		5.9% (1.8% - 9.1%)	4.0% (1.2% - 6.2%)	3.0% (0.9% - 4.7%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	1.4% (0.8% - 2.1%)	1.0% (0.6% - 1.4%)	0.7% (0.4% - 1.0%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	1.7% (0.9% - 2.4%)	1.1% (0.6% - 1.6%)	0.9% (0.5% - 1.2%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	1.4% (0.8% - 2.1%)	1.0% (0.6% - 1.4%)	0.7% (0.4% - 1.0%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	0.3% (-0.5% - 1.1%)	0.2% (-0.3% - 0.7%)	0.1% (-0.2% - 0.5%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.33. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
Los Angeles, CA, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+		4.1% (2.2% - 6.3%)	2.8% (1.4% - 4.2%)	2.1% (1.1% - 3.2%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		8.3% (5.4% - 11.3%)	5.6% (3.6% - 7.7%)	4.2% (2.7% - 5.8%)
	Pope et al. (2002) - ACS extended	All cause	30+		6.6% (2.3% - 11.4%)	4.4% (1.5% - 7.8%)	3.3% (1.2% - 5.9%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		9.5% (3.4% - 15.9%)	6.5% (2.3% - 10.9%)	4.9% (1.7% - 8.3%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		14.1% (4.5% - 21.4%)	9.7% (3.0% - 14.8%)	7.3% (2.3% - 11.3%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	6.0% (3.5% - 8.5%)	4.0% (2.3% - 5.8%)	3.0% (1.8% - 4.4%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	7.1% (3.8% - 10.1%)	4.8% (2.6% - 6.8%)	3.6% (1.9% - 5.2%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	6.0% (3.5% - 8.5%)	4.0% (2.3% - 5.8%)	3.0% (1.8% - 4.4%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	1.1% (-1.9% - 4.5%)	0.7% (-1.3% - 3.0%)	0.6% (-1.0% - 2.3%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest 10; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.34. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
Philadelphia, PA, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+		2.0% (1.0% - 3.0%)	1.3% (0.7% - 2.0%)	1.0% (0.5% - 1.5%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		4.0% (2.6% - 5.5%)	2.7% (1.7% - 3.7%)	2.0% (1.3% - 2.8%)
	Pope et al. (2002) - ACS extended	All cause	30+		3.9% (1.3% - 6.9%)	2.6% (0.9% - 4.6%)	2.0% (0.7% - 3.5%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		5.7% (2.0% - 9.6%)	3.8% (1.3% - 6.5%)	2.9% (1.0% - 4.9%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		8.6% (2.6% - 13.2%)	5.8% (1.8% - 9.0%)	4.4% (1.3% - 6.8%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	2.9% (1.7% - 4.1%)	1.9% (1.1% - 2.8%)	1.5% (0.8% - 2.1%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	3.4% (1.8% - 4.9%)	2.3% (1.2% - 3.3%)	1.7% (0.9% - 2.5%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	2.9% (1.7% - 4.1%)	1.9% (1.1% - 2.8%)	1.5% (0.8% - 2.1%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	0.5% (-0.9% - 2.1%)	0.4% (-0.6% - 1.4%)	0.3% (-0.5% - 1.1%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.35. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
Phoenix, AZ, 2001

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming Relevant AQ 50% higher	Assuming Relevant AQ Twice as High
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+		0.2% (0.1% - 0.3%)	0.1% (0.1% - 0.2%)	0.1% (0.1% - 0.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		0.4% (0.2% - 0.5%)	0.3% (0.2% - 0.4%)	0.2% (0.1% - 0.3%)
	Pope et al. (2002) - ACS extended	All cause	30+		1.7% (0.6% - 3.0%)	1.1% (0.4% - 2.0%)	0.8% (0.3% - 1.5%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		2.5% (0.9% - 4.2%)	1.7% (0.6% - 2.8%)	1.2% (0.4% - 2.1%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		3.7% (1.1% - 5.8%)	2.5% (0.8% - 3.9%)	1.9% (0.6% - 3.0%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	0.3% (0.2% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0.1% - 0.2%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	0.3% (0.2% - 0.5%)	0.2% (0.1% - 0.3%)	0.2% (0.1% - 0.2%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	0.3% (0.2% - 0.4%)	0.2% (0.1% - 0.3%)	0.1% (0.1% - 0.2%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	0.1% (-0.1% - 0.2%)	0.0% (-0.1% - 0.1%)	0.0% (0.0% - 0.1%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.36. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
Pittsburgh, PA, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+		3.2% (1.6% - 4.8%)	2.1% (1.1% - 3.2%)	1.6% (0.8% - 2.4%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		6.3% (4.1% - 8.7%)	4.3% (2.8% - 5.9%)	3.2% (2.1% - 4.5%)
	Pope et al. (2002) - ACS extended	All cause	30+		5.4% (1.9% - 9.4%)	3.6% (1.2% - 6.4%)	2.7% (0.9% - 4.8%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		7.8% (2.8% - 13.1%)	5.3% (1.8% - 8.9%)	4.0% (1.4% - 6.8%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		11.6% (3.6% - 17.8%)	7.9% (2.4% - 12.2%)	6.0% (1.8% - 9.3%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	4.6% (2.7% - 6.6%)	3.1% (1.8% - 4.4%)	2.3% (1.3% - 3.3%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	5.5% (2.9% - 7.8%)	3.7% (2.0% - 5.2%)	2.8% (1.5% - 4.0%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	4.6% (2.7% - 6.6%)	3.1% (1.8% - 4.4%)	2.3% (1.3% - 3.3%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	0.8% (-1.5% - 3.4%)	0.6% (-1.0% - 2.3%)	0.4% (-0.7% - 1.7%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.37. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
San Jose, CA, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - ACS	All cause	30+		0.5% (0.3% - 0.8%)	0.3% (0.2% - 0.5%)	0.2% (0.1% - 0.4%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		1.0% (0.6% - 1.4%)	0.7% (0.4% - 0.9%)	0.5% (0.3% - 0.7%)
	Pope et al. (2002) - ACS extended	All cause	30+		2.1% (0.7% - 3.6%)	1.4% (0.5% - 2.4%)	1.0% (0.4% - 1.8%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		3.0% (1.1% - 5.1%)	2.0% (0.7% - 3.5%)	1.5% (0.5% - 2.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		4.6% (1.4% - 7.1%)	3.1% (0.9% - 4.8%)	2.3% (0.7% - 3.6%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	0.7% (0.4% - 1.0%)	0.5% (0.3% - 0.7%)	0.4% (0.2% - 0.5%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	0.9% (0.5% - 1.2%)	0.6% (0.3% - 0.8%)	0.4% (0.2% - 0.6%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	0.7% (0.4% - 1.0%)	0.5% (0.3% - 0.7%)	0.4% (0.2% - 0.5%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	0.1% (-0.2% - 0.5%)	0.1% (-0.2% - 0.4%)	0.1% (-0.1% - 0.3%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.38. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
Seattle, WA, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
Long-Term Exposure Mortality**	Single Pollutant Models						
	Pope et al. (2002) - ACS extended	All cause	30+		0.5% (0.2% - 0.8%)	0.3% (0.1% - 0.5%)	0.2% (0.1% - 0.4%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		0.7% (0.2% - 1.1%)	0.4% (0.2% - 0.8%)	0.3% (0.1% - 0.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		1.0% (0.3% - 1.6%)	0.7% (0.2% - 1.1%)	0.5% (0.2% - 0.8%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

**Results for the long-term exposure mortality studies are all zero for Seattle because the PM2.5 annual mean for 2002 for Seattle is below the studies' minimum observed levels for PM2.5. In this PM risk assessment, long-term health effects are calculated only for PM2.5 annual means above a study's minimum observed level.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit D.39. Sensitivity Analysis: The Effect of Assumptions About Historical Air Quality on Estimates of Long-Term Exposure Mortality Associated with "As Is" $PM_{2.5}$ Concentrations
St. Louis, MO, 2003

Health Effects	Study	Type	Ages	Other Pollutants in Model	Percent of Total Incidence*		
					Base Case: Assuming AQ as Reported	Assuming relevant AQ 50% higher	Assuming relevant AQ twice as high
Long-Term Exposure Mortality	**Single Pollutant Models**						
	Krewski et al. (2000) - Six Cities	All cause	25+		3.7% (1.2% - 6.1%)	2.5% (0.8% - 4.1%)	1.9% (0.6% - 3.1%)
	Krewski et al. (2000) - ACS	All cause	30+		1.8% (1.0% - 2.8%)	1.2% (0.6% - 1.9%)	0.9% (0.5% - 1.4%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+		5.0% (1.7% - 8.1%)	3.4% (1.1% - 5.5%)	2.5% (0.8% - 4.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+		3.7% (2.4% - 5.1%)	2.5% (1.6% - 3.5%)	1.9% (1.2% - 2.6%)
	Pope et al. (2002) - ACS extended	All cause	30+		3.7% (1.3% - 6.6%)	2.5% (0.9% - 4.4%)	1.9% (0.6% - 3.3%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+		5.5% (1.9% - 9.2%)	3.7% (1.3% - 6.2%)	2.8% (1.0% - 4.7%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+		8.2% (2.5% - 12.6%)	5.5% (1.7% - 8.6%)	4.2% (1.3% - 6.5%)
	Multi-Pollutant Models						
	Krewski et al. (2000) - ACS	All cause	30+	CO	2.7% (1.6% - 3.8%)	1.8% (1.0% - 2.6%)	1.4% (0.8% - 1.9%)
	Krewski et al. (2000) - ACS	All cause	30+	NO2	3.2% (1.7% - 4.6%)	2.2% (1.1% - 3.1%)	1.6% (0.9% - 2.3%)
	Krewski et al. (2000) - ACS	All cause	30+	O3	2.7% (1.6% - 3.8%)	1.8% (1.0% - 2.6%)	1.4% (0.8% - 1.9%)
	Krewski et al. (2000) - ACS	All cause	30+	SO2	0.5% (-0.8% - 2.0%)	0.3% (-0.6% - 1.3%)	0.2% (-0.4% - 1.0%)

* Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit D.40. Sensitivity Analysis: Estimated Annual Health Risks of Short-Term and Long-Term Exposure Mortality Associated with "As Is" PM2.5 Concentrations Using a Constant Policy Relevant Background Level Versus Different Daily Background Levels St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM2.5 Above Lowest Measured Level in Study or Background**			
						Constant Background Level		Different Daily Background Levels	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		233 (86 - 379)	1.1% (0.4% - 1.7%)	233 (86 - 379)	1.1% (0.4% - 1.7%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		312 (224 - 401)	1.4% (1.0% - 1.8%)	313 (224 - 401)	1.4% (1.0% - 1.8%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit D.41. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{10-2.5}$ Concentrations, Using Different Background Levels
Seattle, WA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10-2.5 Above Policy Relevant Background of: **					
						1 ug/m3		3.5 ug/m3		7 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Hospital Admissions	Single Pollutant Models										
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]***	Asthma	<65	1 day		35 (0 - 85)	2.2% (0.0% - 5.3%)	27 (0 - 65)	1.7% (0.0% - 4.1%)	17 (0 - 41)	1.1% (0.0% - 2.5%)

*Health effects are associated with short-term exposure to $PM_{10-2.5}$ unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below background level. Average background $PM_{10-2.5}$ is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

***Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily $PM_{10-2.5}$ values obtained from nephelometer measurements rather than from air quality monitors.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

Exhibit D.42. Sensitivity Analysis: Estimated Annual Health Risks Associated with "As Is" $PM_{10-2.5}$ Concentrations, Using Different Background Levels
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10-2.5 Above Policy Relevant Background of: **					
						1 ug/m3		4.5 ug/m3		9 ug/m3	
						Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence	Incidence	Percent of Total Incidence
Respiratory Symptoms* **	**Single Pollutant Models**										
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day		9700 (-1700 - 27900)	17.2% (-3.1% - 49.4%)	6900 (-1200 - 20800)	12.3% (-2.2% - 36.9%)	3600 (-600 - 10700)	6.3% (-1.1% - 19.1%)
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day		37500 (15400 - 56100)	22.8% (9.4% - 34.1%)	27000 (11000 - 40900)	16.4% (6.7% - 24.9%)	13900 (5700 - 21000)	8.5% (3.4% - 12.8%)
	Multi-Pollutant Models										
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day	PM2.5	3900 (-9900 - 14300)	6.9% (-17.5% - 25.4%)	2800 (-6900 - 10300)	4.9% (-12.2% - 18.3%)	1400 (-3600 - 5300)	2.5% (-6.3% - 9.4%)
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day	PM2.5	34600 (9200 - 55000)	21.0% (5.6% - 33.4%)	24800 (6500 - 40100)	15.1% (4.0% - 24.4%)	12800 (3400 - 20600)	7.8% (2.0% - 12.5%)

*Health effects are associated with short-term exposure to $PM_{10-2.5}$ unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM coarse is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Appendix E. Estimated Annual Health Risk Reductions Associated with Rolling Back $PM_{2.5}$ Concentrations to Just Meet Current Annual and Daily Standards

Exhibit E.1a. Estimated Annual Health Risk Reductions Associated with Rolling Back $PM_{2.5}$ Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
							Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		202 (-25 - 426)	44.9% (44.7% - 45.1%)	0.4% (-0.1% - 0.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		221 (1 - 438)	44.9% (44.8% - 45.1%)	0.4% (0.0% - 0.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		202 (-25 - 426)	44.9% (44.7% - 45.1%)	0.4% (-0.1% - 0.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		221 (1 - 438)	44.9% (44.8% - 45.1%)	0.4% (0.0% - 0.8%)
	Single Pollutant Models (Cause-Specific Mortality)								
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		132 (13 - 248)	45.1% (44.8% - 45.3%)	0.7% (0.1% - 1.3%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		137 (21 - 251)	45.1% (44.8% - 45.4%)	0.7% (0.1% - 1.3%)
	Multi-Pollutant Models (Total Mortality)								
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-199 (-498 - 94)	44.6% (44.3% - 44.8%)	-0.4% (-0.9% - 0.2%)

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
							Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
Long-Term Exposure Mortality	**Multi-Pollutant Models (Cause-Specific Mortality)**								
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	0 day	CO	236 (102 - 368)	45.3% (45.0% - 45.6%)	1.2% (0.5% - 1.9%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	1 day	CO	121 (-16 - 256)	45.0% (44.7% - 45.4%)	0.6% (-0.1% - 1.3%)
	Single Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+	log-linear			1735 (899 - 2642)	74.6% (74.4% - 74.9%)	3.1% (1.6% - 4.7%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+	log-linear			1846 (1199 - 2541)	75.1% (74.8% - 75.4%)	6.2% (4.0% - 8.5%)
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear			2177 (750 - 3840)	59.1% (58.6% - 59.8%)	3.9% (1.3% - 6.8%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+	log-linear			1691 (591 - 2852)	59.5% (58.7% - 60.4%)	5.7% (2.0% - 9.6%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear			271 (84 - 417)	60.1% (58.8% - 61.2%)	8.5% (2.6% - 13.1%)
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		CO	2516 (1463 - 3597)	74.8% (74.6% - 75.1%)	4.5% (2.6% - 6.4%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		NO2	3009 (1600 - 4265)	74.9% (74.6% - 75.2%)	5.4% (2.9% - 7.6%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		O3	2516 (1463 - 3597)	74.8% (74.6% - 75.1%)	4.5% (2.6% - 6.4%)
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		SO2	458 (-804 - 1869)	74.3% (74.1% - 74.7%)	0.8% (-1.4% - 3.3%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient. An asterisk indicates that the lower bound (and, in some cases, the central estimate) could not be calculated.

Exhibit E.1b. Estimated Annual Health Risks of Hospital Admissions Associated with Rolling Back PM2.5 Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
							Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
Hospital Admissions	**Single Pollutant Models**								
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		736 (427 - 1041)	45.3% (45.0% - 45.5%)	1.1% (0.6% - 1.5%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		648 (325 - 967)	45.2% (45.0% - 45.4%)	0.9% (0.5% - 1.4%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		340 (142 - 534)	45.3% (45.0% - 45.6%)	1.1% (0.5% - 1.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		243 (47 - 435)	45.1% (44.8% - 45.4%)	0.8% (0.2% - 1.4%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		376 (171 - 577)	45.3% (45.0% - 45.6%)	1.2% (0.6% - 1.9%)
	Multi-Pollutant Models								
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	0 day	CO	183 (-208 - 567)	44.9% (44.6% - 45.1%)	0.3% (-0.3% - 0.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	1 day	CO	113 (-306 - 524)	44.8% (44.6% - 45.1%)	0.2% (-0.4% - 0.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	0 day	NO2	86 (-188 - 352)	44.9% (44.5% - 45.3%)	0.3% (-0.6% - 1.2%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	1 day	NO2	-8 (-335 - 309)	44.7% (44.2% - 45.2%)	0.0% (-1.1% - 1.0%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	2 day	NO2	72 (-212 - 347)	44.9% (44.4% - 45.3%)	0.2% (-0.7% - 1.2%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient. An asterisk indicates that the lower bound (and, in some cases, the central estimate) could not be calculated.

Exhibit E.2. Estimated Annual Health Risk Reductions Associated with Rolling Back $PM_{2.5}$ Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3
Philadelphia, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
						Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**							
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		45 (21 - 68)	10.9% (10.9% - 10.9%)	0.3% (0.1% - 0.4%)
Long-Term Exposure Mortality	**Single Pollutant Models**							
	Krewski et al. (2000) - ACS	All cause	30+			90 (47 - 139)	27.4% (27.3% - 27.5%)	0.5% (0.3% - 0.8%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			82 (53 - 114)	27.6% (27.4% - 27.8%)	1.1% (0.7% - 1.5%)
	Pope et al. (2002) - ACS extended	All cause	30+			114 (39 - 203)	17.5% (17.3% - 17.7%)	0.7% (0.2% - 1.2%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			75 (26 - 128)	17.6% (17.4% - 18.0%)	1.0% (0.4% - 1.7%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			17 (5 - 26)	17.9% (17.4% - 18.2%)	1.5% (0.5% - 2.4%)
	Multi-Pollutant Models							
	Krewski et al. (2000) - ACS	All cause	30+		CO	132 (76 - 190)	27.5% (27.4% - 27.6%)	0.8% (0.5% - 1.1%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	158 (83 - 227)	27.5% (27.4% - 27.7%)	1.0% (0.5% - 1.4%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	132 (76 - 190)	27.5% (27.4% - 27.6%)	0.8% (0.5% - 1.1%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	24 (-41 - 97)	27.2% (27.1% - 27.4%)	0.1% (-0.3% - 0.6%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 2: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit E.3. Estimated Annual Health Risk Reductions Associated with Rolling Back $PM_{2.5}$ Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3
Pittsburgh, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
						Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**							
	Chock et al. (2000)	Non-accidental	<75	0 day		24 (-19 - 67)	35.3% (34.8% - 35.7%)	0.5% (-0.4% - 1.3%)
	Chock et al. (2000)	Non-accidental	75+	0 day		27 (-58 - 111)	35.2% (34.7% - 35.6%)	0.3% (-0.6% - 1.1%)
	Multi-Pollutant Models (Total Mortality)							
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	31 (-21 - 82)	35.3% (34.8% - 35.9%)	0.6% (-0.4% - 1.6%)
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	18 (-82 - 117)	35.1% (34.6% - 35.7%)	0.2% (-0.8% - 1.2%)
Long-Term Exposure Mortalitv	**Single Pollutant Models**							
	Krewski et al. (2000) - ACS	All cause	30+			328 (170 - 501)	68.2% (68.0% - 68.4%)	2.2% (1.1% - 3.3%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			319 (206 - 441)	68.6% (68.3% - 68.8%)	4.3% (2.8% - 6.0%)
	Pope et al. (2002) - ACS extended	All cause	30+			412 (141 - 731)	50.6% (50.1% - 51.1%)	2.7% (0.9% - 4.8%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			292 (101 - 496)	50.9% (50.2% - 51.6%)	4.0% (1.4% - 6.8%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			60 (18 - 93)	51.4% (50.3% - 52.3%)	6.0% (1.8% - 9.3%)
	Multi-Pollutant Models							
	Krewski et al. (2000) - ACS	All cause	30+		CO	477 (277 - 684)	68.4% (68.1% - 68.6%)	3.1% (1.8% - 4.5%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	571 (303 - 813)	68.5% (68.2% - 68.7%)	3.8% (2.0% - 5.3%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	477 (277 - 684)	68.4% (68.1% - 68.6%)	3.1% (1.8% - 4.5%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	86 (-151 - 354)	67.9% (67.7% - 68.2%)	0.6% (-1.0% - 2.3%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.
** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.
Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient. An asterisk indicates that the lower bound could not be calculated.

Exhibit E.4. Estimated Annual Health Risk Reductions Associated with Rolling Back $PM_{2.5}$ Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
						Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**							
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		42 (15 - 68)	18.0% (17.9% - 18.0%)	0.2% (0.1% - 0.3%)
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		56 (40 - 72)	18.0% (18.0% - 18.0%)	0.3% (0.2% - 0.3%)
	Single Pollutant Models (Cause-Specific Mortality)							
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		1 (-5 - 8)	17.9% (17.6% - 18.3%)	0.1% (-0.6% - 0.8%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		13 (3 - 23)	18.0% (17.9% - 18.1%)	0.2% (0.1% - 0.4%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		1 (-3 - 6)	18.0% (17.6% - 18.3%)	0.2% (-0.5% - 0.9%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		4 (0 - 8)	18.1% (17.9% - 18.3%)	0.4% (0.0% - 0.8%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		17 (11 - 24)	18.1% (18.0% - 18.1%)	0.3% (0.2% - 0.5%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		5 (2 - 8)	18.3% (18.1% - 18.5%)	0.8% (0.4% - 1.1%)
Long-Term Exposure Mortality	**Single Pollutant Models**							
	Krewski et al. (2000) - Six Cities	All cause	25+			526 (176 - 870)	62.7% (62.4% - 63.0%)	2.3% (0.8% - 3.8%)
	Krewski et al. (2000) - ACS	All cause	30+			195 (101 - 299)	47.0% (46.9% - 47.1%)	0.9% (0.5% - 1.3%)
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			308 (103 - 502)	62.9% (62.5% - 63.2%)	3.1% (1.1% - 5.1%)
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			194 (125 - 269)	47.2% (47.1% - 47.4%)	1.8% (1.1% - 2.4%)
	Pope et al. (2002) - ACS extended	All cause	30+			246 (84 - 439)	29.2% (29.0% - 29.5%)	1.1% (0.4% - 1.9%)
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			177 (61 - 304)	29.4% (29.0% - 29.8%)	1.6% (0.6% - 2.8%)
	Pope et al. (2002) - ACS extended	Lung cancer	30+			37 (11 - 58)	29.7% (29.1% - 30.2%)	2.4% (0.7% - 3.8%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Reductions Associated with Just Meeting Current PM-2.5 Standards		
						Reduction in Incidence**	Percent of PM-Related Incidence**	Percent of Total Incidence**
	Multi-Pollutant Models							
	Krewski et al. (2000) - ACS	All cause	30+		CO	285 (164 - 410)	47.1% (47.0% - 47.2%)	1.3% (0.7% - 1.8%)
	Krewski et al. (2000) - ACS	All cause	30+		NO2	342 (180 - 489)	47.2% (47.0% - 47.3%)	1.5% (0.8% - 2.2%)
	Krewski et al. (2000) - ACS	All cause	30+		O3	285 (164 - 410)	47.1% (47.0% - 47.2%)	1.3% (0.7% - 1.8%)
	Krewski et al. (2000) - ACS	All cause	30+		SO2	51 (-89 - 211)	46.8% (46.7% - 47.0%)	0.2% (-0.4% - 0.9%)
Respiratory Symptoms* **	**Single Pollutant Models**							
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory	7-14	1 day		2200 (800 - 3400)	20.0% (18.6% - 21.0%)	3.8% (1.4% - 6.1%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		3300 (-200 - 6800)	18.9% (17.8% - 20.0%)	2.0% (-0.1% - 4.1%)
	Multi-Pollutant Models							
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory	7-14	1 day	PM10-2.5	1900 (500 - 3400)	19.8% (18.3% - 21.0%)	3.4% (0.8% - 6.0%)
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	1500 (-2400 - 5100)	18.3% (17.2% - 19.4%)	0.9% (-1.5% - 3.1%)

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient. An asterisk indicates that the lower bound could not be calculated.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit E.5. Sensitivity Analysis: Estimated Annual Reductions of Short-Term and Long-Term Exposure Mortality Associated with Rolling Back PM2.5 Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3 Using an Alternative Rollback Method
Los Angeles, CA, 2003

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Annual and Daily Standards	Percent Change in PM-Associated Incidence**		Portion of Proportional Rollback Incidence Reduction Achieved by Alternative Rollback Method
								All PM concentrations rolled back equally	Percent rollback of upper 10% of AQ distribution = 1.6 x percent rollback of lower 90% of AQ distribution	
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		15 ug/m3 annual 65 ug/m3 daily	44.9% 0.0%	45.0% 0.0%	100.2% --
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		15 ug/m3 annual 65 ug/m3 daily	44.9% 0.0%	45.0% 0.0%	100.2% --
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		15 ug/m3 annual 65 ug/m3 daily	44.9% 0.0%	45.0% 0.0%	100.2% --
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		15 ug/m3 annual 65 ug/m3 daily	44.9% 0.0%	45.0% 0.0%	100.2% --
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+	log-linear			15 ug/m3 annual 65 ug/m3 daily	74.6% 0.0%	74.8% 0.0%	100.3% --
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear			15 ug/m3 annual 65 ug/m3 daily	59.1% 0.0%	59.3% 0.0%	100.3% --
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		CO	15 ug/m3 annual 65 ug/m3 daily	74.8% 0.0%	75.0% 0.0%	100.3% --
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		NO2	15 ug/m3 annual 65 ug/m3 daily	74.9% 0.0%	75.1% 0.0%	100.3% --
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		O3	15 ug/m3 annual 65 ug/m3 daily	74.8% 0.0%	75.0% 0.0%	100.3% --
	Krewski et al. (2000) - ACS	All cause	30+	log-linear		SO2	15 ug/m3 annual 65 ug/m3 daily	74.3% 0.0%	74.5% 0.0%	100.3% --

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest 10; percents are rounded to the nearest tenth.

Note: Only those C-R functions for which rollbacks are predicted to result in a positive number of cases avoided are included.

Exhibit E.6. Sensitivity Analysis: Estimated Annual Reductions of Short-Term and Long-Term Exposure Mortality Associated with Rolling Back PM2.5 Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3 Using an Alternative Rollback Method
Philadelphia, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Annual and Daily Standards	Percent Change in PM-Associated Incidence**		Portion of Proportional Rollback Incidence Reduction Achieved by Alternative Rollback Method
							All PM concentrations rolled back equally	Percent rollback of upper 10% of AQ distribution = 1.6 x percent rollback of lower 90% of AQ distribution	
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Lipfert et al. (2000)	Non-accidental	all	0 day		15 ug/m3 annual 65 ug/m3 daily	10.9% 0.0%	10.6% 0.0%	97.2% --
	Multi-Pollutant Models (Total Mortality)								
	Lipfert et al. (2000)	Non-accidental	all	0 day	O3	15 ug/m3 annual 65 ug/m3 daily	10.9% 0.0%	10.6% 0.0%	97.2% --
Long-Term Exposure Mortality	**Single Pollutant Models**								
	Krewski et al. (2000) - ACS	All cause	30+			15 ug/m3 annual 65 ug/m3 daily	27.4% 0.0%	27.6% 0.0%	100.7% --
	Pope et al. (2002) - ACS extended	All cause	30+			15 ug/m3 annual 65 ug/m3 daily	17.5% 0.0%	17.6% 0.0%	100.6% --
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	15 ug/m3 annual 65 ug/m3 daily	27.5% 0.0%	27.7% 0.0%	100.7% --
	Krewski et al. (2000) - ACS	All cause	30+		NO2	15 ug/m3 annual 65 ug/m3 daily	27.5% 0.0%	27.7% 0.0%	100.7% --
	Krewski et al. (2000) - ACS	All cause	30+		O3	15 ug/m3 annual 65 ug/m3 daily	27.5% 0.0%	27.7% 0.0%	100.7% --
	Krewski et al. (2000) - ACS	All cause	30+		SO2	15 ug/m3 annual 65 ug/m3 daily	27.2% 0.0%	27.4% 0.0%	100.7% --

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Only those C-R functions for which rollbacks are predicted to result in a positive number of cases avoided are included.

Exhibit E.7. Sensitivity Analysis: Estimated Annual Reductions of Short-Term and Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3 Using an Alternative Rollback Method
Pittsburgh, PA, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Annual and Daily Standards	Percent Change in PM-Associated Incidence**		Portion of Proportional Rollback Incidence Reduction Achieved by Alternative Rollback Method
							All PM concentrations rolled back equally	Percent rollback of upper 10% of AQ distribution = 1.6 x percent rollback of lower 90% of AQ distribution	
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Chock et al. (2000)	Non-accidental	<75	0 day		15 ug/m3 annual 65 ug/m3 daily	35.3% 0.0%	35.4% 0.0%	100.3% --
	Chock et al. (2000)	Non-accidental	75+	0 day		15 ug/m3 annual 65 ug/m3 daily	35.2% 0.0%	35.3% 0.0%	100.3% --
	Multi-Pollutant Models (Total Mortality)								
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	15 ug/m3 annual 65 ug/m3 daily	35.3% 0.0%	35.5% 0.0%	100.6% --
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	15 ug/m3 annual 65 ug/m3 daily	35.1% 0.0%	35.3% 0.0%	100.6% --
Long-Term Exposure Mortality	**Single Pollutant Models**								
	Krewski et al. (2000) - ACS	All cause	30+			15 ug/m3 annual 65 ug/m3 daily	68.2% 0.0%	68.5% 0.0%	100.4% --
	Pope et al. (2002) - ACS extended	All cause	30+			15 ug/m3 annual 65 ug/m3 daily	50.6% 0.0%	50.8% 0.0%	100.4% --
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	15 ug/m3 annual 65 ug/m3 daily	68.4% 0.0%	68.7% 0.0%	100.4% --
	Krewski et al. (2000) - ACS	All cause	30+		NO2	15 ug/m3 annual 65 ug/m3 daily	68.5% 0.0%	68.8% 0.0%	100.4% --
	Krewski et al. (2000) - ACS	All cause	30+		O3	15 ug/m3 annual 65 ug/m3 daily	68.4% 0.0%	68.7% 0.0%	100.4% --
	Krewski et al. (2000) - ACS	All cause	30+		SO2	15 ug/m3 annual 65 ug/m3 daily	67.9% 0.0%	68.2% 0.0%	100.4% --

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note: Only those C-R functions for which rollbacks are predicted to result in a positive number of cases avoided are included.

Exhibit E.8. Sensitivity Analysis: Estimated Annual Reductions of Short-Term and Long-Term Exposure Mortality Associated with Rolling Back PM2.5 Concentrations to Just Meet the Current Annual Standard of 15 ug/m3 and the Current Daily Standard of 65 ug/m3 Using an Alternative Rollback Method
St. Louis, MO, 2003

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Annual and Daily Standards	Percent Change in PM-Associated Incidence**		Portion of Proportional Rollback Incidence Reduction Achieved by Alternative Rollback Method
							All PM concentrations rolled back equally	Percent rollback of upper 10% of AQ distribution = 1.6 x percent rollback of lower 90% of AQ distribution	
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**								
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		15 ug/m3 annual 65 ug/m3 daily	18.0% 0.0%	17.5% 0.0%	97.2% --
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		15 ug/m3 annual 65 ug/m3 daily	18.0% 0.0%	17.6% 0.0%	97.8% --
Long-Term Exposure Mortality	**Single Pollutant Models**								
	Krewski et al. (2000) - Six Cities	All cause	25+			15 ug/m3 annual 65 ug/m3 daily	62.7% 0.0%	62.9% 0.0%	100.3% --
	Krewski et al. (2000) - ACS	All cause	30+			15 ug/m3 annual 65 ug/m3 daily	47.0% 0.0%	47.2% 0.0%	100.4% --
	Pope et al. (2002) - ACS extended	All cause	30+			15 ug/m3 annual 65 ug/m3 daily	29.2% 0.0%	29.3% 0.0%	100.3% --
	Multi-Pollutant Models								
	Krewski et al. (2000) - ACS	All cause	30+		CO	15 ug/m3 annual 65 ug/m3 daily	47.1% 0.0%	47.3% 0.0%	100.4% --
	Krewski et al. (2000) - ACS	All cause	30+		NO2	15 ug/m3 annual 65 ug/m3 daily	47.2% 0.0%	47.3% 0.0%	100.2% --
	Krewski et al. (2000) - ACS	All cause	30+		O3	15 ug/m3 annual 65 ug/m3 daily	47.1% 0.0%	47.3% 0.0%	100.4% --
	Krewski et al. (2000) - ACS	All cause	30+		SO2	15 ug/m3 annual 65 ug/m3 daily	46.8% 0.0%	47.0% 0.0%	100.4% --

*Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

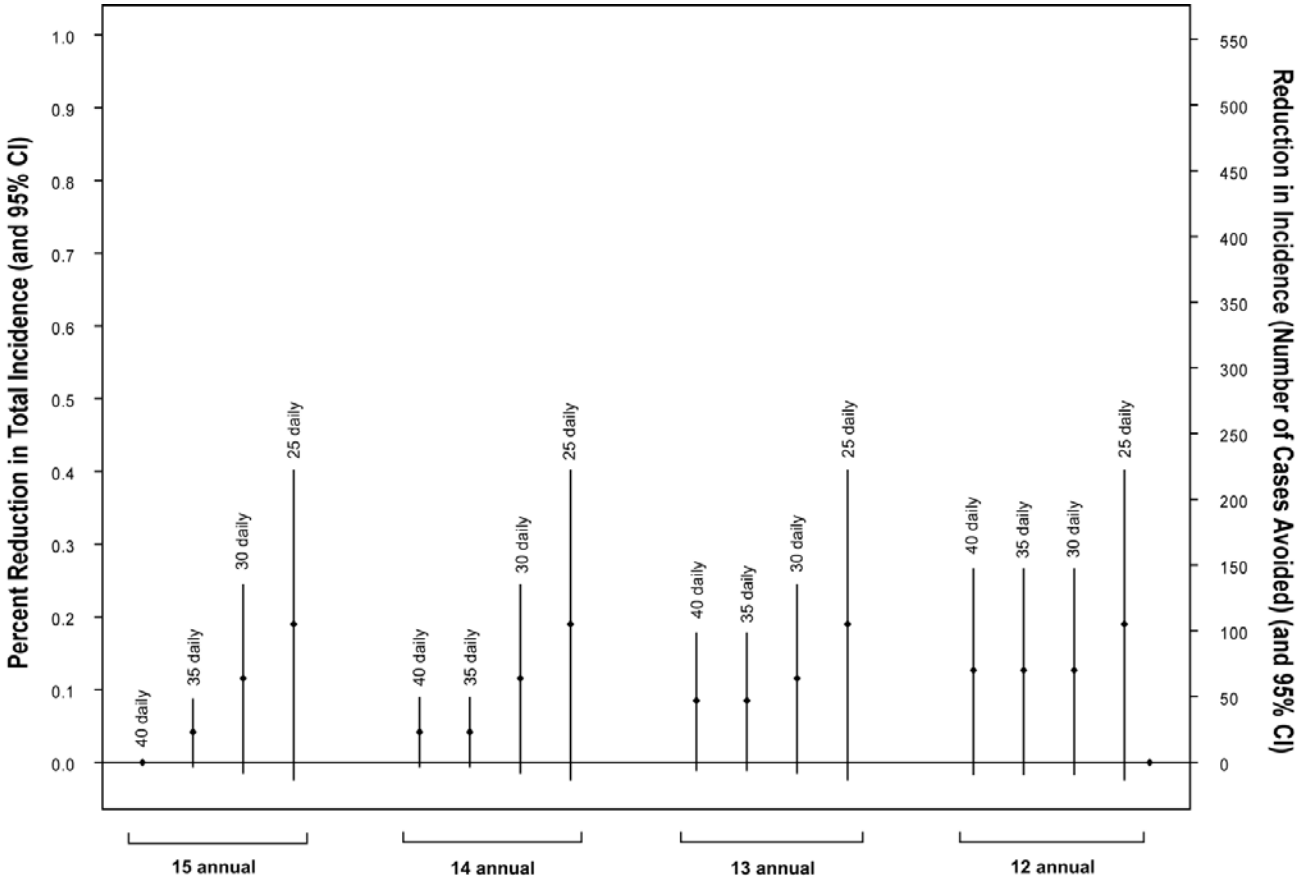
Note 1: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Note 2: Only those C-R functions for which rollbacks are predicted to result in a positive number of cases avoided are included.

Appendix F. Estimated Annual Health Risk Reductions Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet Current $PM_{2.5}$ Standards (15 μg/m^3 Annual Average and 65 μg/m^3 98th Percentile Daily) to Just Meet Alternative Suites of $PM_{2.5}$ Standards

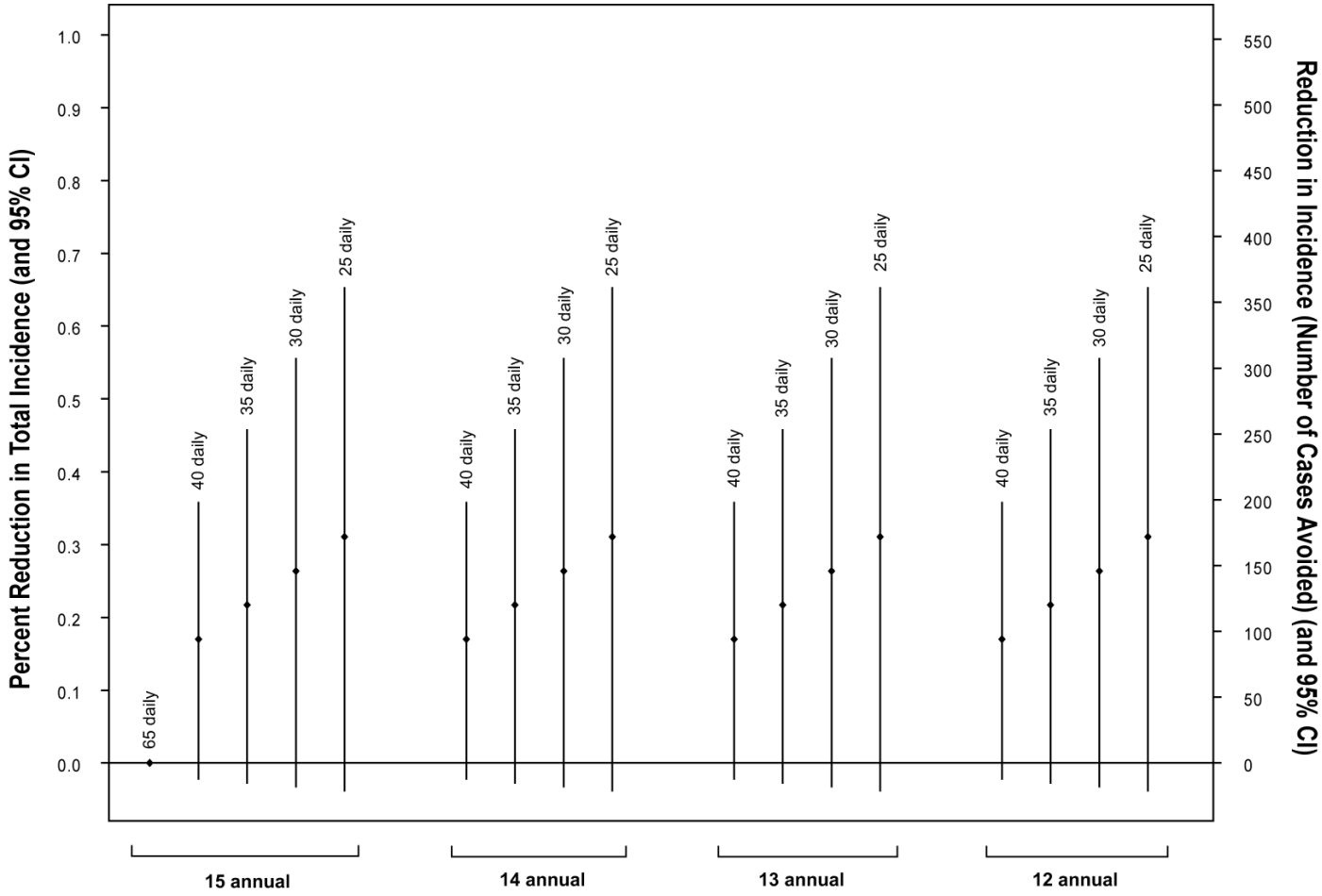
F.1. Figures: $PM_{2.5}$

Figure F.1. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Los Angeles, CA, 2003*



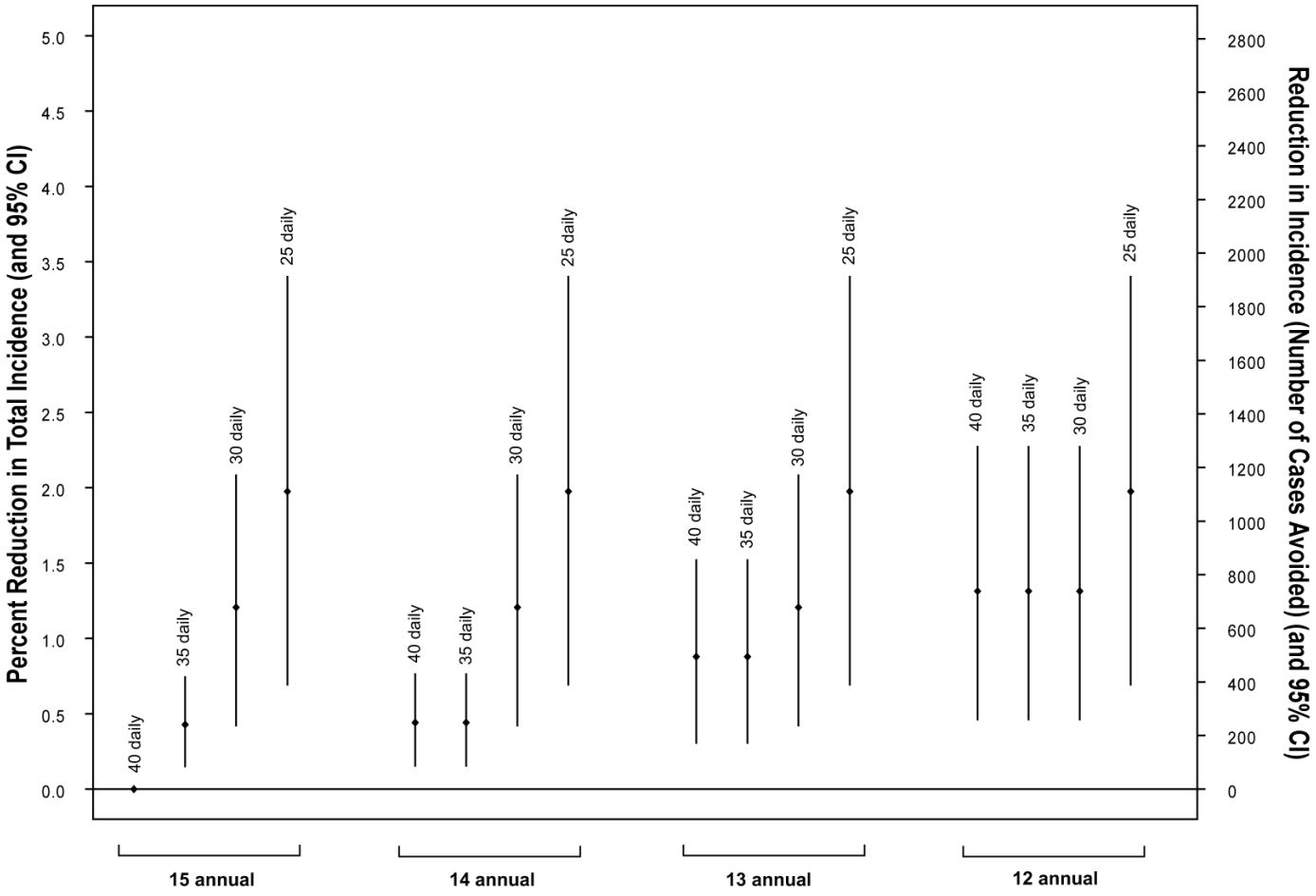
*Based on Moolgavkar (2003)

Figure F.2. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Los Angeles, CA, 2003*



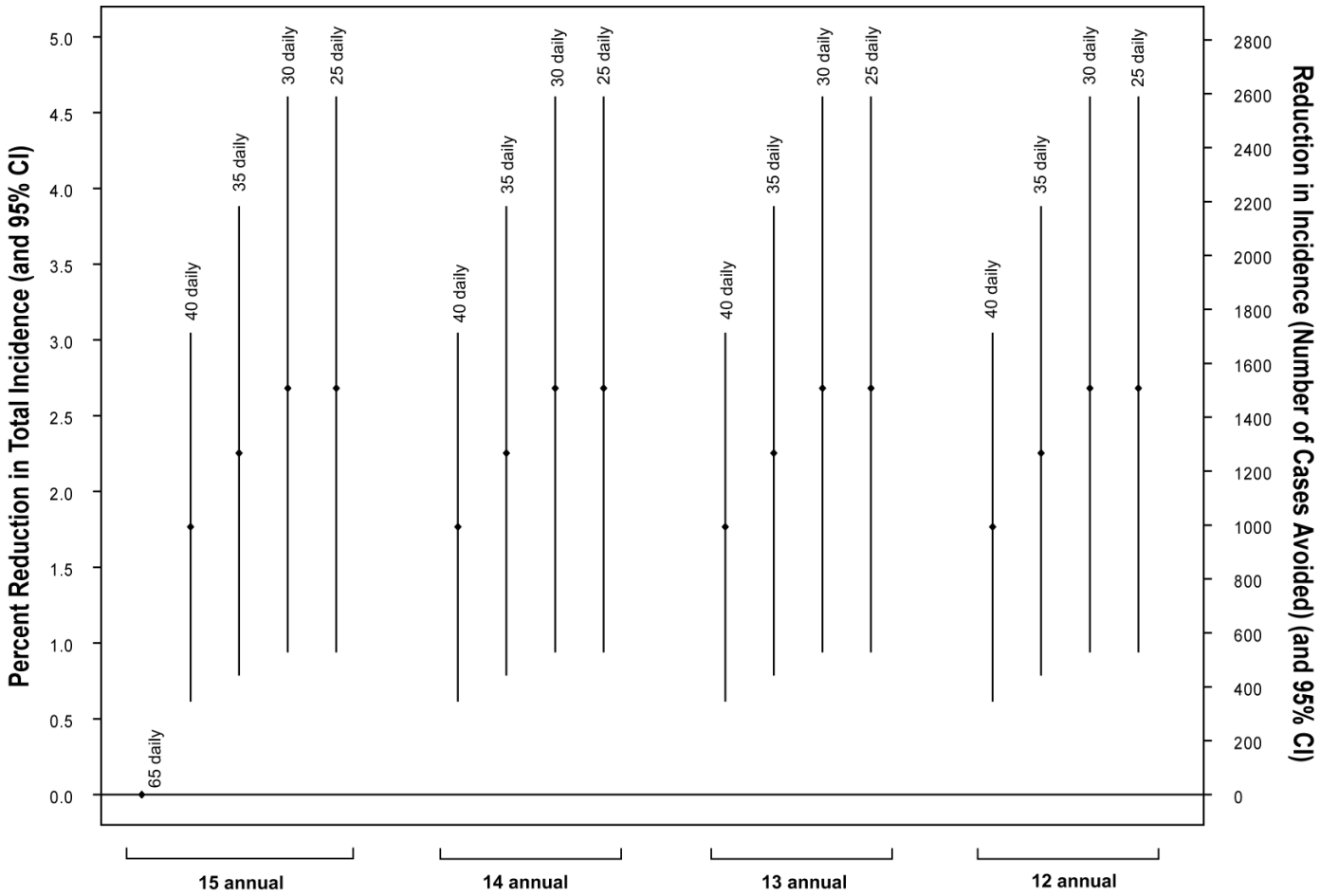
*Based on Moolgavkar (2003)

Figure F.3. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Los Angeles, CA, 2003*



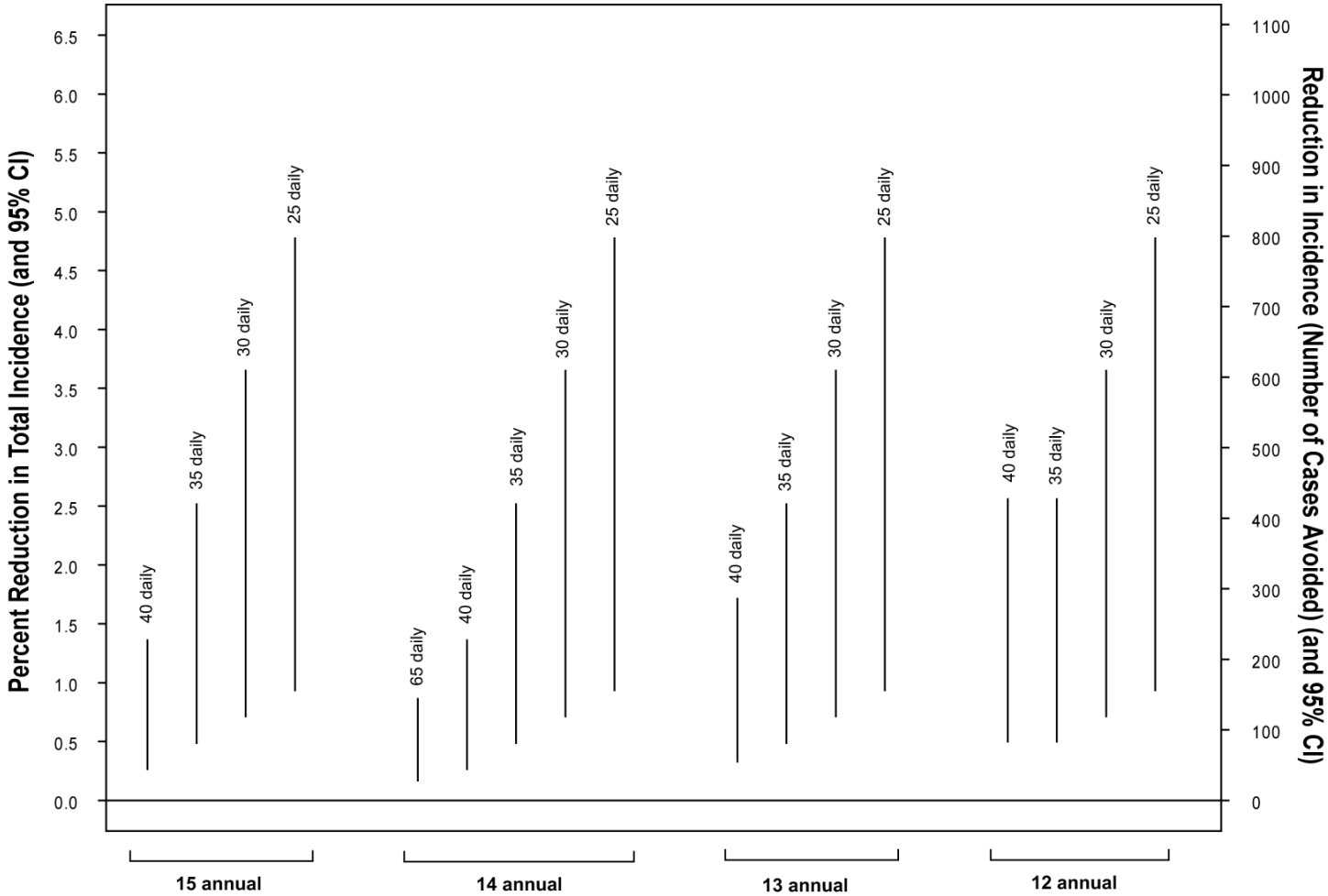
*Based on Pope et al. (2002) - ACS Extended

Figure F.4. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 $\mu g/m^3$ and the Current Daily Standard of 65 $\mu g/m^3$ to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Los Angeles, CA, 2003*



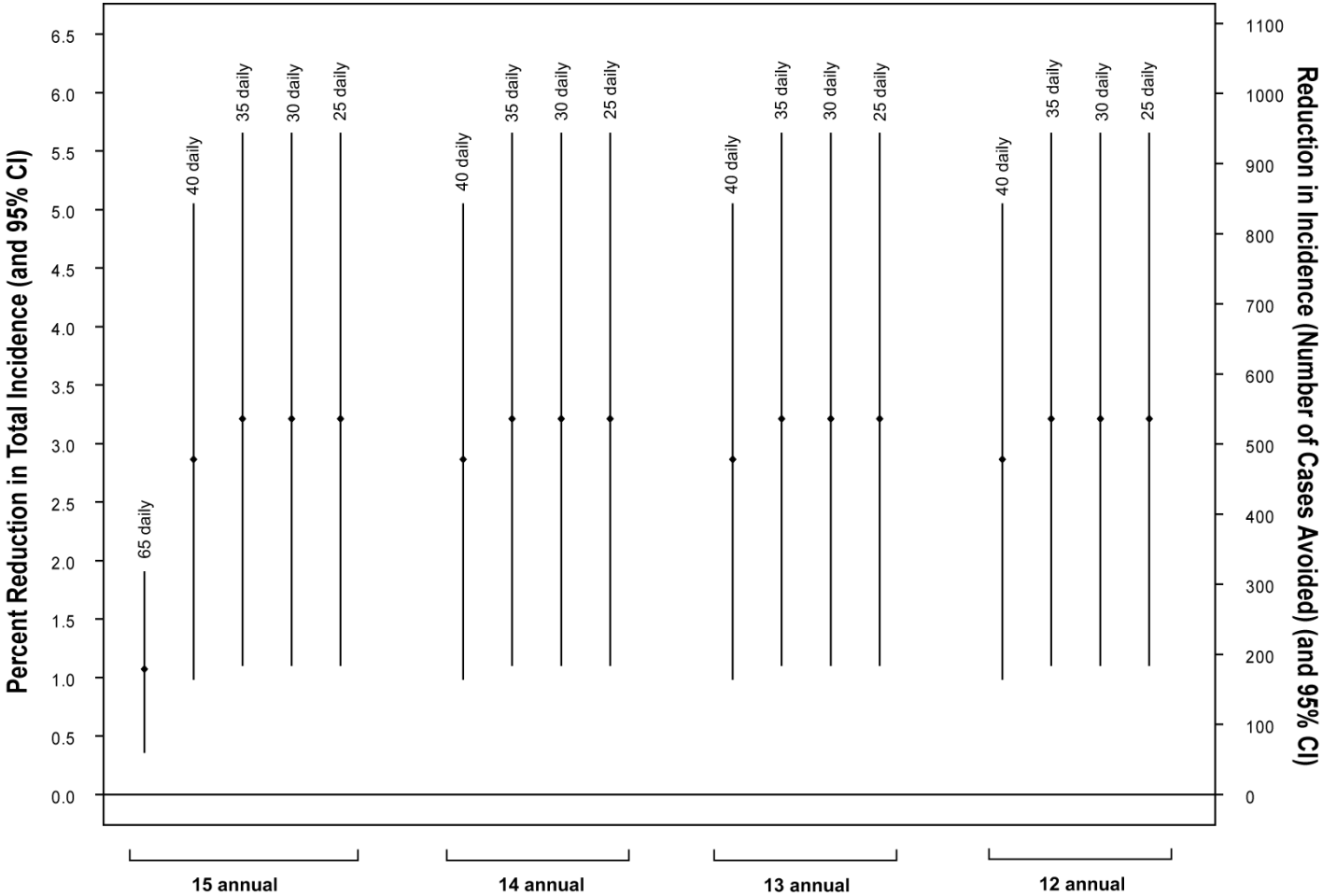
*Based on Pope et al. (2002) - ACS extended

Figure F.5. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 $\mu g/m^3$ and the Current Daily Standard of 65 $\mu g/m^3$ to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Philadelphia, PA, 2003*



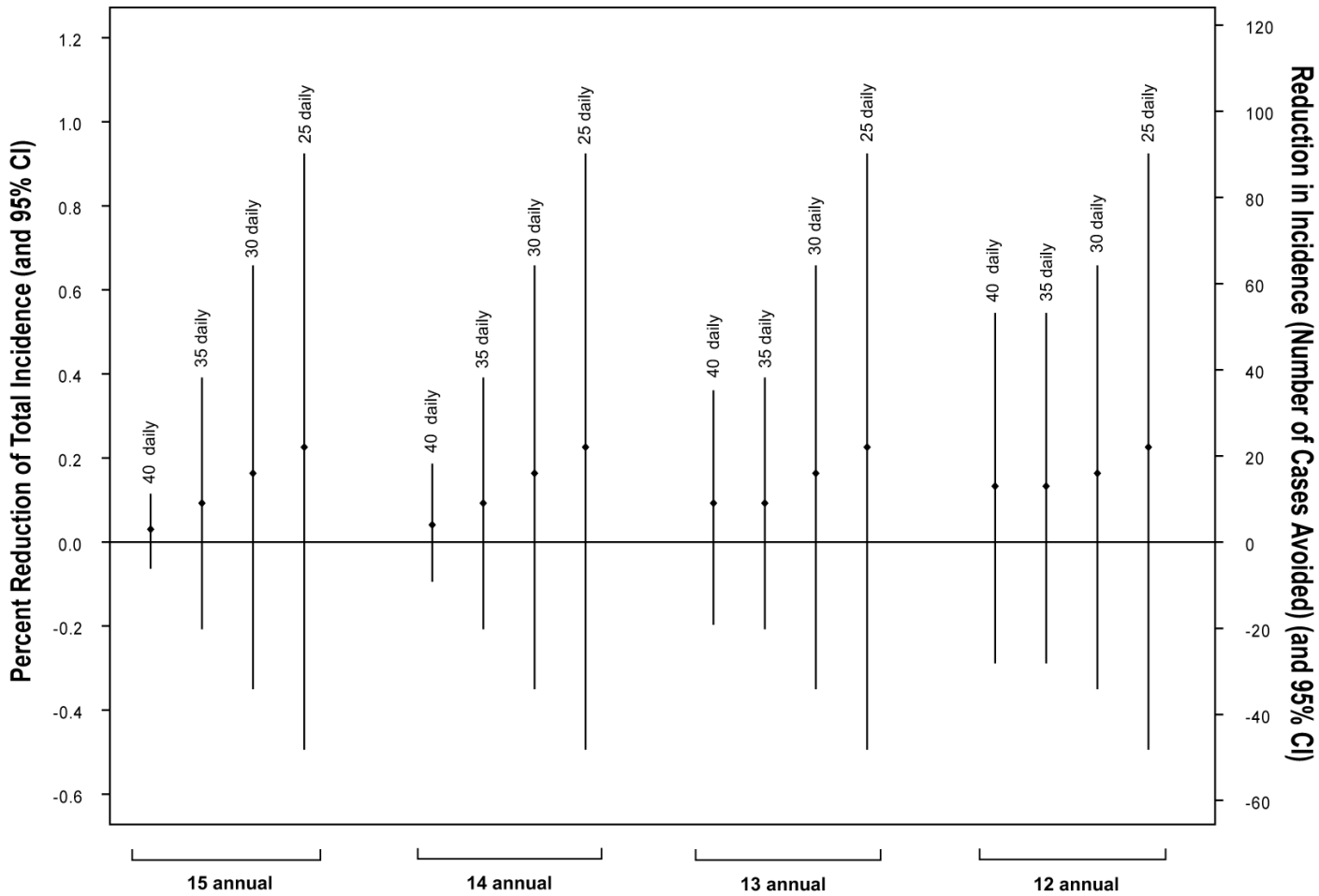
*Based on Pope et al. (2002) - ACS extended

Figure F.6. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 $\mu g/m^3$ and the Current Daily Standard of 65 $\mu g/m^3$ to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Philadelphia, PA, 2003*



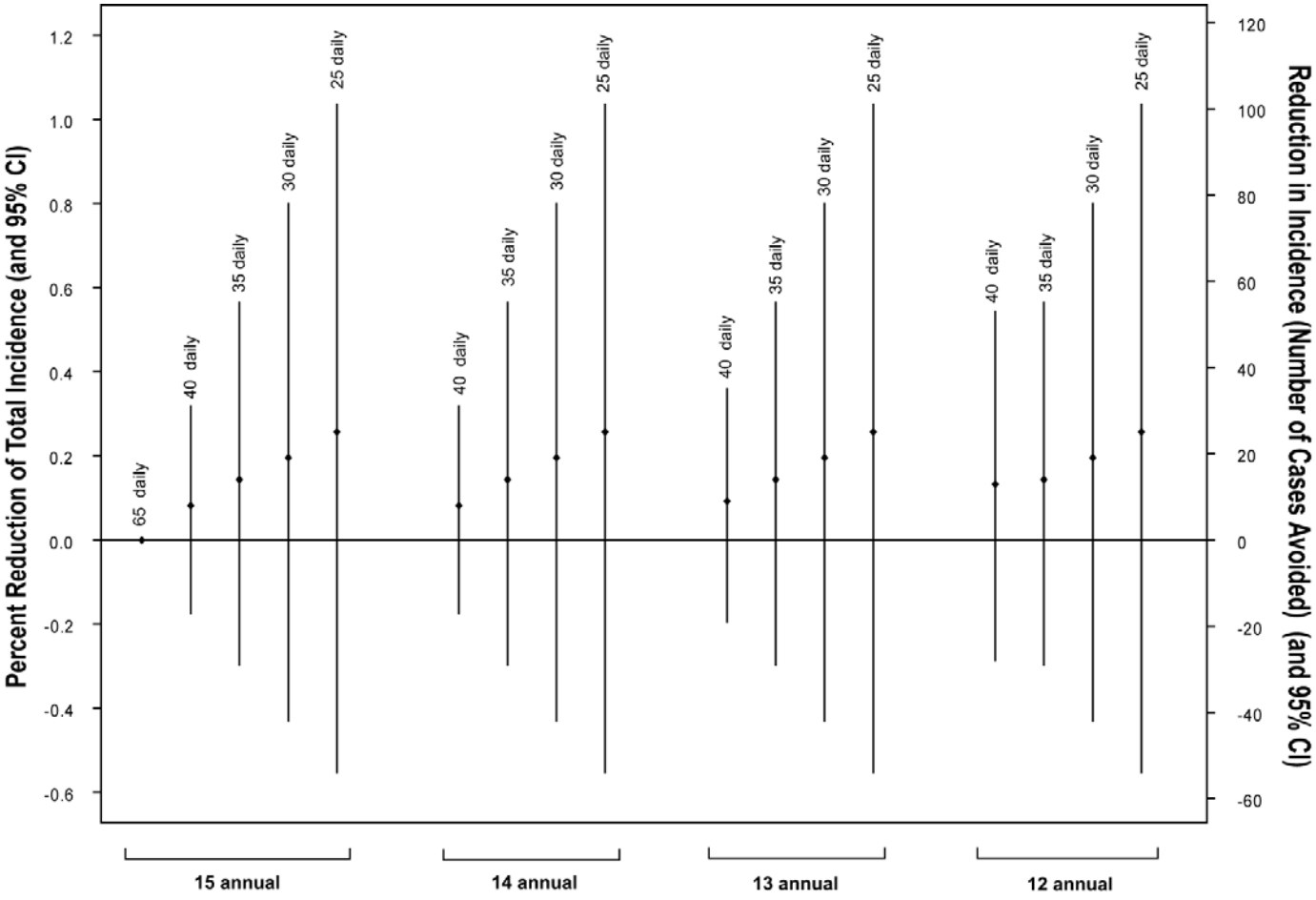
*Based on Pope et al. (2002) - ACS extended

Figure F.7. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Pittsburgh, PA, 2003*



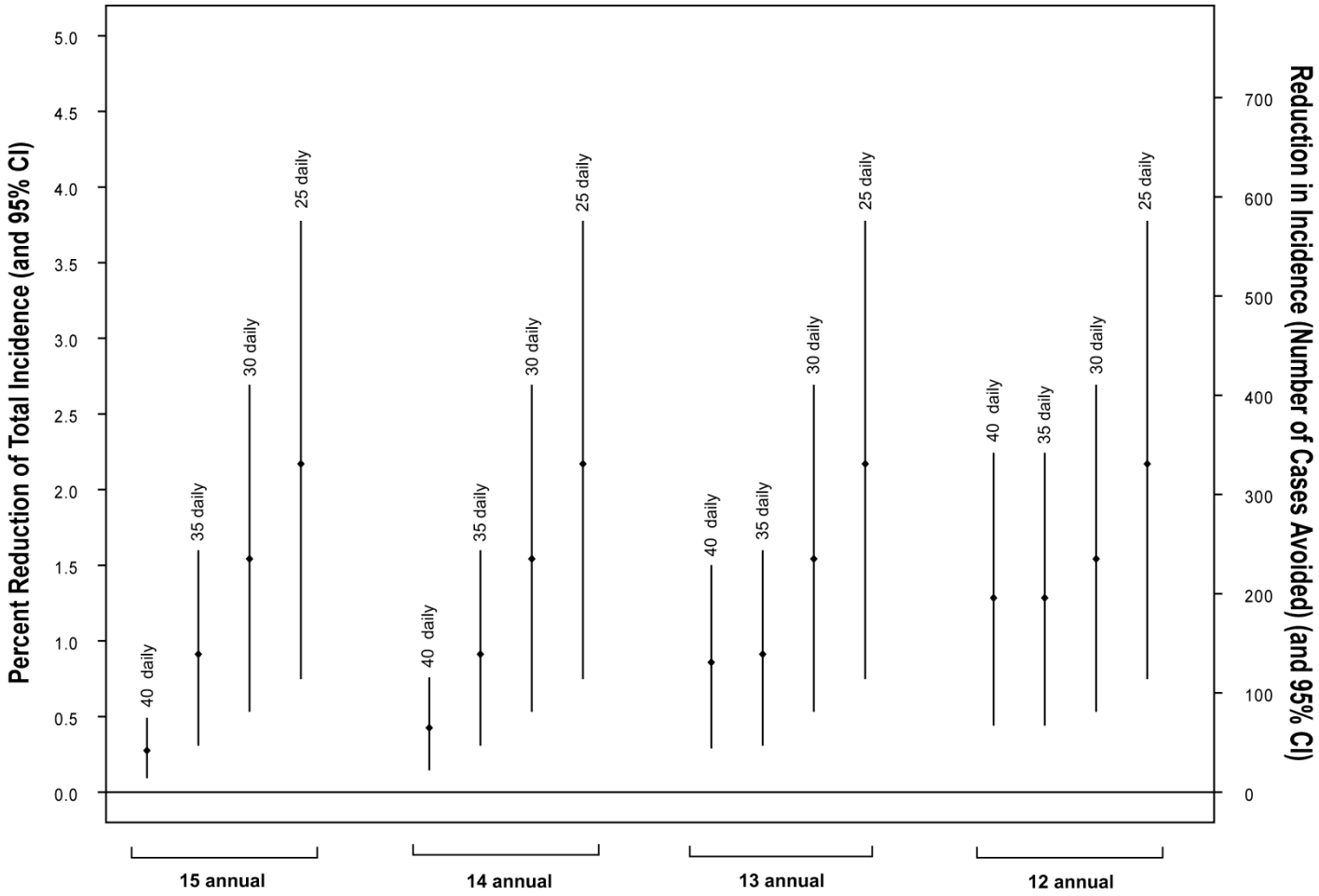
*Based on Chock et al. (2002) (age > 75)

Figure F.8. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Pittsburgh, PA, 2003*



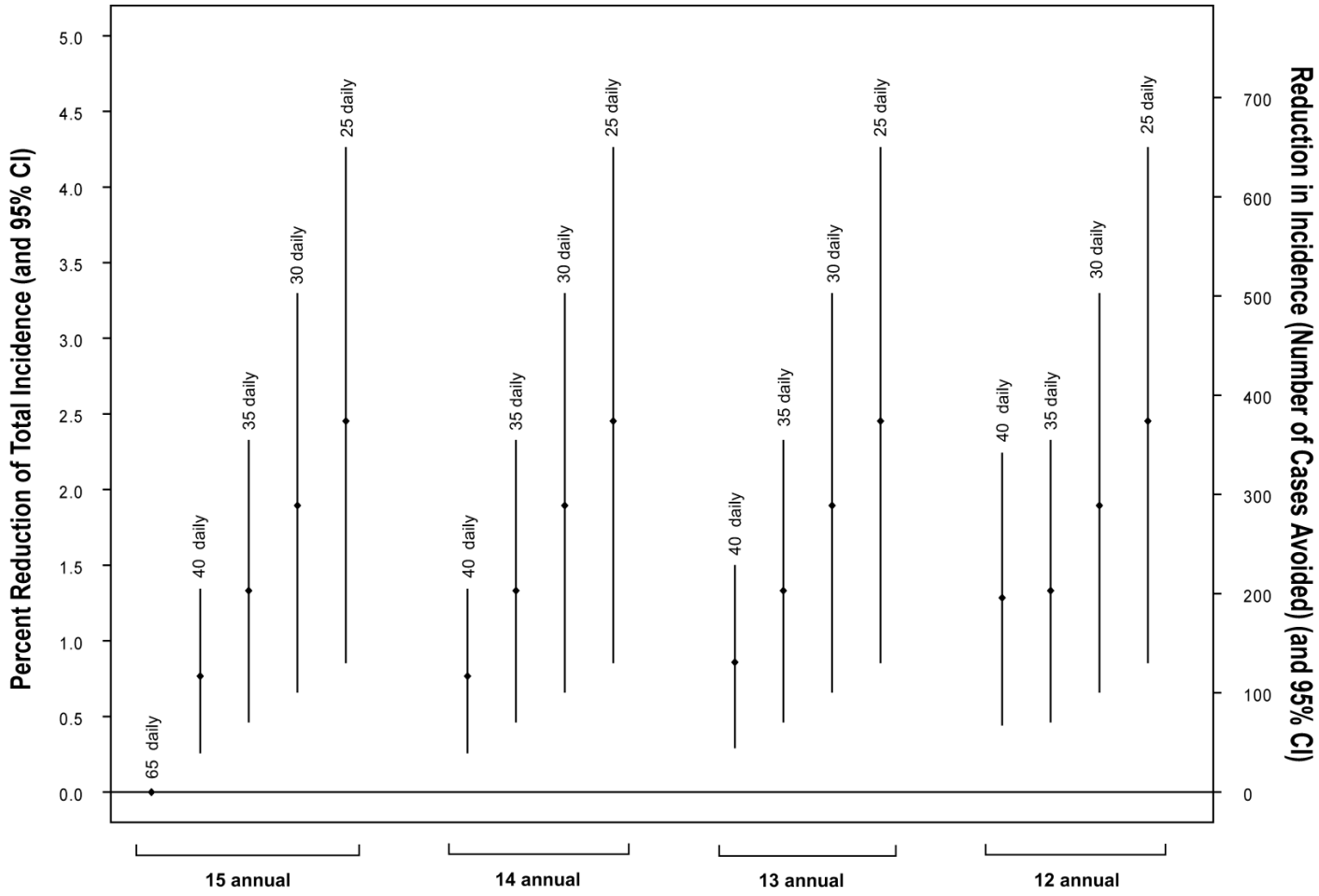
*Based on Chock et al. (2002) (age > 75)

Figure F.9. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 $\mu g/m^3$ and the Current Daily Standard of 65 $\mu g/m^3$ to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Pittsburgh, PA, 2003*



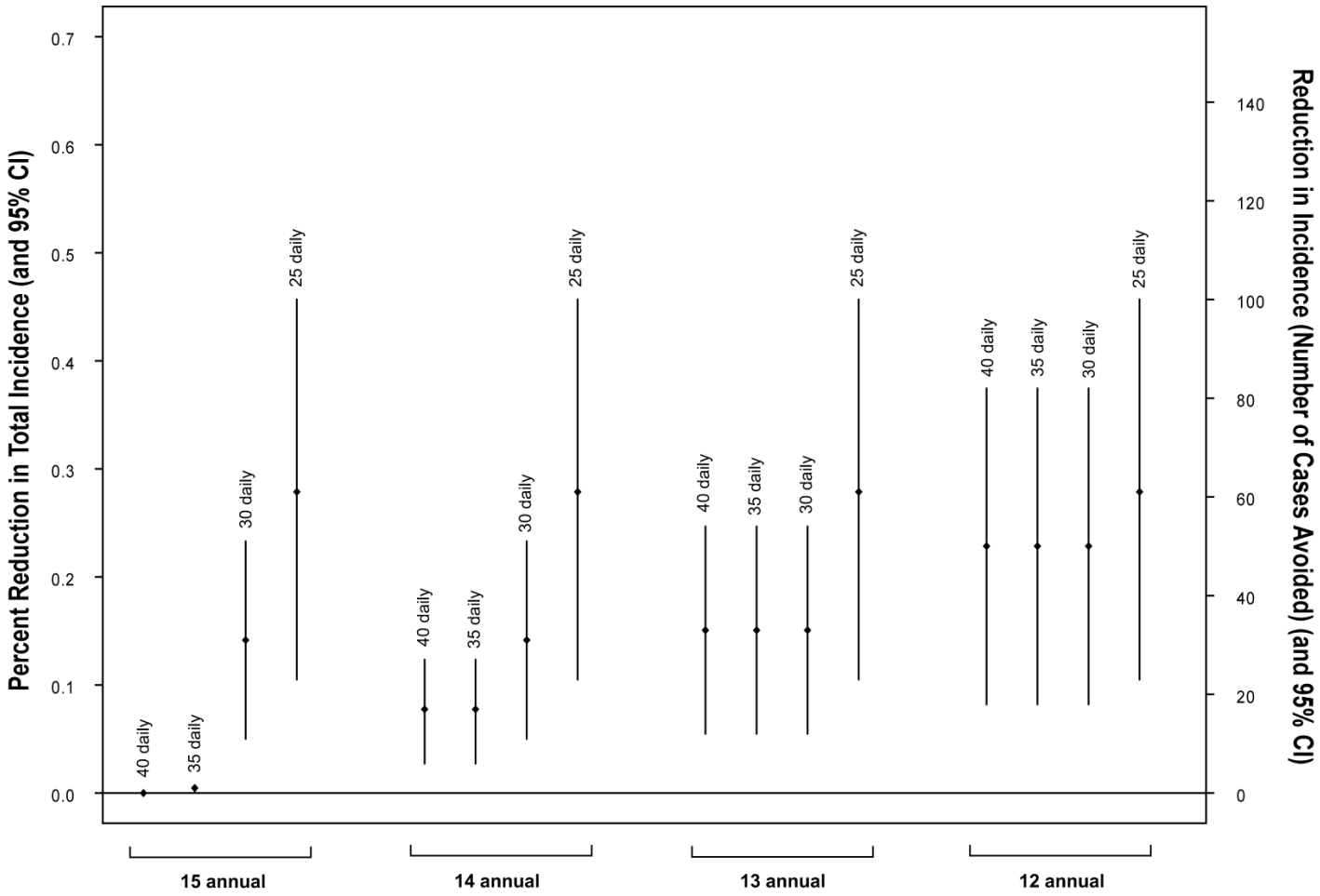
*Based on Pope et al. (2002) - ACS extended

Figure F.10. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Pittsburgh, PA, 2003*



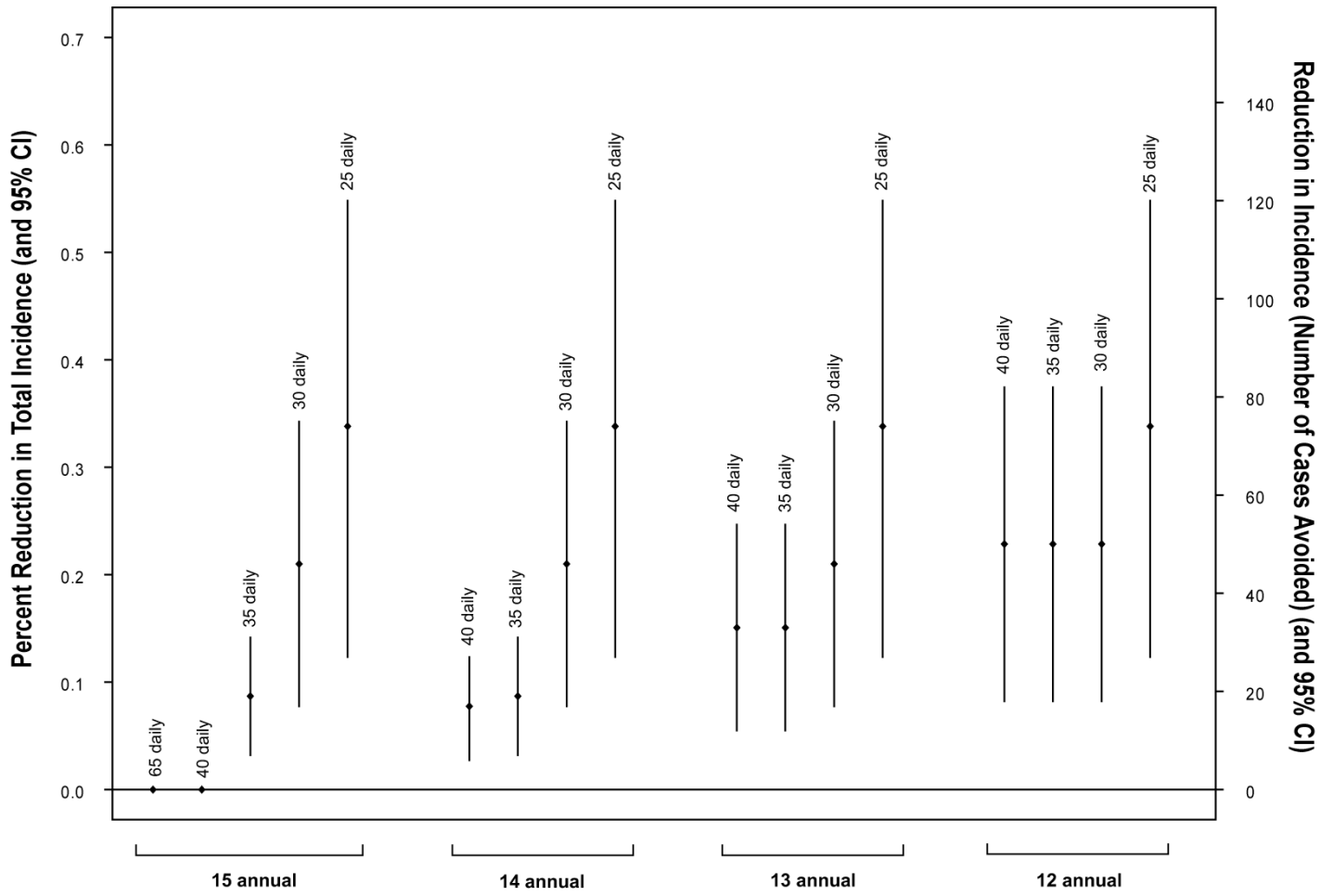
*Based on Pope et al. (2002) - ACS extended

Figure F.11. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: St. Louis, MO, 2003*



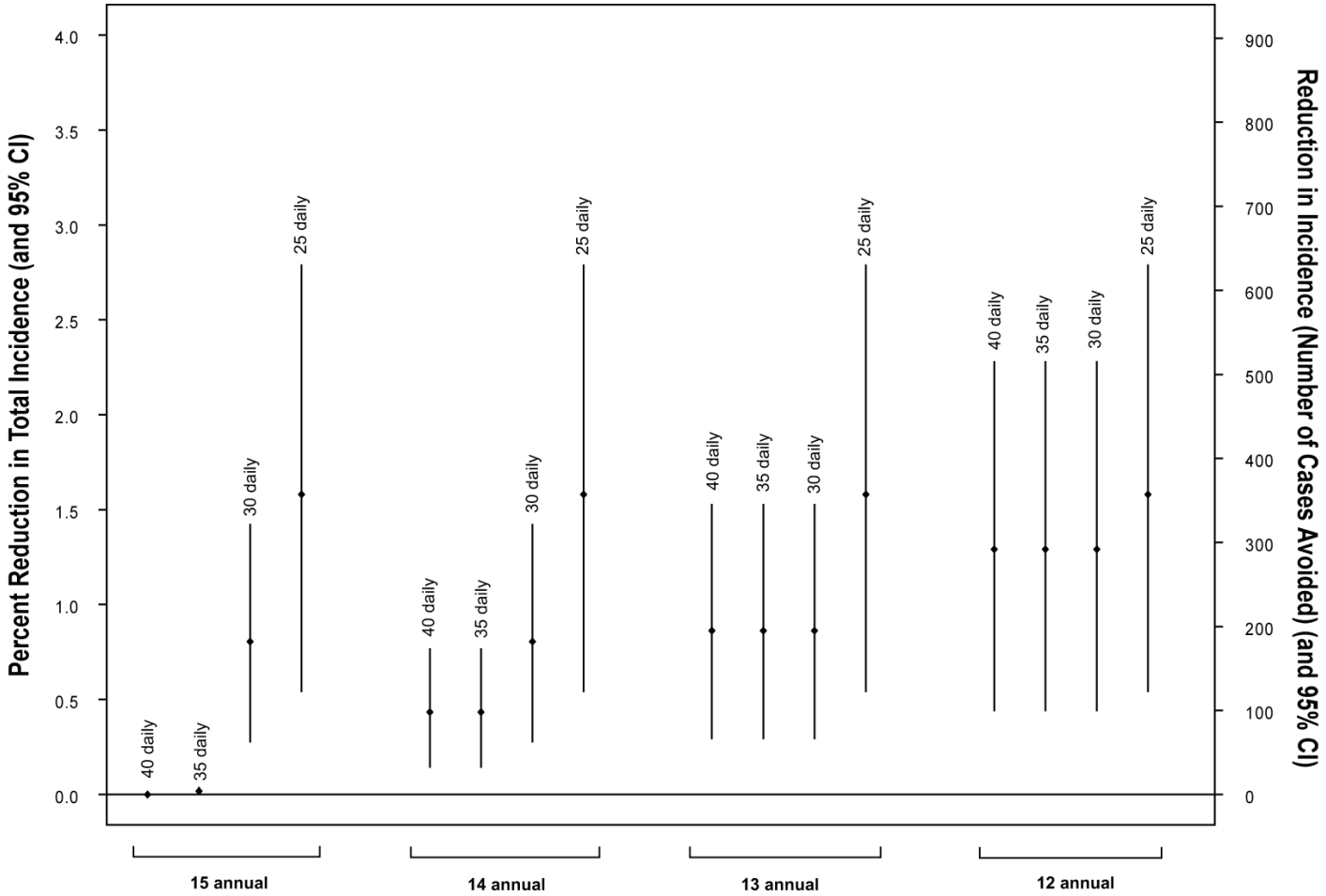
*Based on Schwartz (2003)

Figure F.12. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: St. Louis, MO, 2003*



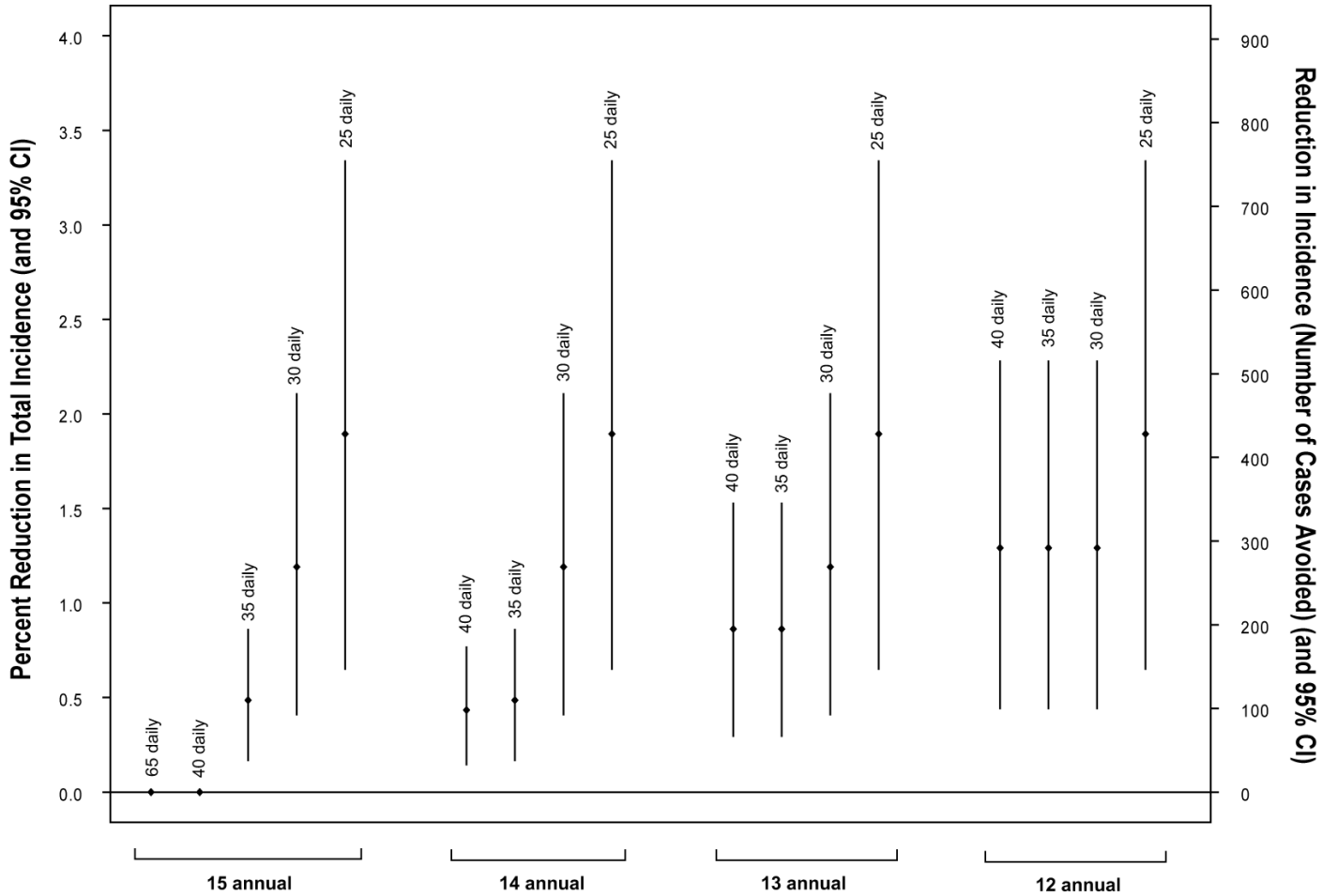
*Based on Schwartz (2003)

Figure F.13. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: St. Louis, MO, 2003*



*Based on Pope et al. (2002) - ACS extended

Figure F.14. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back $PM_{2.5}$ Concentrations that Just Meet the Current Annual Standard of 15 μg/m^3 and the Current Daily Standard of 65 μg/m^3 to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: St. Louis, MO, 2003*



*Based on Pope et al. (2002) - ACS extended

Exhibit F.1a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	0 (0 - 0) 0.0% 0.0%	23 (-3 - 48) 9.2% 0.0%	64 (-8 - 135) 25.9% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	0 (0 - 0) 0.0% 0.0%	25 (0 - 49) 9.2% 0.1%	70 (0 - 139) 25.9% 0.1%	115 (0 - 228) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	0 (0 - 0) 0.0% 0.0%	23 (-3 - 48) 9.2% 0.0%	64 (-8 - 135) 25.9% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	0 (0 - 0) 0.0% 0.0%	25 (0 - 49) 9.2% 0.1%	70 (0 - 139) 25.9% 0.1%	115 (0 - 228) 42.6% 0.2%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	0 (0 - 0) 0.0% 0.0%	15 (2 - 28) 9.2% 0.1%	42 (4 - 78) 26.0% 0.2%	69 (7 - 128) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	0 (0 - 0) 0.0% 0.0%	15 (2 - 28) 9.2% 0.1%	43 (7 - 79) 26.0% 0.2%	71 (11 - 130) 42.7% 0.4%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models (Total Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	0 (0 - 0) 0.0% 0.0%	-23 (-57 - 11) 9.1% 0.0%	-64 (-160 - 30) 25.8% -0.1%	-105 (-264 - 49) 42.4% -0.2%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	0 day	CO	285 (124 - 438)	0 (0 - 0) 0.0% 0.0%	26 (11 - 41) 9.3% 0.1%	74 (32 - 115) 26.1% 0.4%	122 (53 - 189) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100 df	1 day	CO	148 (-20 - 308)	0 (0 - 0) 0.0% 0.0%	14 (-2 - 29) 9.2% 0.1%	38 (-5 - 81) 26.0% 0.2%	63 (-9 - 132) 42.7% 0.3%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0		590 (309 - 888)	0 (0 - 0) 0.0% 0.0%	193 (101 - 291) 32.8% 0.3%	543 (284 - 818) 92.1% 1.0%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	0 (0 - 0) 0.0% 0.0%	202 (133 - 274) 32.9% 0.7%	565 (373 - 765) 92.1% 1.9%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	0 (0 - 0) 0.0% 0.0%	241 (84 - 418) 16.0% 0.4%	678 (237 - 1171) 45.0% 1.2%	1111 (390 - 1912) 73.7% 2.0%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	0 (0 - 0) 0.0% 0.0%	186 (66 - 306) 16.1% 0.6%	520 (186 - 852) 45.2% 1.7%	850 (306 - 1388) 73.8% 2.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	0 (0 - 0) 0.0% 0.0%	29 (9 - 44) 16.3% 0.9%	81 (26 - 121) 45.4% 2.6%	133 (43 - 197) 74.1% 4.2%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	0 (0 - 0) 0.0% 0.0%	278 (163 - 393) 32.8% 0.5%	780 (459 - 1100) 92.1% 1.4%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	0 (0 - 0) 0.0% 0.0%	331 (178 - 463) 32.9% 0.6%	927 (502 - 1293) 92.1% 1.7%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	0 (0 - 0) 0.0% 0.0%	278 (163 - 393) 32.8% 0.5%	780 (459 - 1100) 92.1% 1.4%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	0 (0 - 0) 0.0% 0.0%	52 (-92 - 208) 32.7% 0.1%	146 (-259 - 584) 92.1% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.1b Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
								15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	0 (0 - 0) 0.0% 0.0%	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	0 (0 - 0) 0.0% 0.0%	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	0 (0 - 0) 0.0% 0.0%	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	0 (0 - 0) 0.0% 0.0%	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Single Pollutant Models (Cause-Specific Mortality)											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	0 (0 - 0) 0.0% 0.0%	61 (6 - 115) 38.1% 0.3%	78 (8 - 146) 48.7% 0.4%	95 (10 - 178) 59.2% 0.5%	112 (12 - 209) 69.6% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	0 (0 - 0) 0.0% 0.0%	64 (10 - 116) 38.1% 0.3%	81 (13 - 148) 48.7% 0.4%	99 (15 - 180) 59.2% 0.5%	116 (18 - 211) 69.6% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
								15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models (Total Mortality)											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	0 (0 - 0) 0.0% 0.0%	-94 (-236 - 44) 37.8% -0.2%	-120 (-301 - 56) 48.4% -0.2%	-146 (-367 - 69) 58.9% -0.3%	-172 (-432 - 81) 69.2% -0.3%
	Multi-Pollutant Models (Cause-Specific Mortality)											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	0 (0 - 0) 0.0% 0.0%	109 (47 - 169) 38.3% 0.6%	139 (61 - 215) 48.9% 0.7%	169 (74 - 261) 59.4% 0.9%	199 (87 - 306) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	0 (0 - 0) 0.0% 0.0%	56 (-8 - 118) 38.1% 0.3%	72 (-10 - 151) 48.7% 0.4%	88 (-12 - 183) 59.2% 0.4%	103 (-14 - 215) 69.5% 0.5%
Long-Term Exposure Mortality	**Single Pollutant Models**											
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	0 (0 - 0) 0.0% 0.0%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	0 (0 - 0) 0.0% 0.0%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	0 (0 - 0) 0.0% 0.0%	993 (348 - 1711) 65.9% 1.8%	1267 (445 - 2179) 84.1% 2.3%	1507 (531 - 2587) 100.0% 2.7%	1507 (531 - 2587) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	0 (0 - 0) 0.0% 0.0%	760 (273 - 1243) 66.1% 2.6%	969 (349 - 1580) 84.2% 3.3%	1151 (416 - 1873) 100.0% 3.9%	1151 (416 - 1873) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	0 (0 - 0) 0.0% 0.0%	119 (38 - 176) 66.3% 3.7%	151 (49 - 224) 84.3% 4.8%	179 (58 - 264) 100.0% 5.6%	179 (58 - 264) 100.0% 5.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
								15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models											
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	0 (0 - 0) 0.0% 0.0%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	0 (0 - 0) 0.0% 0.0%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	0 (0 - 0) 0.0% 0.0%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	0 (0 - 0) 0.0% 0.0%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.1c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	23 (-3 - 49) 9.4% 0.0%	23 (-3 - 49) 9.4% 0.0%	64 (-8 - 135) 25.9% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	26 (0 - 51) 9.5% 0.1%	26 (0 - 51) 9.5% 0.1%	70 (0 - 139) 25.9% 0.1%	115 (0 - 228) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	23 (-3 - 49) 9.4% 0.0%	23 (-3 - 49) 9.4% 0.0%	64 (-8 - 135) 25.9% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	26 (0 - 51) 9.5% 0.1%	26 (0 - 51) 9.5% 0.1%	70 (0 - 139) 25.9% 0.1%	115 (0 - 228) 42.6% 0.2%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	15 (2 - 29) 9.5% 0.1%	15 (2 - 29) 9.5% 0.1%	42 (4 - 78) 26.0% 0.2%	69 (7 - 128) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	16 (2 - 29) 9.5% 0.1%	16 (2 - 29) 9.5% 0.1%	43 (7 - 79) 26.0% 0.2%	71 (11 - 130) 42.7% 0.4%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Multi-Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	-23 (-58 - 11) 9.4% 0.0%	-23 (-58 - 11) 9.4% 0.0%	-64 (-160 - 30) 25.8% -0.1%	-105 (-264 - 49) 42.4% -0.2%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	27 (12 - 42) 9.5% 0.1%	27 (12 - 42) 9.5% 0.1%	74 (32 - 115) 26.1% 0.4%	122 (53 - 189) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	14 (-2 - 29) 9.5% 0.1%	14 (-2 - 29) 9.5% 0.1%	38 (-5 - 81) 26.0% 0.2%	63 (-9 - 132) 42.7% 0.3%
	Single Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	198 (104 - 299) 33.6% 0.4%	198 (104 - 299) 33.6% 0.4%	543 (284 - 818) 92.1% 1.0%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	207 (136 - 281) 33.7% 0.7%	207 (136 - 281) 33.7% 0.7%	565 (373 - 765) 92.1% 1.9%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	248 (87 - 429) 16.4% 0.4%	248 (87 - 429) 16.4% 0.4%	678 (237 - 1171) 45.0% 1.2%	1111 (390 - 1912) 73.7% 2.0%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	190 (68 - 313) 16.5% 0.6%	190 (68 - 313) 16.5% 0.6%	520 (186 - 852) 45.2% 1.7%	850 (306 - 1388) 73.8% 2.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	30 (10 - 45) 16.7% 0.9%	30 (10 - 45) 16.7% 0.9%	81 (26 - 121) 45.4% 2.6%	133 (43 - 197) 74.1% 4.2%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	285 (168 - 403) 33.7% 0.5%	285 (168 - 403) 33.7% 0.5%	780 (459 - 1100) 92.1% 1.4%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	339 (183 - 474) 33.7% 0.6%	339 (183 - 474) 33.7% 0.6%	927 (502 - 1293) 92.1% 1.7%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	285 (168 - 403) 33.7% 0.5%	285 (168 - 403) 33.7% 0.5%	780 (459 - 1100) 92.1% 1.4%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	53 (-94 - 213) 33.5% 0.1%	53 (-94 - 213) 33.5% 0.1%	146 (-259 - 584) 92.1% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.1d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	61 (6 - 115) 38.1% 0.3%	78 (8 - 146) 48.7% 0.4%	95 (10 - 178) 59.2% 0.5%	112 (12 - 209) 69.6% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	64 (10 - 116) 38.1% 0.3%	81 (13 - 148) 48.7% 0.4%	99 (15 - 180) 59.2% 0.5%	116 (18 - 211) 69.6% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models (Total Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	-94 (-236 - 44) 37.8% -0.2%	-120 (-301 - 56) 48.4% -0.2%	-146 (-367 - 69) 58.9% -0.3%	-172 (-432 - 81) 69.2% -0.3%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	109 (47 - 169) 38.3% 0.6%	139 (61 - 215) 48.9% 0.7%	169 (74 - 261) 59.4% 0.9%	199 (87 - 306) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	56 (-8 - 118) 38.1% 0.3%	72 (-10 - 151) 48.7% 0.4%	88 (-12 - 183) 59.2% 0.4%	103 (-14 - 215) 69.5% 0.5%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	993 (348 - 1711) 65.9% 1.8%	1267 (445 - 2179) 84.1% 2.3%	1507 (531 - 2587) 100.0% 2.7%	1507 (531 - 2587) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	760 (273 - 1243) 66.1% 2.6%	969 (349 - 1580) 84.2% 3.3%	1151 (416 - 1873) 100.0% 3.9%	1151 (416 - 1873) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	119 (38 - 176) 66.3% 3.7%	151 (49 - 224) 84.3% 4.8%	179 (58 - 264) 100.0% 5.6%	179 (58 - 264) 100.0% 5.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.1e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	47 (-6 - 98) 18.9% 0.1%	47 (-6 - 98) 18.9% 0.1%	64 (-8 - 135) 25.9% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	51 (0 - 101) 18.9% 0.1%	51 (0 - 101) 18.9% 0.1%	70 (0 - 139) 25.9% 0.1%	115 (0 - 228) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	47 (-6 - 98) 18.9% 0.1%	47 (-6 - 98) 18.9% 0.1%	64 (-8 - 135) 25.9% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	51 (0 - 101) 18.9% 0.1%	51 (0 - 101) 18.9% 0.1%	70 (0 - 139) 25.9% 0.1%	115 (0 - 228) 42.6% 0.2%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	30 (3 - 57) 18.9% 0.2%	30 (3 - 57) 18.9% 0.2%	42 (4 - 78) 26.0% 0.2%	69 (7 - 128) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	32 (5 - 58) 18.9% 0.2%	32 (5 - 58) 18.9% 0.2%	43 (7 - 79) 26.0% 0.2%	71 (11 - 130) 42.7% 0.4%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models (Total Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	-46 (-117 - 22) 18.7% -0.1%	-46 (-117 - 22) 18.7% -0.1%	-64 (-160 - 30) 25.8% -0.1%	-105 (-264 - 49) 42.4% -0.2%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	54 (24 - 84) 19.0% 0.3%	54 (24 - 84) 19.0% 0.3%	74 (32 - 115) 26.1% 0.4%	122 (53 - 189) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	28 (-4 - 59) 18.9% 0.1%	28 (-4 - 59) 18.9% 0.1%	38 (-5 - 81) 26.0% 0.2%	63 (-9 - 132) 42.7% 0.3%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	396 (207 - 596) 67.1% 0.7%	396 (207 - 596) 67.1% 0.7%	543 (284 - 818) 92.1% 1.0%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	413 (272 - 559) 67.2% 1.4%	413 (272 - 559) 67.2% 1.4%	565 (373 - 765) 92.1% 1.9%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	494 (173 - 855) 32.8% 0.9%	494 (173 - 855) 32.8% 0.9%	678 (237 - 1171) 45.0% 1.2%	1111 (390 - 1912) 73.7% 2.0%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	379 (136 - 623) 32.9% 1.3%	379 (136 - 623) 32.9% 1.3%	520 (186 - 852) 45.2% 1.7%	850 (306 - 1388) 73.8% 2.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	60 (19 - 89) 33.2% 1.9%	60 (19 - 89) 33.2% 1.9%	81 (26 - 121) 45.4% 2.6%	133 (43 - 197) 74.1% 4.2%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	569 (335 - 803) 67.2% 1.0%	569 (335 - 803) 67.2% 1.0%	780 (459 - 1100) 92.1% 1.4%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	676 (366 - 945) 67.2% 1.2%	676 (366 - 945) 67.2% 1.2%	927 (502 - 1293) 92.1% 1.7%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	569 (335 - 803) 67.2% 1.0%	569 (335 - 803) 67.2% 1.0%	780 (459 - 1100) 92.1% 1.4%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	106 (-189 - 426) 67.0% 0.2%	106 (-189 - 426) 67.0% 0.2%	146 (-259 - 584) 92.1% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F1.f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	61 (6 - 115) 38.1% 0.3%	78 (8 - 146) 48.7% 0.4%	95 (10 - 178) 59.2% 0.5%	112 (12 - 209) 69.6% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	64 (10 - 116) 38.1% 0.3%	81 (13 - 148) 48.7% 0.4%	99 (15 - 180) 59.2% 0.5%	116 (18 - 211) 69.6% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models (Total Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	-94 (-236 - 44) 37.8% -0.2%	-120 (-301 - 56) 48.4% -0.2%	-146 (-367 - 69) 58.9% -0.3%	-172 (-432 - 81) 69.2% -0.3%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	109 (47 - 169) 38.3% 0.6%	139 (61 - 215) 48.9% 0.7%	169 (74 - 261) 59.4% 0.9%	199 (87 - 306) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	56 (-8 - 118) 38.1% 0.3%	72 (-10 - 151) 48.7% 0.4%	88 (-12 - 183) 59.2% 0.4%	103 (-14 - 215) 69.5% 0.5%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	993 (348 - 1711) 65.9% 1.8%	1267 (445 - 2179) 84.1% 2.3%	1507 (531 - 2587) 100.0% 2.7%	1507 (531 - 2587) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	760 (273 - 1243) 66.1% 2.6%	969 (349 - 1580) 84.2% 3.3%	1151 (416 - 1873) 100.0% 3.9%	1151 (416 - 1873) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	119 (38 - 176) 66.3% 3.7%	151 (49 - 224) 84.3% 4.8%	179 (58 - 264) 100.0% 5.6%	179 (58 - 264) 100.0% 5.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.1g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	70 (-9 - 147) 28.3% 0.1%	70 (-9 - 147) 28.3% 0.1%	70 (-9 - 147) 28.3% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	77 (0 - 151) 28.3% 0.1%	77 (0 - 151) 28.3% 0.1%	77 (0 - 151) 28.3% 0.1%	115 (0 - 228) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	70 (-9 - 147) 28.3% 0.1%	70 (-9 - 147) 28.3% 0.1%	70 (-9 - 147) 28.3% 0.1%	105 (-13 - 222) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	77 (0 - 151) 28.3% 0.1%	77 (0 - 151) 28.3% 0.1%	77 (0 - 151) 28.3% 0.1%	115 (0 - 228) 42.6% 0.2%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	46 (5 - 85) 28.4% 0.2%	46 (5 - 85) 28.4% 0.2%	46 (5 - 85) 28.4% 0.2%	69 (7 - 128) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	47 (7 - 86) 28.4% 0.2%	47 (7 - 86) 28.4% 0.2%	47 (7 - 86) 28.4% 0.2%	71 (11 - 130) 42.7% 0.4%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models (Total Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	-70 (-175 - 33) 28.1% -0.1%	-70 (-175 - 33) 28.1% -0.1%	-70 (-175 - 33) 28.1% -0.1%	-105 (-264 - 49) 42.4% -0.2%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	81 (35 - 126) 28.5% 0.4%	81 (35 - 126) 28.5% 0.4%	81 (35 - 126) 28.5% 0.4%	122 (53 - 189) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	42 (-6 - 88) 28.4% 0.2%	42 (-6 - 88) 28.4% 0.2%	42 (-6 - 88) 28.4% 0.2%	63 (-9 - 132) 42.7% 0.3%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	739 (259 - 1277) 49.1% 1.3%	739 (259 - 1277) 49.1% 1.3%	739 (259 - 1277) 49.1% 1.3%	1111 (390 - 1912) 73.7% 2.0%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	567 (203 - 929) 49.3% 1.9%	567 (203 - 929) 49.3% 1.9%	567 (203 - 929) 49.3% 1.9%	850 (306 - 1388) 73.8% 2.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	89 (29 - 132) 49.5% 2.8%	89 (29 - 132) 49.5% 2.8%	89 (29 - 132) 49.5% 2.8%	133 (43 - 197) 74.1% 4.2%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.1h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		248 (-31 - 519)	94 (-12 - 198) 38.0% 0.2%	120 (-15 - 253) 48.6% 0.2%	146 (-18 - 307) 59.1% 0.3%	172 (-21 - 361) 69.5% 0.3%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		270 (1 - 533)	103 (0 - 203) 38.1% 0.2%	131 (0 - 260) 48.6% 0.2%	160 (0 - 316) 59.1% 0.3%	188 (1 - 371) 69.5% 0.3%
	Single Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		161 (17 - 299)	61 (6 - 115) 38.1% 0.3%	78 (8 - 146) 48.7% 0.4%	95 (10 - 178) 59.2% 0.5%	112 (12 - 209) 69.6% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		167 (26 - 303)	64 (10 - 116) 38.1% 0.3%	81 (13 - 148) 48.7% 0.4%	99 (15 - 180) 59.2% 0.5%	116 (18 - 211) 69.6% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models (Total Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day	CO	-248 (-625 - 116)	-94 (-236 - 44) 37.8% -0.2%	-120 (-301 - 56) 48.4% -0.2%	-146 (-367 - 69) 58.9% -0.3%	-172 (-432 - 81) 69.2% -0.3%
	Multi-Pollutant Models (Cause-Specific Mortality)										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	0 day	CO	285 (124 - 438)	109 (47 - 169) 38.3% 0.6%	139 (61 - 215) 48.9% 0.7%	169 (74 - 261) 59.4% 0.9%	199 (87 - 306) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 100	1 day	CO	148 (-20 - 308)	56 (-8 - 118) 38.1% 0.3%	72 (-10 - 151) 48.7% 0.4%	88 (-12 - 183) 59.2% 0.4%	103 (-14 - 215) 69.5% 0.5%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+		0		590 (309 - 888)	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%	590 (309 - 888) 100.0% 1.1%
	Krewski et al. (2000) - ACS	Cardiopulmona	30+	log-linear	0		614 (405 - 830)	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%	614 (405 - 830) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	All cause	30+	log-linear	0		1507 (531 - 2587)	993 (348 - 1711) 65.9% 1.8%	1267 (445 - 2179) 84.1% 2.3%	1507 (531 - 2587) 100.0% 2.7%	1507 (531 - 2587) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmona	30+	log-linear	0		1151 (416 - 1873)	760 (273 - 1243) 66.1% 2.6%	969 (349 - 1580) 84.2% 3.3%	1151 (416 - 1873) 100.0% 3.9%	1151 (416 - 1873) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+	log-linear	0		179 (58 - 264)	119 (38 - 176) 66.3% 3.7%	151 (49 - 224) 84.3% 4.8%	179 (58 - 264) 100.0% 5.6%	179 (58 - 264) 100.0% 5.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards **** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	CO	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	NO2	1007 (545 - 1404)	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%	1007 (545 - 1404) 100.0% 1.8%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	O3	847 (499 - 1194)	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%	847 (499 - 1194) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+	log-linear	0	SO2	158 (-282 - 634)	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%	158 (-282 - 634) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	0 (0 - 0) 0.0% 0.0%	83 (48 - 116) 9.3% 0.1%	232 (135 - 327) 26.1% 0.3%	381 (222 - 536) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	0 (0 - 0) 0.0% 0.0%	73 (37 - 108) 9.3% 0.1%	205 (103 - 304) 26.1% 0.3%	336 (170 - 499) 42.8% 0.5%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	0 (0 - 0) 0.0% 0.0%	38 (16 - 60) 9.3% 0.1%	107 (45 - 167) 26.1% 0.4%	176 (74 - 274) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	0 (0 - 0) 0.0% 0.0%	27 (5 - 49) 9.3% 0.1%	77 (15 - 137) 26.0% 0.3%	126 (25 - 224) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	0 (0 - 0) 0.0% 0.0%	42 (19 - 64) 9.3% 0.1%	118 (54 - 181) 26.1% 0.4%	194 (89 - 296) 42.9% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	0 (0 - 0) 0.0% 0.0%	21 (-24 - 64) 9.2% 0.0%	58 (-66 - 179) 25.9% 0.1%	96 (-109 - 294) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	0 (0 - 0) 0.0% 0.0%	13 (-35 - 59) 9.2% 0.0%	36 (-98 - 166) 25.9% 0.1%	59 (-161 - 272) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	0 (0 - 0) 0.0% 0.0%	10 (-21 - 40) 9.2% 0.0%	27 (-60 - 111) 25.9% 0.1%	45 (-99 - 182) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	0 (0 - 0) 0.0% 0.0%	-1 (-38 - 35) 9.2% 0.0%	-3 (-108 - 97) 25.8% 0.0%	-4 (-178 - 160) 42.5% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	0 (0 - 0) 0.0% 0.0%	8 (-24 - 39) 9.2% 0.0%	23 (-68 - 110) 25.9% 0.1%	37 (-112 - 180) 42.5% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
								15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Hospital Admissions	**Single Pollutant Models**											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	0 (0 - 0) 0.0% 0.0%	341 (199 - 480) 38.3% 0.5%	435 (254 - 612) 48.8% 0.6%	529 (309 - 743) 59.3% 0.8%	621 (363 - 873) 69.7% 0.9%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	0 (0 - 0) 0.0% 0.0%	300 (152 - 446) 38.2% 0.4%	384 (194 - 569) 48.8% 0.6%	466 (235 - 691) 59.3% 0.7%	548 (277 - 812) 69.7% 0.8%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	0 (0 - 0) 0.0% 0.0%	157 (66 - 245) 38.3% 0.5%	201 (84 - 313) 48.9% 0.7%	244 (102 - 380) 59.4% 0.8%	286 (120 - 446) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	0 (0 - 0) 0.0% 0.0%	113 (22 - 200) 38.2% 0.4%	144 (28 - 256) 48.8% 0.5%	175 (34 - 310) 59.3% 0.6%	205 (40 - 364) 69.6% 0.7%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	0 (0 - 0) 0.0% 0.0%	174 (80 - 264) 38.3% 0.6%	222 (102 - 337) 48.9% 0.7%	269 (123 - 410) 59.4% 0.9%	316 (145 - 481) 69.8% 1.1%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
								15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models											
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	0 (0 - 0) 0.0% 0.0%	85 (-98 - 263) 38.0% 0.1%	109 (-125 - 336) 48.6% 0.2%	133 (-152 - 408) 59.1% 0.2%	156 (-179 - 480) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	0 (0 - 0) 0.0% 0.0%	53 (-144 - 243) 38.0% 0.1%	67 (-184 - 311) 48.5% 0.1%	82 (-224 - 378) 59.0% 0.1%	96 (-264 - 444) 69.4% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	0 (0 - 0) 0.0% 0.0%	40 (-89 - 163) 38.0% 0.1%	51 (-113 - 208) 48.6% 0.2%	62 (-138 - 253) 59.1% 0.2%	73 (-162 - 297) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	0 (0 - 0) 0.0% 0.0%	-4 (-159 - 143) 37.9% 0.0%	-5 (-203 - 182) 48.5% 0.0%	-6 (-248 - 222) 59.0% 0.0%	-7 (-292 - 260) 69.3% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	0 (0 - 0) 0.0% 0.0%	33 (-100 - 161) 38.0% 0.1%	43 (-128 - 205) 48.6% 0.1%	52 (-156 - 249) 59.1% 0.2%	61 (-183 - 292) 69.4% 0.2%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	85 (49 - 119) 9.5% 0.1%	85 (49 - 119) 9.5% 0.1%	232 (135 - 327) 26.1% 0.3%	381 (222 - 536) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	75 (38 - 111) 9.5% 0.1%	75 (38 - 111) 9.5% 0.1%	205 (103 - 304) 26.1% 0.3%	336 (170 - 499) 42.8% 0.5%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	39 (16 - 61) 9.5% 0.1%	39 (16 - 61) 9.5% 0.1%	107 (45 - 167) 26.1% 0.4%	176 (74 - 274) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	28 (5 - 50) 9.5% 0.1%	28 (5 - 50) 9.5% 0.1%	77 (15 - 137) 26.0% 0.3%	126 (25 - 224) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	43 (20 - 66) 9.5% 0.1%	43 (20 - 66) 9.5% 0.1%	118 (54 - 181) 26.1% 0.4%	194 (89 - 296) 42.9% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	21 (-24 - 65) 9.4% 0.0%	21 (-24 - 65) 9.4% 0.0%	58 (-66 - 179) 25.9% 0.1%	96 (-109 - 294) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	13 (-36 - 60) 9.4% 0.0%	13 (-36 - 60) 9.4% 0.0%	36 (-98 - 166) 25.9% 0.1%	59 (-161 - 272) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	10 (-22 - 41) 9.4% 0.0%	10 (-22 - 41) 9.4% 0.0%	27 (-60 - 111) 25.9% 0.1%	45 (-99 - 182) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	-1 (-39 - 36) 9.4% 0.0%	-1 (-39 - 36) 9.4% 0.0%	-3 (-108 - 97) 25.8% 0.0%	-4 (-178 - 160) 42.5% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	8 (-25 - 40) 9.4% 0.0%	8 (-25 - 40) 9.4% 0.0%	23 (-68 - 110) 25.9% 0.1%	37 (-112 - 180) 42.5% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	341 (199 - 480) 38.3% 0.5%	435 (254 - 612) 48.8% 0.6%	529 (309 - 743) 59.3% 0.8%	621 (363 - 873) 69.7% 0.9%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	300 (152 - 446) 38.2% 0.4%	384 (194 - 569) 48.8% 0.6%	466 (235 - 691) 59.3% 0.7%	548 (277 - 812) 69.7% 0.8%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	157 (66 - 245) 38.3% 0.5%	201 (84 - 313) 48.9% 0.7%	244 (102 - 380) 59.4% 0.8%	286 (120 - 446) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	113 (22 - 200) 38.2% 0.4%	144 (28 - 256) 48.8% 0.5%	175 (34 - 310) 59.3% 0.6%	205 (40 - 364) 69.6% 0.7%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	174 (80 - 264) 38.3% 0.6%	222 (102 - 337) 48.9% 0.7%	269 (123 - 410) 59.4% 0.9%	316 (145 - 481) 69.8% 1.1%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	85 (-98 - 263) 38.0% 0.1%	109 (-125 - 336) 48.6% 0.2%	133 (-152 - 408) 59.1% 0.2%	156 (-179 - 480) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	53 (-144 - 243) 38.0% 0.1%	67 (-184 - 311) 48.5% 0.1%	82 (-224 - 378) 59.0% 0.1%	96 (-264 - 444) 69.4% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	40 (-89 - 163) 38.0% 0.1%	51 (-113 - 208) 48.6% 0.2%	62 (-138 - 253) 59.1% 0.2%	73 (-162 - 297) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	-4 (-159 - 143) 37.9% 0.0%	-5 (-203 - 182) 48.5% 0.0%	-6 (-248 - 222) 59.0% 0.0%	-7 (-292 - 260) 69.3% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	33 (-100 - 161) 38.0% 0.1%	43 (-128 - 205) 48.6% 0.1%	52 (-156 - 249) 59.1% 0.2%	61 (-183 - 292) 69.4% 0.2%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	169 (99 - 238) 19.0% 0.2%	169 (99 - 238) 19.0% 0.2%	232 (135 - 327) 26.1% 0.3%	381 (222 - 536) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	149 (75 - 222) 19.0% 0.2%	149 (75 - 222) 19.0% 0.2%	205 (103 - 304) 26.1% 0.3%	336 (170 - 499) 42.8% 0.5%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	78 (33 - 122) 19.0% 0.3%	78 (33 - 122) 19.0% 0.3%	107 (45 - 167) 26.1% 0.4%	176 (74 - 274) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	56 (11 - 100) 19.0% 0.2%	56 (11 - 100) 19.0% 0.2%	77 (15 - 137) 26.0% 0.3%	126 (25 - 224) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	86 (39 - 132) 19.0% 0.3%	86 (39 - 132) 19.0% 0.3%	118 (54 - 181) 26.1% 0.4%	194 (89 - 296) 42.9% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	42 (-48 - 131) 18.9% 0.1%	42 (-48 - 131) 18.9% 0.1%	58 (-66 - 179) 25.9% 0.1%	96 (-109 - 294) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	26 (-71 - 121) 18.8% 0.0%	26 (-71 - 121) 18.8% 0.0%	36 (-98 - 166) 25.9% 0.1%	59 (-161 - 272) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	20 (-44 - 81) 18.9% 0.1%	20 (-44 - 81) 18.9% 0.1%	27 (-60 - 111) 25.9% 0.1%	45 (-99 - 182) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	-2 (-79 - 71) 18.8% 0.0%	-2 (-79 - 71) 18.8% 0.0%	-3 (-108 - 97) 25.8% 0.0%	-4 (-178 - 160) 42.5% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	17 (-49 - 80) 18.9% 0.1%	17 (-49 - 80) 18.9% 0.1%	23 (-68 - 110) 25.9% 0.1%	37 (-112 - 180) 42.5% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	341 (199 - 480) 38.3% 0.5%	435 (254 - 612) 48.8% 0.6%	529 (309 - 743) 59.3% 0.8%	621 (363 - 873) 69.7% 0.9%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	300 (152 - 446) 38.2% 0.4%	384 (194 - 569) 48.8% 0.6%	466 (235 - 691) 59.3% 0.7%	548 (277 - 812) 69.7% 0.8%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	157 (66 - 245) 38.3% 0.5%	201 (84 - 313) 48.9% 0.7%	244 (102 - 380) 59.4% 0.8%	286 (120 - 446) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	113 (22 - 200) 38.2% 0.4%	144 (28 - 256) 48.8% 0.5%	175 (34 - 310) 59.3% 0.6%	205 (40 - 364) 69.6% 0.7%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	174 (80 - 264) 38.3% 0.6%	222 (102 - 337) 48.9% 0.7%	269 (123 - 410) 59.4% 0.9%	316 (145 - 481) 69.8% 1.1%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	85 (-98 - 263) 38.0% 0.1%	109 (-125 - 336) 48.6% 0.2%	133 (-152 - 408) 59.1% 0.2%	156 (-179 - 480) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	53 (-144 - 243) 38.0% 0.1%	67 (-184 - 311) 48.5% 0.1%	82 (-224 - 378) 59.0% 0.1%	96 (-264 - 444) 69.4% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	40 (-89 - 163) 38.0% 0.1%	51 (-113 - 208) 48.6% 0.2%	62 (-138 - 253) 59.1% 0.2%	73 (-162 - 297) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	-4 (-159 - 143) 37.9% 0.0%	-5 (-203 - 182) 48.5% 0.0%	-6 (-248 - 222) 59.0% 0.0%	-7 (-292 - 260) 69.3% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	33 (-100 - 161) 38.0% 0.1%	43 (-128 - 205) 48.6% 0.1%	52 (-156 - 249) 59.1% 0.2%	61 (-183 - 292) 69.4% 0.2%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	254 (148 - 357) 28.5% 0.4%	254 (148 - 357) 28.5% 0.4%	254 (148 - 357) 28.5% 0.4%	381 (222 - 536) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	224 (113 - 332) 28.4% 0.3%	224 (113 - 332) 28.4% 0.3%	224 (113 - 332) 28.4% 0.3%	336 (170 - 499) 42.8% 0.5%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	117 (49 - 183) 28.5% 0.4%	117 (49 - 183) 28.5% 0.4%	117 (49 - 183) 28.5% 0.4%	176 (74 - 274) 42.8% 0.6%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	84 (16 - 149) 28.4% 0.3%	84 (16 - 149) 28.4% 0.3%	84 (16 - 149) 28.4% 0.3%	126 (25 - 224) 42.7% 0.4%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	129 (59 - 197) 28.5% 0.4%	129 (59 - 197) 28.5% 0.4%	129 (59 - 197) 28.5% 0.4%	194 (89 - 296) 42.9% 0.6%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	63 (-73 - 196) 28.3% 0.1%	63 (-73 - 196) 28.3% 0.1%	63 (-73 - 196) 28.3% 0.1%	96 (-109 - 294) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	39 (-107 - 181) 28.2% 0.1%	39 (-107 - 181) 28.2% 0.1%	39 (-107 - 181) 28.2% 0.1%	59 (-161 - 272) 42.5% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	30 (-66 - 121) 28.3% 0.1%	30 (-66 - 121) 28.3% 0.1%	30 (-66 - 121) 28.3% 0.1%	45 (-99 - 182) 42.6% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	-3 (-118 - 106) 28.2% 0.0%	-3 (-118 - 106) 28.2% 0.0%	-3 (-118 - 106) 28.2% 0.0%	-4 (-178 - 160) 42.5% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	25 (-74 - 120) 28.3% 0.1%	25 (-74 - 120) 28.3% 0.1%	25 (-74 - 120) 28.3% 0.1%	37 (-112 - 180) 42.5% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.2h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Los Angeles, CA, 2003

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Hospital Admissions	**Single Pollutant Models**										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		891 (521 - 1250)	341 (199 - 480) 38.3% 0.5%	435 (254 - 612) 48.8% 0.6%	529 (309 - 743) 59.3% 0.8%	621 (363 - 873) 69.7% 0.9%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		786 (398 - 1163)	300 (152 - 446) 38.2% 0.4%	384 (194 - 569) 48.8% 0.6%	466 (235 - 691) 59.3% 0.7%	548 (277 - 812) 69.7% 0.8%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		411 (173 - 637)	157 (66 - 245) 38.3% 0.5%	201 (84 - 313) 48.9% 0.7%	244 (102 - 380) 59.4% 0.8%	286 (120 - 446) 69.7% 1.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		295 (58 - 522)	113 (22 - 200) 38.2% 0.4%	144 (28 - 256) 48.8% 0.5%	175 (34 - 310) 59.3% 0.6%	205 (40 - 364) 69.6% 0.7%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		453 (209 - 687)	174 (80 - 264) 38.3% 0.6%	222 (102 - 337) 48.9% 0.7%	269 (123 - 410) 59.4% 0.9%	316 (145 - 481) 69.8% 1.1%

Health Effects**	Study	Type	Ages	Model	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
								12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	0 day	CO	225 (-258 - 689)	85 (-98 - 263) 38.0% 0.1%	109 (-125 - 336) 48.6% 0.2%	133 (-152 - 408) 59.1% 0.2%	156 (-179 - 480) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100	1 day	CO	139 (-381 - 638)	53 (-144 - 243) 38.0% 0.1%	67 (-184 - 311) 48.5% 0.1%	82 (-224 - 378) 59.0% 0.1%	96 (-264 - 444) 69.4% 0.1%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	0 day	NO2	106 (-234 - 426)	40 (-89 - 163) 38.0% 0.1%	51 (-113 - 208) 48.6% 0.2%	62 (-138 - 253) 59.1% 0.2%	73 (-162 - 297) 69.4% 0.2%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	1 day	NO2	-10 (-423 - 374)	-4 (-159 - 143) 37.9% 0.0%	-5 (-203 - 182) 48.5% 0.0%	-6 (-248 - 222) 59.0% 0.0%	-7 (-292 - 260) 69.3% 0.0%
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100	2 day	NO2	88 (-265 - 420)	33 (-100 - 161) 38.0% 0.1%	43 (-128 - 205) 48.6% 0.1%	52 (-156 - 249) 59.1% 0.2%	61 (-183 - 292) 69.4% 0.2%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.3a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	51 (24 - 77) 13.8% 0.3%	94 (45 - 143) 25.6% 0.6%	138 (66 - 209) 37.4% 0.9%	181 (86 - 275) 49.2% 1.1%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	102 (53 - 156) 42.5% 0.6%	189 (97 - 288) 78.7% 1.1%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	92 (59 - 127) 42.7% 1.2%	169 (109 - 234) 78.8% 2.3%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	128 (44 - 227) 23.9% 0.8%	237 (81 - 420) 44.2% 1.4%	345 (119 - 609) 64.3% 2.1%	452 (156 - 797) 84.3% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	84 (29 - 143) 24.0% 1.1%	155 (54 - 263) 44.4% 2.1%	225 (78 - 380) 64.5% 3.0%	295 (103 - 496) 84.4% 4.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	19 (6 - 29) 24.3% 1.7%	34 (11 - 53) 44.7% 3.1%	50 (15 - 77) 64.8% 4.6%	65 (20 - 100) 84.6% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	148 (86 - 213) 42.6% 0.9%	274 (159 - 393) 78.7% 1.6%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	178 (94 - 253) 42.6% 1.1%	328 (174 - 467) 78.8% 2.0%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	148 (86 - 213) 42.6% 0.9%	274 (159 - 393) 78.7% 1.6%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	27 (-47 - 110) 42.4% 0.2%	50 (-87 - 203) 78.6% 0.3%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant policy relevant background level. Average policy relevant policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**										
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	71 (34 - 108) 19.3% 0.4%	192 (91 - 292) 52.1% 1.2%	216 (103 - 328) 58.7% 1.3%	240 (114 - 365) 65.2% 1.5%	264 (126 - 402) 71.8% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	142 (74 - 217) 59.4% 0.9%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	128 (83 - 177) 59.6% 1.7%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	179 (61 - 317) 33.4% 1.1%	478 (165 - 842) 89.2% 2.9%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	117 (41 - 199) 33.5% 1.6%	311 (109 - 524) 89.3% 4.2%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	26 (8 - 41) 33.8% 2.4%	69 (21 - 106) 89.4% 6.3%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	207 (120 - 297) 59.5% 1.2%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	248 (131 - 353) 59.5% 1.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	207 (120 - 297) 59.5% 1.2%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	37 (-65 - 153) 59.3% 0.2%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							14 ug/m3 annual and 65 ug/m3 daily 98th percentile value	14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**										
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	32 (15 - 49) 8.7% 0.2%	51 (24 - 77) 13.8% 0.3%	94 (45 - 143) 25.6% 0.6%	138 (66 - 209) 37.4% 0.9%	181 (86 - 275) 49.2% 1.1%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	64 (33 - 98) 26.8% 0.4%	102 (53 - 156) 42.5% 0.6%	189 (97 - 288) 78.7% 1.1%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	58 (37 - 80) 27.0% 0.8%	92 (59 - 127) 42.7% 1.2%	169 (109 - 234) 78.8% 2.3%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	81 (28 - 144) 15.1% 0.5%	128 (44 - 227) 23.9% 0.8%	237 (81 - 420) 44.2% 1.4%	345 (119 - 609) 64.3% 2.1%	452 (156 - 797) 84.3% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	53 (18 - 90) 15.2% 0.7%	84 (29 - 143) 24.0% 1.1%	155 (54 - 263) 44.4% 2.1%	225 (78 - 380) 64.5% 3.0%	295 (103 - 496) 84.4% 4.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	12 (4 - 18) 15.3% 1.1%	19 (6 - 29) 24.3% 1.7%	34 (11 - 53) 44.7% 3.1%	50 (15 - 77) 64.8% 4.6%	65 (20 - 100) 84.6% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							14 ug/m3 annual and 65 ug/m3 daily 98th percentile value	14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	94 (54 - 134) 26.9% 0.6%	148 (86 - 213) 42.6% 0.9%	274 (159 - 393) 78.7% 1.6%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	112 (59 - 160) 26.9% 0.7%	178 (94 - 253) 42.6% 1.1%	328 (174 - 467) 78.8% 2.0%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	94 (54 - 134) 26.9% 0.6%	148 (86 - 213) 42.6% 0.9%	274 (159 - 393) 78.7% 1.6%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	17 (-29 - 69) 26.7% 0.1%	27 (-47 - 110) 42.4% 0.2%	50 (-87 - 203) 78.6% 0.3%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	192 (91 - 292) 52.1% 1.2%	216 (103 - 328) 58.7% 1.3%	240 (114 - 365) 65.2% 1.5%	264 (126 - 402) 71.8% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	478 (165 - 842) 89.2% 2.9%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	311 (109 - 524) 89.3% 4.2%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	69 (21 - 106) 89.4% 6.3%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 8 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	64 (31 - 97) 17.4% 0.4%	94 (45 - 143) 25.6% 0.6%	138 (66 - 209) 37.4% 0.9%	181 (86 - 275) 49.2% 1.1%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	128 (66 - 196) 53.5% 0.8%	189 (97 - 288) 78.7% 1.1%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	115 (75 - 159) 53.7% 1.6%	169 (109 - 234) 78.8% 2.3%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	161 (55 - 286) 30.1% 1.0%	237 (81 - 420) 44.2% 1.4%	345 (119 - 609) 64.3% 2.1%	452 (156 - 797) 84.3% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	105 (37 - 179) 30.2% 1.4%	155 (54 - 263) 44.4% 2.1%	225 (78 - 380) 64.5% 3.0%	295 (103 - 496) 84.4% 4.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	23 (7 - 37) 30.5% 2.1%	34 (11 - 53) 44.7% 3.1%	50 (15 - 77) 64.8% 4.6%	65 (20 - 100) 84.6% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	187 (108 - 268) 53.6% 1.1%	274 (159 - 393) 78.7% 1.6%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	224 (118 - 318) 53.7% 1.3%	328 (174 - 467) 78.8% 2.0%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	187 (108 - 268) 53.6% 1.1%	274 (159 - 393) 78.7% 1.6%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	34 (-59 - 138) 53.4% 0.2%	50 (-87 - 203) 78.6% 0.3%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 8 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	192 (91 - 292) 52.1% 1.2%	216 (103 - 328) 58.7% 1.3%	240 (114 - 365) 65.2% 1.5%	264 (126 - 402) 71.8% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	478 (165 - 842) 89.2% 2.9%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	311 (109 - 524) 89.3% 4.2%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	69 (21 - 106) 89.4% 6.3%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 8 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	96 (46 - 146) 26.1% 0.6%	96 (46 - 146) 26.1% 0.6%	138 (66 - 209) 37.4% 0.9%	181 (86 - 275) 49.2% 1.1%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	192 (99 - 293) 80.1% 1.2%	192 (99 - 293) 80.1% 1.2%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	172 (111 - 238) 80.2% 2.3%	172 (111 - 238) 80.2% 2.3%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	241 (83 - 427) 45.0% 1.5%	241 (83 - 427) 45.0% 1.5%	345 (119 - 609) 64.3% 2.1%	452 (156 - 797) 84.3% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	158 (55 - 267) 45.2% 2.1%	158 (55 - 267) 45.2% 2.1%	225 (78 - 380) 64.5% 3.0%	295 (103 - 496) 84.4% 4.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	35 (11 - 54) 45.5% 3.2%	35 (11 - 54) 45.5% 3.2%	50 (15 - 77) 64.8% 4.6%	65 (20 - 100) 84.6% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	279 (162 - 400) 80.2% 1.7%	279 (162 - 400) 80.2% 1.7%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	334 (177 - 475) 80.2% 2.0%	334 (177 - 475) 80.2% 2.0%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	279 (162 - 400) 80.2% 1.7%	279 (162 - 400) 80.2% 1.7%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	51 (-88 - 207) 80.0% 0.3%	51 (-88 - 207) 80.0% 0.3%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 8 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.3h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Philadelphia, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		367 (175 - 560)	192 (91 - 292) 52.1% 1.2%	216 (103 - 328) 58.7% 1.3%	240 (114 - 365) 65.2% 1.5%	264 (126 - 402) 71.8% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			240 (124 - 365)	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%	240 (124 - 365) 100.0% 1.4%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			215 (139 - 296)	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%	215 (139 - 296) 100.0% 2.9%
	Pope et al. (2002) - ACS extended	All cause	30+			536 (185 - 943)	478 (165 - 842) 89.2% 2.9%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%	536 (185 - 943) 100.0% 3.2%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			349 (122 - 586)	311 (109 - 524) 89.3% 4.2%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%	349 (122 - 586) 100.0% 4.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			77 (24 - 118)	69 (21 - 106) 89.4% 6.3%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%	77 (24 - 118) 100.0% 7.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	348 (202 - 499)	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	417 (221 - 592)	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%	417 (221 - 592) 100.0% 2.5%
	Krewski et al. (2000) - ACS	All cause	30+		O3	348 (202 - 499)	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%	348 (202 - 499) 100.0% 2.1%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	63 (-111 - 258)	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%	63 (-111 - 258) 100.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 8 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

Note 1: Incidence and incidence reduction is rounded to the nearest whole number.

Note 2: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Note 3: Multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit F.4a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	3 (-2 - 7) 5.6% 0.1%	8 (-7 - 23) 18.6% 0.2%	14 (-11 - 38) 31.6% 0.3%	20 (-16 - 54) 44.6% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	3 (-6 - 11) 5.6% 0.0%	9 (-20 - 38) 18.6% 0.1%	16 (-34 - 64) 31.5% 0.2%	22 (-48 - 90) 44.5% 0.2%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	3 (-2 - 8) 5.6% 0.1%	11 (-7 - 28) 18.7% 0.2%	18 (-12 - 47) 31.6% 0.4%	25 (-17 - 66) 44.6% 0.5%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	2 (-9 - 12) 5.6% 0.0%	6 (-29 - 40) 18.6% 0.1%	11 (-49 - 67) 31.5% 0.1%	15 (-69 - 95) 44.5% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	34 (17 - 51) 21.9% 0.2%	111 (58 - 168) 72.5% 0.7%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	32 (21 - 44) 22.0% 0.4%	106 (70 - 145) 72.7% 1.5%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	42 (15 - 74) 10.4% 0.3%	139 (48 - 243) 34.5% 0.9%	235 (82 - 410) 58.4% 1.5%	331 (115 - 575) 82.1% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	30 (10 - 49) 10.5% 0.4%	98 (35 - 162) 34.6% 1.3%	165 (59 - 274) 58.5% 2.3%	232 (83 - 383) 82.2% 3.2%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	6 (2 - 9) 10.6% 0.6%	20 (6 - 30) 34.9% 2.0%	33 (10 - 50) 58.8% 3.3%	46 (15 - 70) 82.4% 4.7%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	49 (28 - 69) 22.0% 0.3%	160 (94 - 228) 72.6% 1.1%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	58 (31 - 82) 22.0% 0.4%	191 (103 - 269) 72.6% 1.3%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	49 (28 - 69) 22.0% 0.3%	160 (94 - 228) 72.6% 1.1%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	9 (-16 - 36) 21.9% 0.1%	30 (-52 - 120) 72.5% 0.2%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	0 (0 - 0) 0.0% 0.0%	7 (-6 - 19) 15.6% 0.1%	12 (-10 - 33) 27.2% 0.2%	17 (-14 - 47) 38.8% 0.3%	22 (-18 - 61) 50.4% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	0 (0 - 0) 0.0% 0.0%	8 (-17 - 31) 15.6% 0.1%	14 (-29 - 55) 27.2% 0.1%	19 (-42 - 78) 38.8% 0.2%	25 (-54 - 101) 50.3% 0.3%
	Multi-Pollutant Models (Total Mortality)										
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	0 (0 - 0) 0.0% 0.0%	9 (-6 - 23) 15.6% 0.2%	16 (-10 - 41) 27.3% 0.3%	22 (-15 - 58) 38.9% 0.4%	29 (-19 - 75) 50.5% 0.6%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	0 (0 - 0) 0.0% 0.0%	5 (-24 - 33) 15.6% 0.1%	9 (-42 - 58) 27.2% 0.1%	13 (-60 - 83) 38.7% 0.1%	17 (-78 - 107) 50.3% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	0 (0 - 0) 0.0% 0.0%	93 (49 - 141) 60.9% 0.6%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	0 (0 - 0) 0.0% 0.0%	89 (58 - 122) 61.0% 1.2%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	0 (0 - 0) 0.0% 0.0%	117 (40 - 204) 28.9% 0.8%	203 (71 - 354) 50.3% 1.3%	289 (101 - 502) 71.6% 1.9%	374 (131 - 649) 92.8% 2.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	0 (0 - 0) 0.0% 0.0%	82 (29 - 136) 29.1% 1.1%	142 (50 - 236) 50.5% 1.9%	202 (72 - 335) 71.8% 2.8%	262 (93 - 432) 92.8% 3.6%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	0 (0 - 0) 0.0% 0.0%	17 (5 - 25) 29.3% 1.7%	29 (9 - 43) 50.8% 2.9%	41 (13 - 61) 72.0% 4.1%	52 (17 - 79) 92.9% 5.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	0 (0 - 0) 0.0% 0.0%	135 (79 - 191) 60.9% 0.9%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	0 (0 - 0) 0.0% 0.0%	161 (86 - 226) 60.9% 1.1%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	0 (0 - 0) 0.0% 0.0%	135 (79 - 191) 60.9% 0.9%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	0 (0 - 0) 0.0% 0.0%	25 (-44 - 100) 60.8% 0.2%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	4 (-3 - 11) 8.8% 0.1%	8 (-7 - 23) 18.6% 0.2%	14 (-11 - 38) 31.6% 0.3%	20 (-16 - 54) 44.6% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	4 (-9 - 18) 8.7% 0.0%	9 (-20 - 38) 18.6% 0.1%	16 (-34 - 64) 31.5% 0.2%	22 (-48 - 90) 44.5% 0.2%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	5 (-3 - 13) 8.8% 0.1%	11 (-7 - 28) 18.7% 0.2%	18 (-12 - 47) 31.6% 0.4%	25 (-17 - 66) 44.6% 0.5%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	3 (-13 - 19) 8.7% 0.0%	6 (-29 - 40) 18.6% 0.1%	11 (-49 - 67) 31.5% 0.1%	15 (-69 - 95) 44.5% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	52 (27 - 79) 34.1% 0.3%	111 (58 - 168) 72.5% 0.7%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	50 (33 - 69) 34.3% 0.7%	106 (70 - 145) 72.7% 1.5%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	65 (23 - 115) 16.2% 0.4%	139 (48 - 243) 34.5% 0.9%	235 (82 - 410) 58.4% 1.5%	331 (115 - 575) 82.1% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	46 (16 - 77) 16.3% 0.6%	98 (35 - 162) 34.6% 1.3%	165 (59 - 274) 58.5% 2.3%	232 (83 - 383) 82.2% 3.2%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	9 (3 - 14) 16.5% 0.9%	20 (6 - 30) 34.9% 2.0%	33 (10 - 50) 58.8% 3.3%	46 (15 - 70) 82.4% 4.7%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	76 (44 - 107) 34.2% 0.5%	160 (94 - 228) 72.6% 1.1%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	90 (48 - 127) 34.2% 0.6%	191 (103 - 269) 72.6% 1.3%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	76 (44 - 107) 34.2% 0.5%	160 (94 - 228) 72.6% 1.1%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	14 (-24 - 56) 34.1% 0.1%	30 (-52 - 120) 72.5% 0.2%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	7 (-6 - 19) 15.6% 0.1%	12 (-10 - 33) 27.2% 0.2%	17 (-14 - 47) 38.8% 0.3%	22 (-18 - 61) 50.4% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	8 (-17 - 31) 15.6% 0.1%	14 (-29 - 55) 27.2% 0.1%	19 (-42 - 78) 38.8% 0.2%	25 (-54 - 101) 50.3% 0.3%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	9 (-6 - 23) 15.6% 0.2%	16 (-10 - 41) 27.3% 0.3%	22 (-15 - 58) 38.9% 0.4%	29 (-19 - 75) 50.5% 0.6%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	5 (-24 - 33) 15.6% 0.1%	9 (-42 - 58) 27.2% 0.1%	13 (-60 - 83) 38.7% 0.1%	17 (-78 - 107) 50.3% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	93 (49 - 141) 60.9% 0.6%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	89 (58 - 122) 61.0% 1.2%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	117 (40 - 204) 28.9% 0.8%	203 (71 - 354) 50.3% 1.3%	289 (101 - 502) 71.6% 1.9%	374 (131 - 649) 92.8% 2.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	82 (29 - 136) 29.1% 1.1%	142 (50 - 236) 50.5% 1.9%	202 (72 - 335) 71.8% 2.8%	262 (93 - 432) 92.8% 3.6%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	17 (5 - 25) 29.3% 1.7%	29 (9 - 43) 50.8% 2.9%	41 (13 - 61) 72.0% 4.1%	52 (17 - 79) 92.9% 5.3%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	135 (79 - 191) 60.9% 0.9%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	161 (86 - 226) 60.9% 1.1%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	135 (79 - 191) 60.9% 0.9%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	25 (-44 - 100) 60.8% 0.2%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	8 (-6 - 21) 17.5% 0.2%	8 (-7 - 23) 18.6% 0.2%	14 (-11 - 38) 31.6% 0.3%	20 (-16 - 54) 44.6% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	9 (-19 - 35) 17.5% 0.1%	9 (-20 - 38) 18.6% 0.1%	16 (-34 - 64) 31.5% 0.2%	22 (-48 - 90) 44.5% 0.2%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	10 (-7 - 26) 17.5% 0.2%	11 (-7 - 28) 18.7% 0.2%	18 (-12 - 47) 31.6% 0.4%	25 (-17 - 66) 44.6% 0.5%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	6 (-27 - 37) 17.4% 0.1%	6 (-29 - 40) 18.6% 0.1%	11 (-49 - 67) 31.5% 0.1%	15 (-69 - 95) 44.5% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	104 (54 - 158) 68.2% 0.7%	111 (58 - 168) 72.5% 0.7%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	100 (65 - 136) 68.3% 1.4%	106 (70 - 145) 72.7% 1.5%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	131 (45 - 228) 32.4% 0.9%	139 (48 - 243) 34.5% 0.9%	235 (82 - 410) 58.4% 1.5%	331 (115 - 575) 82.1% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	92 (32 - 153) 32.5% 1.3%	98 (35 - 162) 34.6% 1.3%	165 (59 - 274) 58.5% 2.3%	232 (83 - 383) 82.2% 3.2%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	18 (6 - 28) 32.8% 1.9%	20 (6 - 30) 34.9% 2.0%	33 (10 - 50) 58.8% 3.3%	46 (15 - 70) 82.4% 4.7%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	151 (88 - 214) 68.2% 1.0%	160 (94 - 228) 72.6% 1.1%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	180 (96 - 253) 68.2% 1.2%	191 (103 - 269) 72.6% 1.3%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	151 (88 - 214) 68.2% 1.0%	160 (94 - 228) 72.6% 1.1%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	28 (-49 - 112) 68.1% 0.2%	30 (-52 - 120) 72.5% 0.2%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	8 (-6 - 21) 17.5% 0.2%	12 (-10 - 33) 27.2% 0.2%	17 (-14 - 47) 38.8% 0.3%	22 (-18 - 61) 50.4% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	9 (-19 - 35) 17.5% 0.1%	14 (-29 - 55) 27.2% 0.1%	19 (-42 - 78) 38.8% 0.2%	25 (-54 - 101) 50.3% 0.3%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	10 (-7 - 26) 17.5% 0.2%	16 (-10 - 41) 27.3% 0.3%	22 (-15 - 58) 38.9% 0.4%	29 (-19 - 75) 50.5% 0.6%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	6 (-27 - 37) 17.4% 0.1%	9 (-42 - 58) 27.2% 0.1%	13 (-60 - 83) 38.7% 0.1%	17 (-78 - 107) 50.3% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	104 (54 - 158) 68.2% 0.7%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	100 (65 - 136) 68.3% 1.4%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	131 (45 - 228) 32.4% 0.9%	203 (71 - 354) 50.3% 1.3%	289 (101 - 502) 71.6% 1.9%	374 (131 - 649) 92.8% 2.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	92 (32 - 153) 32.5% 1.3%	142 (50 - 236) 50.5% 1.9%	202 (72 - 335) 71.8% 2.8%	262 (93 - 432) 92.8% 3.6%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	18 (6 - 28) 32.8% 1.9%	29 (9 - 43) 50.8% 2.9%	41 (13 - 61) 72.0% 4.1%	52 (17 - 79) 92.9% 5.3%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	151 (88 - 214) 68.2% 1.0%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	180 (96 - 253) 68.2% 1.2%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	151 (88 - 214) 68.2% 1.0%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	28 (-49 - 112) 68.1% 0.2%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	12 (-9 - 32) 26.2% 0.2%	12 (-9 - 32) 26.2% 0.2%	14 (-11 - 38) 31.6% 0.3%	20 (-16 - 54) 44.6% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	13 (-28 - 53) 26.2% 0.1%	13 (-28 - 53) 26.2% 0.1%	16 (-34 - 64) 31.5% 0.2%	22 (-48 - 90) 44.5% 0.2%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	15 (-10 - 39) 26.3% 0.3%	15 (-10 - 39) 26.3% 0.3%	18 (-12 - 47) 31.6% 0.4%	25 (-17 - 66) 44.6% 0.5%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	9 (-40 - 56) 26.1% 0.1%	9 (-40 - 56) 26.1% 0.1%	11 (-49 - 67) 31.5% 0.1%	15 (-69 - 95) 44.5% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	196 (68 - 341) 48.5% 1.3%	196 (68 - 341) 48.5% 1.3%	235 (82 - 410) 58.4% 1.5%	331 (115 - 575) 82.1% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	137 (49 - 228) 48.7% 1.9%	137 (49 - 228) 48.7% 1.9%	165 (59 - 274) 58.5% 2.3%	232 (83 - 383) 82.2% 3.2%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	28 (9 - 42) 48.9% 2.8%	28 (9 - 42) 48.9% 2.8%	33 (10 - 50) 58.8% 3.3%	46 (15 - 70) 82.4% 4.7%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.4h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Pittsburgh, PA, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Chock et al. (2000)	Non-accidental	<75	0 day		45 (-36 - 121)	12 (-9 - 32) 26.2% 0.2%	12 (-10 - 33) 27.2% 0.2%	17 (-14 - 47) 38.8% 0.3%	22 (-18 - 61) 50.4% 0.4%
	Chock et al. (2000)	Non-accidental	75+	0 day		50 (-108 - 200)	13 (-28 - 53) 26.2% 0.1%	14 (-29 - 55) 27.2% 0.1%	19 (-42 - 78) 38.8% 0.2%	25 (-54 - 101) 50.3% 0.3%
	Multi-Pollutant Models (Total Mortality)									
	Chock et al. (2000)	Non-accidental	<75	0 day	CO, O3, SO2, NO2, PM10-2.5	57 (-39 - 147)	15 (-10 - 39) 26.3% 0.3%	16 (-10 - 41) 27.3% 0.3%	22 (-15 - 58) 38.9% 0.4%	29 (-19 - 75) 50.5% 0.6%
	Chock et al. (2000)	Non-accidental	75+	0 day	CO, O3, SO2, NO2, PM10-2.5	34 (-156 - 212)	9 (-40 - 56) 26.1% 0.1%	9 (-42 - 58) 27.2% 0.1%	13 (-60 - 83) 38.7% 0.1%	17 (-78 - 107) 50.3% 0.2%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			153 (80 - 232)	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%	153 (80 - 232) 100.0% 1.0%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			146 (96 - 200)	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%	146 (96 - 200) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			403 (141 - 699)	196 (68 - 341) 48.5% 1.3%	203 (71 - 354) 50.3% 1.3%	289 (101 - 502) 71.6% 1.9%	374 (131 - 649) 92.8% 2.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			282 (101 - 464)	137 (49 - 228) 48.7% 1.9%	142 (50 - 236) 50.5% 1.9%	202 (72 - 335) 71.8% 2.8%	262 (93 - 432) 92.8% 3.6%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			56 (18 - 84)	28 (9 - 42) 48.9% 2.8%	29 (9 - 43) 50.8% 2.9%	41 (13 - 61) 72.0% 4.1%	52 (17 - 79) 92.9% 5.3%
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	221 (129 - 314)	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	263 (141 - 370)	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%	263 (141 - 370) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	221 (129 - 314)	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%	221 (129 - 314) 100.0% 1.5%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	41 (-72 - 165)	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%	41 (-72 - 165) 100.0% 0.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit F.5a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	0 (0 - 0) 0.0% 0.0%	1 (0 - 1) 0.4% 0.0%	31 (11 - 51) 16.3% 0.1%	61 (23 - 100) 32.2% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	0 (0 - 0) 0.0% 0.0%	1 (1 - 1) 0.4% 0.0%	42 (30 - 54) 16.3% 0.2%	82 (59 - 106) 32.2% 0.4%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.4% 0.0%	1 (-4 - 6) 16.3% 0.1%	2 (-8 - 11) 32.1% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.4% 0.0%	9 (2 - 17) 16.3% 0.2%	18 (4 - 34) 32.2% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.4% 0.0%	1 (-2 - 4) 16.3% 0.2%	2 (-5 - 8) 32.2% 0.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.4% 0.0%	3 (0 - 6) 16.4% 0.3%	6 (0 - 12) 32.3% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.4% 0.0%	13 (8 - 18) 16.4% 0.3%	25 (16 - 35) 32.3% 0.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.4% 0.0%	4 (2 - 6) 16.5% 0.6%	7 (3 - 11) 32.5% 32.5%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	0 (0 - 0) 0.0% 0.0%	9 (3 - 15) 3.0% 0.0%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	0 (0 - 0) 0.0% 0.0%	4 (2 - 5) 1.6% 0.0%	145 (75 - 221) 65.6% 0.6%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	0 (0 - 0) 0.0% 0.0%	6 (2 - 9) 3.0% 0.1%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	0 (0 - 0) 0.0% 0.0%	3 (2 - 5) 1.6% 0.0%	142 (92 - 197) 65.7% 1.3%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	0 (0 - 0) 0.0% 0.0%	4 (2 - 8) 0.8% 0.0%	182 (62 - 321) 30.5% 0.8%	357 (123 - 630) 60.0% 1.6%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	0 (0 - 0) 0.0% 0.0%	3 (1 - 5) 0.8% 0.0%	130 (45 - 221) 30.6% 1.2%	256 (89 - 432) 60.1% 2.3%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	0 (0 - 0) 0.0% 0.0%	1 (0 - 1) 0.8% 0.0%	27 (8 - 42) 30.8% 1.8%	53 (16 - 82) 60.4% 3.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	0 (0 - 0) 0.0% 0.0%	5 (3 - 7) 1.6% 0.0%	210 (122 - 301) 65.6% 0.9%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	0 (0 - 0) 0.0% 0.0%	6 (3 - 9) 1.6% 0.0%	251 (133 - 357) 65.7% 1.1%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	0 (0 - 0) 0.0% 0.0%	5 (3 - 7) 1.6% 0.0%	210 (122 - 301) 65.6% 0.9%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	0 (0 - 0) 0.0% 0.0%	1 (-2 - 4) 1.6% 0.0%	38 (-67 - 156) 65.5% 0.2%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	0 (0 - 0) 0.0% 0.0%	0 (0 - 100) 0.4% 0.1%	1500 (600 - 2400) 17.8% 2.7%	3000 (1200 - 4600) 34.6% 5.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	0 (0 - 0) 0.0% 0.0%	100 (0 - 100) 0.4% 0.0%	2400 (-200 - 4800) 17.0% 1.5%	4700 (-300 - 9400) 33.2% 2.9%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	0 (0 - 0) 0.0% 0.0%	0 (0 - 100) 0.4% 0.1%	1400 (300 - 2400) 17.7% 2.5%	2700 (700 - 4500) 34.3% 4.8%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	0 (0 - 0) 0.0% 0.0%	0 (0 - 100) 0.4% 0.0%	1100 (-1800 - 3700) 16.6% 0.7%	2200 (-3600 - 7200) 32.6% 1.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	19 (7 - 31) 9.8% 0.1%	46 (17 - 75) 24.2% 0.2%	74 (27 - 120) 38.6% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	25 (18 - 32) 9.8% 0.1%	62 (44 - 80) 24.2% 0.3%	99 (71 - 127) 38.6% 0.5%
	Single Pollutant Models (Cause-Specific Mortality)										
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (-2 - 3) 9.8% 0.1%	1 (-6 - 8) 24.2% 0.1%	2 (-10 - 13) 38.5% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	6 (1 - 10) 9.8% 0.1%	14 (3 - 25) 24.2% 0.3%	22 (5 - 40) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	1 (-1 - 3) 9.8% 0.1%	2 (-4 - 6) 24.2% 0.2%	2 (-6 - 10) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	2 (0 - 4) 9.9% 0.2%	5 (0 - 9) 24.3% 0.5%	7 (0 - 14) 38.7% 0.8%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	8 (5 - 11) 9.9% 0.2%	19 (12 - 26) 24.3% 0.4%	30 (19 - 42) 38.7% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	2 (1 - 3) 10.0% 0.3%	6 (3 - 8) 24.5% 0.8%	9 (4 - 13) 39.0% 1.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	232 (79 - 380) 74.2% 1.0%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	87 (45 - 133) 39.6% 0.4%	215 (111 - 327) 97.3% 1.0%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	135 (46 - 217) 74.3% 1.4%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	86 (56 - 119) 39.7% 0.8%	211 (137 - 291) 97.3% 1.9%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	110 (38 - 194) 18.4% 0.5%	269 (93 - 476) 45.2% 1.2%	428 (147 - 754) 71.8% 1.9%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	79 (27 - 134) 18.5% 0.7%	193 (67 - 327) 45.4% 1.8%	306 (107 - 516) 71.9% 2.8%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	16 (5 - 25) 18.7% 1.1%	40 (12 - 62) 45.6% 2.6%	63 (20 - 97) 72.2% 4.2%
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	127 (74 - 182) 39.6% 0.6%	312 (181 - 446) 97.3% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	152 (80 - 216) 39.7% 0.7%	373 (198 - 529) 97.3% 1.7%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	127 (74 - 182) 39.6% 0.6%	312 (181 - 446) 97.3% 1.4%	320 (186 - 458) 100.0% 1.4%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	23 (-40 - 94) 39.5% 0.1%	57 (-99 - 231) 97.3% 0.3%	58 (-102 - 238) 100.0% 0.3%
Respiratory Symptoms	**Single Pollutant Models**										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	900 (400 - 1500) 10.8% 1.7%	2300 (900 - 3500) 26.3% 4.0%	3600 (1400 - 5500) 41.2% 6.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	1500 (-100 - 2900) 10.3% 0.9%	3600 (-300 - 7100) 25.1% 2.2%	5700 (-400 - 11200) 39.7% 3.4%
	Multi-Pollutant Models										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	800 (200 - 1400) 10.7% 1.5%	2000 (500 - 3500) 26.0% 3.6%	3200 (800 - 5400) 40.9% 5.7%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	700 (-1100 - 2200) 10.0% 0.4%	1700 (-2700 - 5500) 24.6% 1.0%	2600 (-4300 - 8600) 39.0% 1.6%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	17 (6 - 27) 8.7% 0.1%	17 (6 - 27) 8.7% 0.1%	31 (11 - 51) 16.3% 0.1%	61 (23 - 100) 32.2% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	22 (16 - 29) 8.8% 0.1%	22 (16 - 29) 8.8% 0.1%	42 (30 - 54) 16.3% 0.2%	82 (59 - 106) 32.2% 0.4%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	0 (-2 - 3) 8.7% 0.0%	0 (-2 - 3) 8.7% 0.0%	1 (-4 - 6) 16.3% 0.1%	2 (-8 - 11) 32.1% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	5 (1 - 9) 8.8% 0.1%	5 (1 - 9) 8.8% 0.1%	9 (2 - 17) 16.3% 0.2%	18 (4 - 34) 32.2% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	1 (-1 - 2) 8.8% 0.1%	1 (-1 - 2) 8.8% 0.1%	1 (-2 - 4) 16.3% 0.2%	2 (-5 - 8) 32.2% 0.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	2 (0 - 3) 8.8% 0.2%	2 (0 - 3) 8.8% 0.2%	3 (0 - 6) 16.4% 0.3%	6 (0 - 12) 32.3% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	7 (4 - 10) 8.8% 0.1%	7 (4 - 10) 8.8% 0.1%	13 (8 - 18) 16.4% 0.3%	25 (16 - 35) 32.3% 0.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	2 (1 - 3) 8.9% 0.3%	2 (1 - 3) 8.9% 0.3%	4 (2 - 6) 16.5% 0.6%	7 (3 - 11) 32.5% 32.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	207 (70 - 338) 66.1% 0.9%	207 (70 - 338) 66.1% 0.9%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	78 (40 - 119) 35.2% 0.3%	78 (40 - 119) 35.2% 0.3%	145 (75 - 221) 65.6% 0.6%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	120 (41 - 194) 66.2% 1.2%	120 (41 - 194) 66.2% 1.2%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	77 (50 - 106) 35.4% 0.7%	77 (50 - 106) 35.4% 0.7%	142 (92 - 197) 65.7% 1.3%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	98 (33 - 173) 16.4% 0.4%	98 (33 - 173) 16.4% 0.4%	182 (62 - 321) 30.5% 0.8%	357 (123 - 630) 60.0% 1.6%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	70 (24 - 119) 16.5% 0.6%	70 (24 - 119) 16.5% 0.6%	130 (45 - 221) 30.6% 1.2%	256 (89 - 432) 60.1% 2.3%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	15 (4 - 23) 16.6% 1.0%	15 (4 - 23) 16.6% 1.0%	27 (8 - 42) 30.8% 1.8%	53 (16 - 82) 60.4% 3.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	113 (65 - 162) 35.3% 0.5%	113 (65 - 162) 35.3% 0.5%	210 (122 - 301) 65.6% 0.9%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	135 (72 - 192) 35.3% 0.6%	135 (72 - 192) 35.3% 0.6%	251 (133 - 357) 65.7% 1.1%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	113 (65 - 162) 35.3% 0.5%	113 (65 - 162) 35.3% 0.5%	210 (122 - 301) 65.6% 0.9%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	20 (-36 - 84) 35.2% 0.1%	20 (-36 - 84) 35.2% 0.1%	38 (-67 - 156) 65.5% 0.2%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	800 (300 - 1300) 9.7% 1.5%	800 (300 - 1300) 9.7% 1.5%	1500 (600 - 2400) 17.8% 2.7%	3000 (1200 - 4600) 34.6% 5.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	1300 (-100 - 2600) 9.1% 0.8%	1300 (-100 - 2600) 9.1% 0.8%	2400 (-200 - 4800) 17.0% 1.5%	4700 (-300 - 9400) 33.2% 2.9%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	800 (200 - 1300) 9.5% 1.3%	800 (200 - 1300) 9.5% 1.3%	1400 (300 - 2400) 17.7% 2.5%	2700 (700 - 4500) 34.3% 4.8%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	600 (-1000 - 2000) 8.9% 0.4%	600 (-1000 - 2000) 8.9% 0.4%	1100 (-1800 - 3700) 16.6% 0.7%	2200 (-3600 - 7200) 32.6% 1.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	17 (6 - 27) 8.7% 0.1%	19 (7 - 31) 9.8% 0.1%	46 (17 - 75) 24.2% 0.2%	74 (27 - 120) 38.6% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	22 (16 - 29) 8.8% 0.1%	25 (18 - 32) 9.8% 0.1%	62 (44 - 80) 24.2% 0.3%	99 (71 - 127) 38.6% 0.5%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	0 (-2 - 3) 8.7% 0.0%	0 (-2 - 3) 9.8% 0.1%	1 (-6 - 8) 24.2% 0.1%	2 (-10 - 13) 38.5% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	5 (1 - 9) 8.8% 0.1%	6 (1 - 10) 9.8% 0.1%	14 (3 - 25) 24.2% 0.3%	22 (5 - 40) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	1 (-1 - 2) 8.8% 0.1%	1 (-1 - 3) 9.8% 0.1%	2 (-4 - 6) 24.2% 0.2%	2 (-6 - 10) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	2 (0 - 3) 8.8% 0.2%	2 (0 - 4) 9.9% 0.2%	5 (0 - 9) 24.3% 0.5%	7 (0 - 14) 38.7% 0.8%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	7 (4 - 10) 8.8% 0.1%	8 (5 - 11) 9.9% 0.2%	19 (12 - 26) 24.3% 0.4%	30 (19 - 42) 38.7% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	2 (1 - 3) 8.9% 0.3%	2 (1 - 3) 10.0% 0.3%	6 (3 - 8) 24.5% 0.8%	9 (4 - 13) 39.0% 39.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	207 (70 - 338) 66.1% 0.9%	232 (79 - 380) 74.2% 1.0%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	78 (40 - 119) 35.2% 0.3%	87 (45 - 133) 39.6% 0.4%	215 (111 - 327) 97.3% 1.0%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	120 (41 - 194) 66.2% 1.2%	135 (46 - 217) 74.3% 1.4%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	77 (50 - 106) 35.4% 0.7%	86 (56 - 119) 39.7% 0.8%	211 (137 - 291) 97.3% 1.9%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	98 (33 - 173) 16.4% 0.4%	110 (38 - 194) 18.4% 0.5%	269 (93 - 476) 45.2% 1.2%	428 (147 - 754) 71.8% 1.9%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	70 (24 - 119) 16.5% 0.6%	79 (27 - 134) 18.5% 0.7%	193 (67 - 327) 45.4% 1.8%	306 (107 - 516) 71.9% 2.8%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	15 (4 - 23) 16.6% 1.0%	16 (5 - 25) 18.7% 1.1%	40 (12 - 62) 45.6% 2.6%	63 (20 - 97) 72.2% 4.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	113 (65 - 162) 35.3% 0.5%	127 (74 - 182) 39.6% 0.6%	312 (181 - 446) 97.3% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	135 (72 - 192) 35.3% 0.6%	152 (80 - 216) 39.7% 0.7%	373 (198 - 529) 97.3% 1.7%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	113 (65 - 162) 35.3% 0.5%	127 (74 - 182) 39.6% 0.6%	312 (181 - 446) 97.3% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	20 (-36 - 84) 35.2% 0.1%	23 (-40 - 94) 39.5% 0.1%	57 (-99 - 231) 97.3% 0.3%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	800 (300 - 1300) 9.7% 1.5%	900 (400 - 1500) 10.8% 1.7%	2300 (900 - 3500) 26.3% 4.0%	3600 (1400 - 5500) 41.2% 6.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	1300 (-100 - 2600) 9.1% 0.8%	1500 (-100 - 2900) 10.3% 0.9%	3600 (-300 - 7100) 25.1% 2.2%	5700 (-400 - 11200) 39.7% 3.4%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	800 (200 - 1300) 9.5% 1.3%	800 (200 - 1400) 10.7% 1.5%	2000 (500 - 3500) 26.0% 3.6%	3200 (800 - 5400) 40.9% 5.7%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	600 (-1000 - 2000) 8.9% 0.4%	700 (-1100 - 2200) 10.0% 0.4%	1700 (-2700 - 5500) 24.6% 1.0%	2600 (-4300 - 8600) 39.0% 1.6%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	33 (12 - 54) 17.5% 0.2%	33 (12 - 54) 17.5% 0.2%	33 (12 - 54) 17.5% 0.2%	61 (23 - 100) 32.2% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	45 (32 - 58) 17.5% 0.2%	45 (32 - 58) 17.5% 0.2%	45 (32 - 58) 17.5% 0.2%	82 (59 - 106) 32.2% 0.4%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	1 (-4 - 6) 17.4% 0.1%	1 (-4 - 6) 17.4% 0.1%	1 (-4 - 6) 17.4% 0.1%	2 (-8 - 11) 32.1% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	10 (2 - 18) 17.5% 0.2%	10 (2 - 18) 17.5% 0.2%	10 (2 - 18) 17.5% 0.2%	18 (4 - 34) 32.2% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	1 (-3 - 5) 17.5% 0.2%	1 (-3 - 5) 17.5% 0.2%	1 (-3 - 5) 17.5% 0.2%	2 (-5 - 8) 32.2% 0.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	3 (0 - 6) 17.6% 0.3%	3 (0 - 6) 17.6% 0.3%	3 (0 - 6) 17.6% 0.3%	6 (0 - 12) 32.3% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	14 (9 - 19) 17.5% 0.3%	14 (9 - 19) 17.5% 0.3%	14 (9 - 19) 17.5% 0.3%	25 (16 - 35) 32.3% 0.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	4 (2 - 6) 17.7% 0.6%	4 (2 - 6) 17.7% 0.6%	4 (2 - 6) 17.7% 0.6%	7 (3 - 11) 32.5% 32.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	155 (80 - 237) 70.3% 0.7%	155 (80 - 237) 70.3% 0.7%	155 (80 - 237) 70.3% 0.7%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	153 (99 - 211) 70.5% 1.4%	153 (99 - 211) 70.5% 1.4%	153 (99 - 211) 70.5% 1.4%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	195 (67 - 345) 32.7% 0.9%	195 (67 - 345) 32.7% 0.9%	195 (67 - 345) 32.7% 0.9%	357 (123 - 630) 60.0% 1.6%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	140 (49 - 237) 32.8% 1.3%	140 (49 - 237) 32.8% 1.3%	140 (49 - 237) 32.8% 1.3%	256 (89 - 432) 60.1% 2.3%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	29 (9 - 45) 33.1% 1.9%	29 (9 - 45) 33.1% 1.9%	29 (9 - 45) 33.1% 1.9%	53 (16 - 82) 60.4% 3.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	225 (131 - 323) 70.4% 1.0%	225 (131 - 323) 70.4% 1.0%	225 (131 - 323) 70.4% 1.0%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	270 (143 - 383) 70.4% 1.2%	270 (143 - 383) 70.4% 1.2%	270 (143 - 383) 70.4% 1.2%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	225 (131 - 323) 70.4% 1.0%	225 (131 - 323) 70.4% 1.0%	225 (131 - 323) 70.4% 1.0%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	41 (-71 - 167) 70.3% 0.2%	41 (-71 - 167) 70.3% 0.2%	41 (-71 - 167) 70.3% 0.2%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	1700 (600 - 2600) 19.1% 2.9%	1700 (600 - 2600) 19.1% 2.9%	1700 (600 - 2600) 19.1% 2.9%	3000 (1200 - 4600) 34.6% 5.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	2600 (-200 - 5200) 18.2% 1.6%	2600 (-200 - 5200) 18.2% 1.6%	2600 (-200 - 5200) 18.2% 1.6%	4700 (-300 - 9400) 33.2% 2.9%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	1500 (400 - 2500) 18.9% 2.6%	1500 (400 - 2500) 18.9% 2.6%	1500 (400 - 2500) 18.9% 2.6%	2700 (700 - 4500) 34.3% 4.8%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	1200 (-2000 - 4000) 17.8% 0.7%	1200 (-2000 - 4000) 17.8% 0.7%	1200 (-2000 - 4000) 17.8% 0.7%	2200 (-3600 - 7200) 32.6% 1.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	33 (12 - 54) 17.5% 0.2%	33 (12 - 54) 17.5% 0.2%	46 (17 - 75) 24.2% 0.2%	74 (27 - 120) 38.6% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	45 (32 - 58) 17.5% 0.2%	45 (32 - 58) 17.5% 0.2%	62 (44 - 80) 24.2% 0.3%	99 (71 - 127) 38.6% 0.5%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	1 (-4 - 6) 17.4% 0.1%	1 (-4 - 6) 17.4% 0.1%	1 (-6 - 8) 24.2% 0.1%	2 (-10 - 13) 38.5% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	10 (2 - 18) 17.5% 0.2%	10 (2 - 18) 17.5% 0.2%	14 (3 - 25) 24.2% 0.3%	22 (5 - 40) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	1 (-3 - 5) 17.5% 0.2%	1 (-3 - 5) 17.5% 0.2%	2 (-4 - 6) 24.2% 0.2%	2 (-6 - 10) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	3 (0 - 6) 17.6% 0.3%	3 (0 - 6) 17.6% 0.3%	5 (0 - 9) 24.3% 0.5%	7 (0 - 14) 38.7% 0.8%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	14 (9 - 19) 17.5% 0.3%	14 (9 - 19) 17.5% 0.3%	19 (12 - 26) 24.3% 0.4%	30 (19 - 42) 38.7% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	4 (2 - 6) 17.7% 0.6%	4 (2 - 6) 17.7% 0.6%	6 (3 - 8) 24.5% 0.8%	9 (4 - 13) 39.0% 39.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	155 (80 - 237) 70.3% 0.7%	155 (80 - 237) 70.3% 0.7%	215 (111 - 327) 97.3% 1.0%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	153 (99 - 211) 70.5% 1.4%	153 (99 - 211) 70.5% 1.4%	211 (137 - 291) 97.3% 1.9%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	195 (67 - 345) 32.7% 0.9%	195 (67 - 345) 32.7% 0.9%	269 (93 - 476) 45.2% 1.2%	428 (147 - 754) 71.8% 1.9%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	140 (49 - 237) 32.8% 1.3%	140 (49 - 237) 32.8% 1.3%	193 (67 - 327) 45.4% 1.8%	306 (107 - 516) 71.9% 2.8%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	29 (9 - 45) 33.1% 1.9%	29 (9 - 45) 33.1% 1.9%	40 (12 - 62) 45.6% 2.6%	63 (20 - 97) 72.2% 4.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	225 (131 - 323) 70.4% 1.0%	225 (131 - 323) 70.4% 1.0%	312 (181 - 446) 97.3% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	270 (143 - 383) 70.4% 1.2%	270 (143 - 383) 70.4% 1.2%	373 (198 - 529) 97.3% 1.7%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	225 (131 - 323) 70.4% 1.0%	225 (131 - 323) 70.4% 1.0%	312 (181 - 446) 97.3% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	41 (-71 - 167) 70.3% 0.2%	41 (-71 - 167) 70.3% 0.2%	57 (-99 - 231) 97.3% 0.3%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	1700 (600 - 2600) 19.1% 2.9%	1700 (600 - 2600) 19.1% 2.9%	2300 (900 - 3500) 26.3% 4.0%	3600 (1400 - 5500) 41.2% 6.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	2600 (-200 - 5200) 18.2% 1.6%	2600 (-200 - 5200) 18.2% 1.6%	3600 (-300 - 7100) 25.1% 2.2%	5700 (-400 - 11200) 39.7% 3.4%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	1500 (400 - 2500) 18.9% 2.6%	1500 (400 - 2500) 18.9% 2.6%	2000 (500 - 3500) 26.0% 3.6%	3200 (800 - 5400) 40.9% 5.7%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	1200 (-2000 - 4000) 17.8% 0.7%	1200 (-2000 - 4000) 17.8% 0.7%	1700 (-2700 - 5500) 24.6% 1.0%	2600 (-4300 - 8600) 39.0% 1.6%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	50 (18 - 82) 26.2% 0.2%	50 (18 - 82) 26.2% 0.2%	50 (18 - 82) 26.2% 0.2%	61 (23 - 100) 32.2% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	67 (48 - 86) 26.2% 0.3%	67 (48 - 86) 26.2% 0.3%	67 (48 - 86) 26.2% 0.3%	82 (59 - 106) 32.2% 0.4%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	1 (-7 - 9) 26.2% 0.1%	1 (-7 - 9) 26.2% 0.1%	1 (-7 - 9) 26.2% 0.1%	2 (-8 - 11) 32.1% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	15 (4 - 27) 26.2% 0.3%	15 (4 - 27) 26.2% 0.3%	15 (4 - 27) 26.2% 0.3%	18 (4 - 34) 32.2% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	2 (-4 - 7) 26.2% 0.3%	2 (-4 - 7) 26.2% 0.3%	2 (-4 - 7) 26.2% 0.3%	2 (-5 - 8) 32.2% 0.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	5 (0 - 10) 26.4% 0.5%	5 (0 - 10) 26.4% 0.5%	5 (0 - 10) 26.4% 0.5%	6 (0 - 12) 32.3% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	21 (13 - 29) 26.3% 0.4%	21 (13 - 29) 26.3% 0.4%	21 (13 - 29) 26.3% 0.4%	25 (16 - 35) 32.3% 0.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	6 (3 - 9) 26.5% 0.9%	6 (3 - 9) 26.5% 0.9%	6 (3 - 9) 26.5% 0.9%	7 (3 - 11) 32.5% 32.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	221 (114 - 336) 100.0% 1.0%	221 (114 - 336) 100.0% 1.0%	221 (114 - 336) 100.0% 1.0%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	217 (141 - 299) 100.0% 2.0%	217 (141 - 299) 100.0% 2.0%	217 (141 - 299) 100.0% 2.0%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	292 (100 - 515) 48.9% 1.3%	292 (100 - 515) 48.9% 1.3%	292 (100 - 515) 48.9% 1.3%	357 (123 - 630) 60.0% 1.6%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	209 (73 - 353) 49.1% 1.9%	209 (73 - 353) 49.1% 1.9%	209 (73 - 353) 49.1% 1.9%	256 (89 - 432) 60.1% 2.3%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	43 (13 - 67) 49.3% 2.8%	43 (13 - 67) 49.3% 2.8%	43 (13 - 67) 49.3% 2.8%	53 (16 - 82) 60.4% 3.5%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	383 (203 - 544) 100.0% 1.7%	383 (203 - 544) 100.0% 1.7%	383 (203 - 544) 100.0% 1.7%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	58 (-102 - 238) 100.0% 0.3%	58 (-102 - 238) 100.0% 0.3%	58 (-102 - 238) 100.0% 0.3%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	2500 (900 - 3800) 28.4% 4.4%	2500 (900 - 3800) 28.4% 4.4%	2500 (900 - 3800) 28.4% 4.4%	3000 (1200 - 4600) 34.6% 5.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	3900 (-300 - 7700) 27.2% 2.4%	3900 (-300 - 7700) 27.2% 2.4%	3900 (-300 - 7700) 27.2% 2.4%	4700 (-300 - 9400) 33.2% 2.9%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	2200 (500 - 3700) 28.1% 3.9%	2200 (500 - 3700) 28.1% 3.9%	2200 (500 - 3700) 28.1% 3.9%	2700 (700 - 4500) 34.3% 4.8%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	1800 (-2900 - 5900) 26.6% 1.1%	1800 (-2900 - 5900) 26.6% 1.1%	1800 (-2900 - 5900) 26.6% 1.1%	2200 (-3600 - 7200) 32.6% 1.3%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit F.5h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

St. Louis, MO, 2003

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		191 (70 - 311)	50 (18 - 82) 26.2% 0.2%	50 (18 - 82) 26.2% 0.2%	50 (18 - 82) 26.2% 0.2%	74 (27 - 120) 38.6% 0.3%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		256 (183 - 328)	67 (48 - 86) 26.2% 0.3%	67 (48 - 86) 26.2% 0.3%	67 (48 - 86) 26.2% 0.3%	99 (71 - 127) 38.6% 0.5%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		5 (-26 - 34)	1 (-7 - 9) 26.2% 0.1%	1 (-7 - 9) 26.2% 0.1%	1 (-7 - 9) 26.2% 0.1%	2 (-10 - 13) 38.5% 0.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		57 (13 - 104)	15 (4 - 27) 26.2% 0.3%	15 (4 - 27) 26.2% 0.3%	15 (4 - 27) 26.2% 0.3%	22 (5 - 40) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		6 (-15 - 26)	2 (-4 - 7) 26.2% 0.3%	2 (-4 - 7) 26.2% 0.3%	2 (-4 - 7) 26.2% 0.3%	2 (-6 - 10) 38.6% 0.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		19 (1 - 36)	5 (0 - 10) 26.4% 0.5%	5 (0 - 10) 26.4% 0.5%	5 (0 - 10) 26.4% 0.5%	7 (0 - 14) 38.7% 0.8%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		79 (49 - 108)	21 (13 - 29) 26.3% 0.4%	21 (13 - 29) 26.3% 0.4%	21 (13 - 29) 26.3% 0.4%	30 (19 - 42) 38.7% 0.6%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		23 (11 - 33)	6 (3 - 9) 26.5% 0.9%	6 (3 - 9) 26.5% 0.9%	6 (3 - 9) 26.5% 0.9%	9 (4 - 13) 39.0% 39.0%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (106 - 511)	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%	313 (106 - 511) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			221 (114 - 336)	221 (114 - 336) 100.0% 1.0%	221 (114 - 336) 100.0% 1.0%	221 (114 - 336) 100.0% 1.0%	221 (114 - 336) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			182 (62 - 292)	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%	182 (62 - 292) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			217 (141 - 299)	217 (141 - 299) 100.0% 2.0%	217 (141 - 299) 100.0% 2.0%	217 (141 - 299) 100.0% 2.0%	217 (141 - 299) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			596 (206 - 1047)	292 (100 - 515) 48.9% 1.3%	292 (100 - 515) 48.9% 1.3%	292 (100 - 515) 48.9% 1.3%	428 (147 - 754) 71.8% 1.9%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			426 (150 - 715)	209 (73 - 353) 49.1% 1.9%	209 (73 - 353) 49.1% 1.9%	209 (73 - 353) 49.1% 1.9%	306 (107 - 516) 71.9% 2.8%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			88 (27 - 134)	43 (13 - 67) 49.3% 2.8%	43 (13 - 67) 49.3% 2.8%	43 (13 - 67) 49.3% 2.8%	63 (20 - 97) 72.2% 4.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	320 (186 - 458)	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	383 (203 - 544)	383 (203 - 544) 100.0% 1.7%	383 (203 - 544) 100.0% 1.7%	383 (203 - 544) 100.0% 1.7%	383 (203 - 544) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	320 (186 - 458)	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%	320 (186 - 458) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	58 (-102 - 238)	58 (-102 - 238) 100.0% 0.3%	58 (-102 - 238) 100.0% 0.3%	58 (-102 - 238) 100.0% 0.3%	58 (-102 - 238) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with Current Stds. (95% Confidence Interval)***	Reduced Incidence from that Associated with Just Meeting Current Standards**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		8700 (3500 - 12900)	2500 (900 - 3800) 28.4% 4.4%	2500 (900 - 3800) 28.4% 4.4%	2500 (900 - 3800) 28.4% 4.4%	3600 (1400 - 5500) 41.2% 6.3%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		14300 (-1100 - 27200)	3900 (-300 - 7700) 27.2% 2.4%	3900 (-300 - 7700) 27.2% 2.4%	3900 (-300 - 7700) 27.2% 2.4%	5700 (-400 - 11200) 39.7% 3.4%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7900 (2000 - 12700)	2200 (500 - 3700) 28.1% 3.9%	2200 (500 - 3700) 28.1% 3.9%	2200 (500 - 3700) 28.1% 3.9%	3200 (800 - 5400) 40.9% 5.7%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	6800 (-11600 - 21300)	1800 (-2900 - 5900) 26.6% 1.1%	1800 (-2900 - 5900) 26.6% 1.1%	1800 (-2900 - 5900) 26.6% 1.1%	2600 (-4300 - 8600) 39.0% 1.6%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

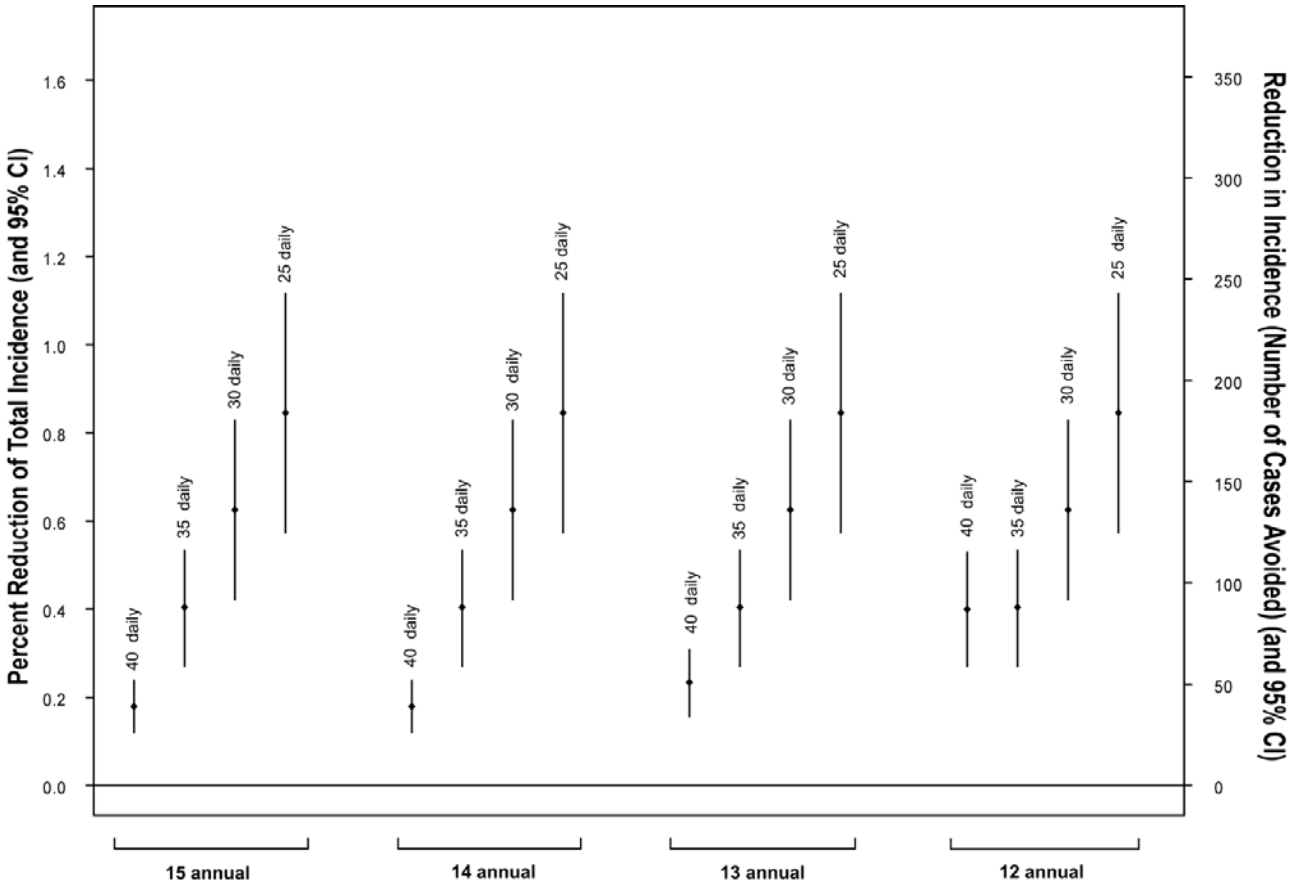
****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Appendix G. Estimated Annual Health Risk Reductions Associated with Rolling Back PM From "As Is" Concentrations to Just Meet Alternative Suites of PM Standards for Those Locations that Already Meet Current Standards

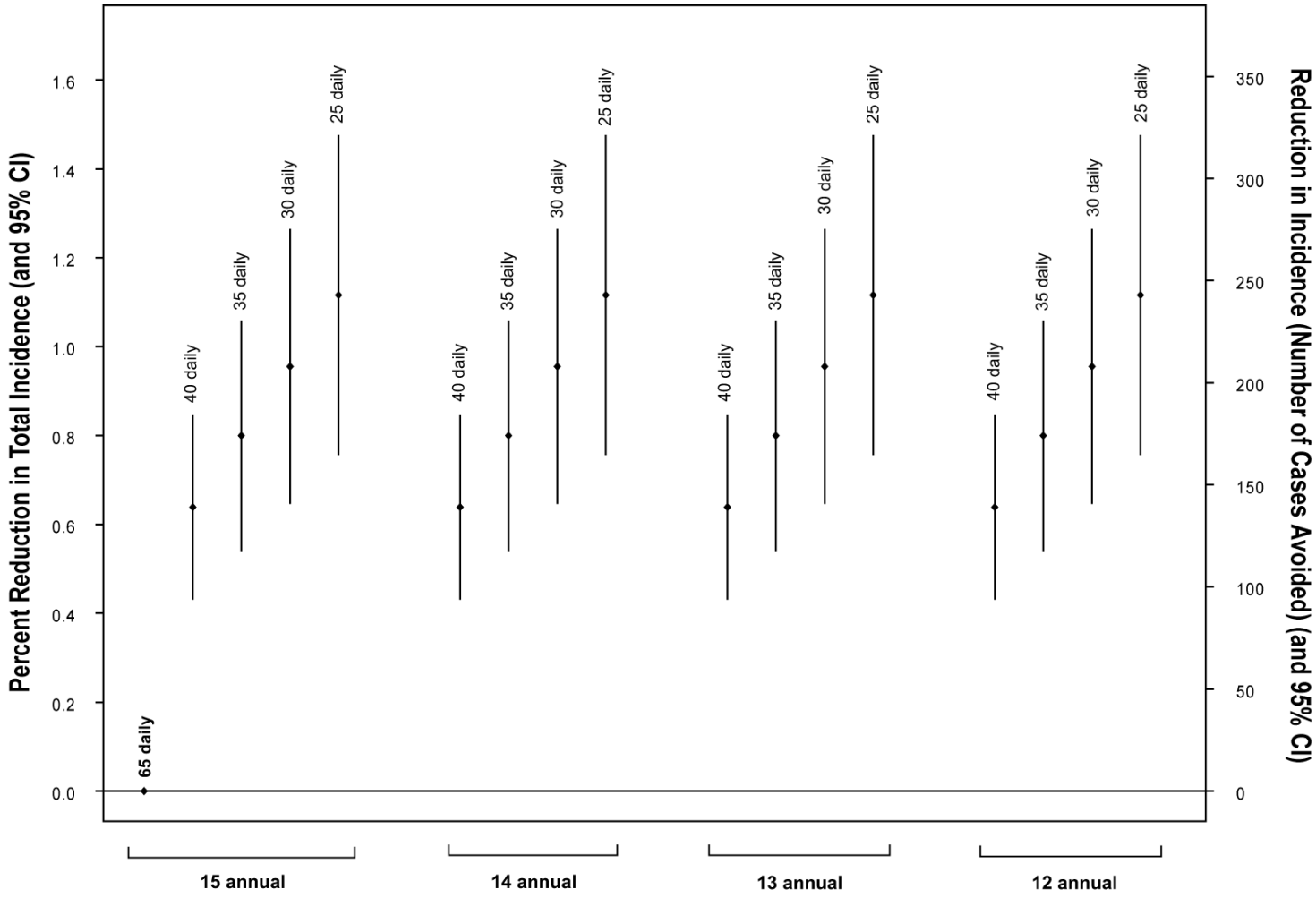
G.1. Figures: $PM_{2.5}$

Figure G.1. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Boston, MA, 2003*



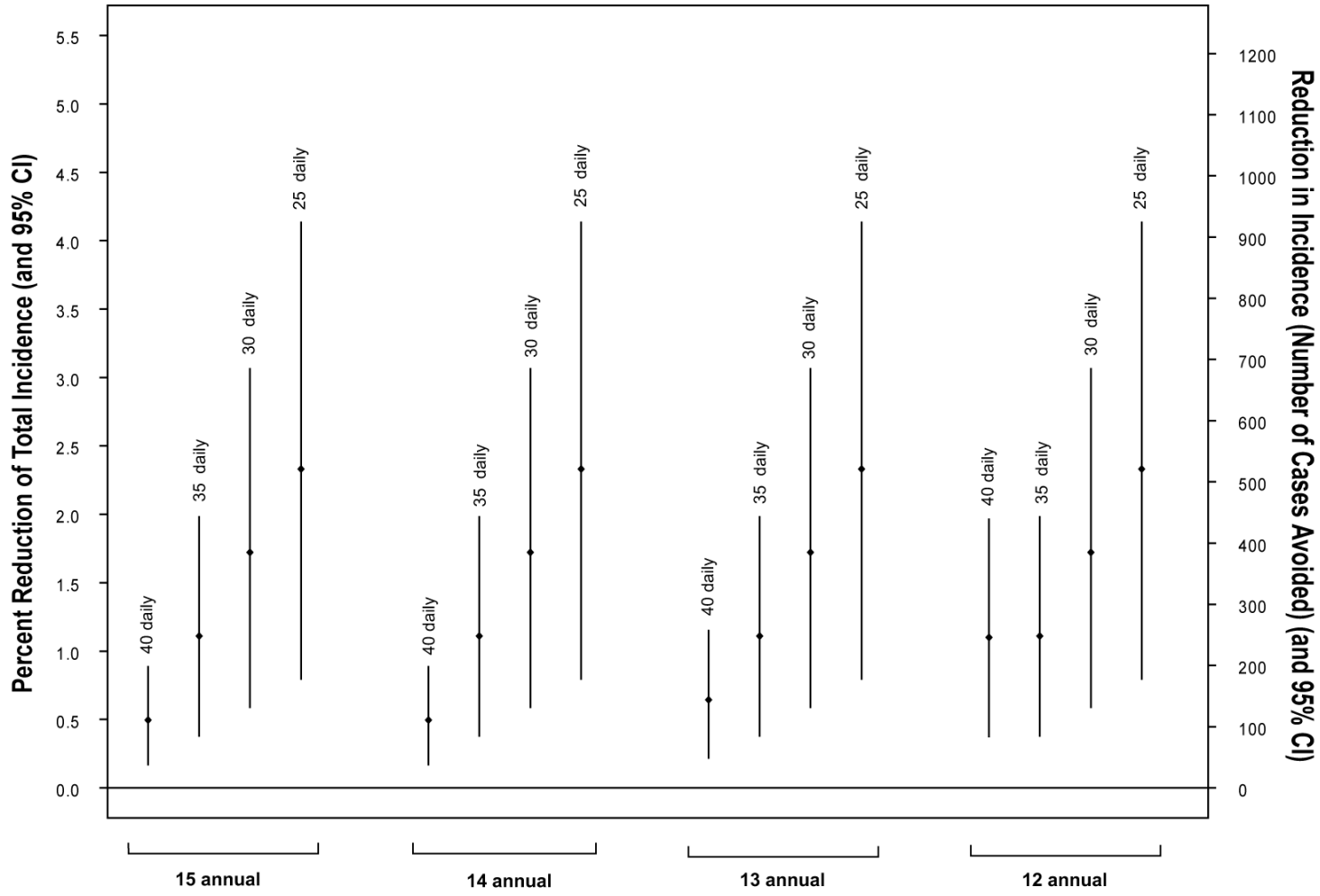
*Based on Schwartz (2003)

Figure G.2. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Boston, MA, 2003*



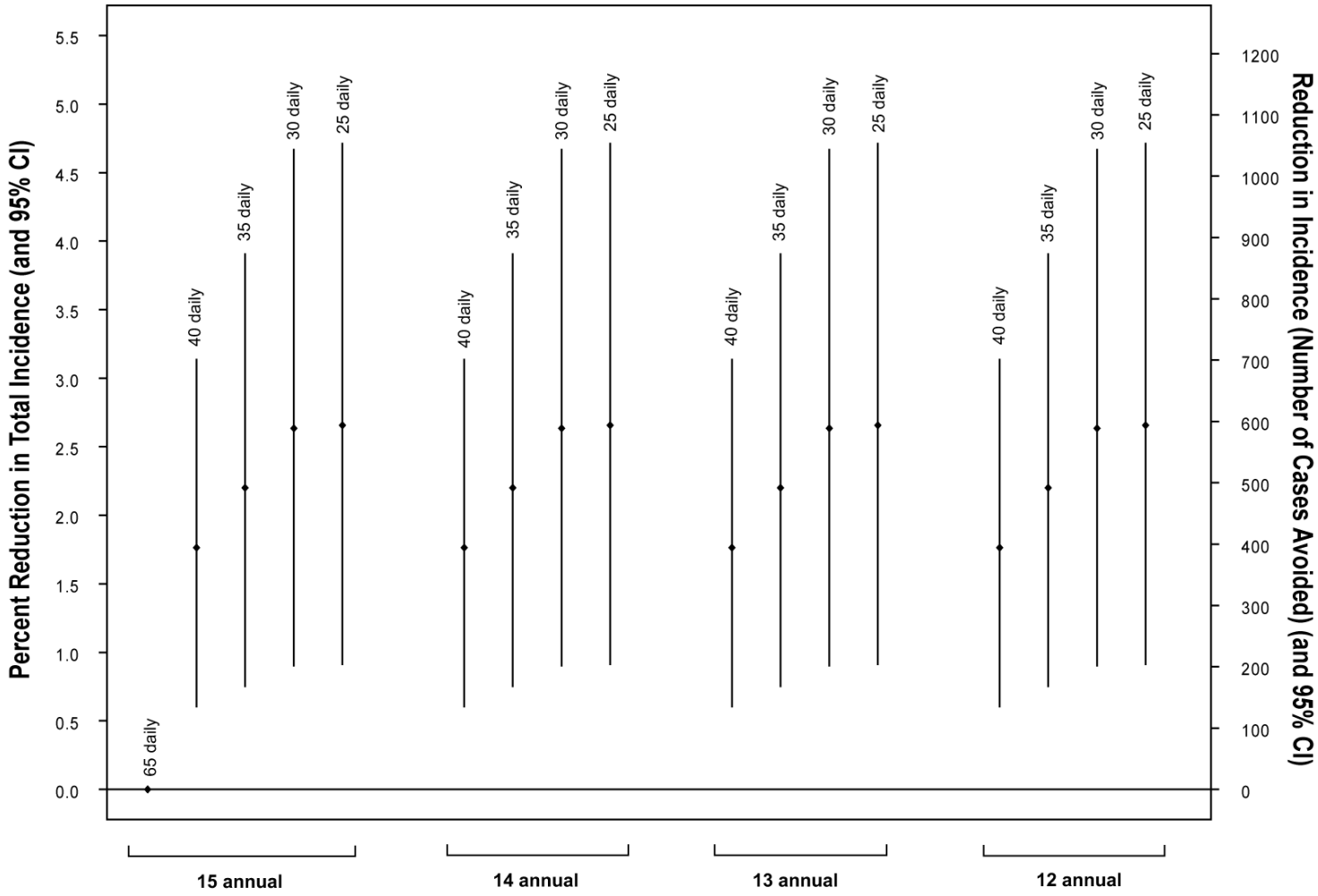
*Based on Schwartz (2003)

Figure G.3. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Boston, MA, 2003*



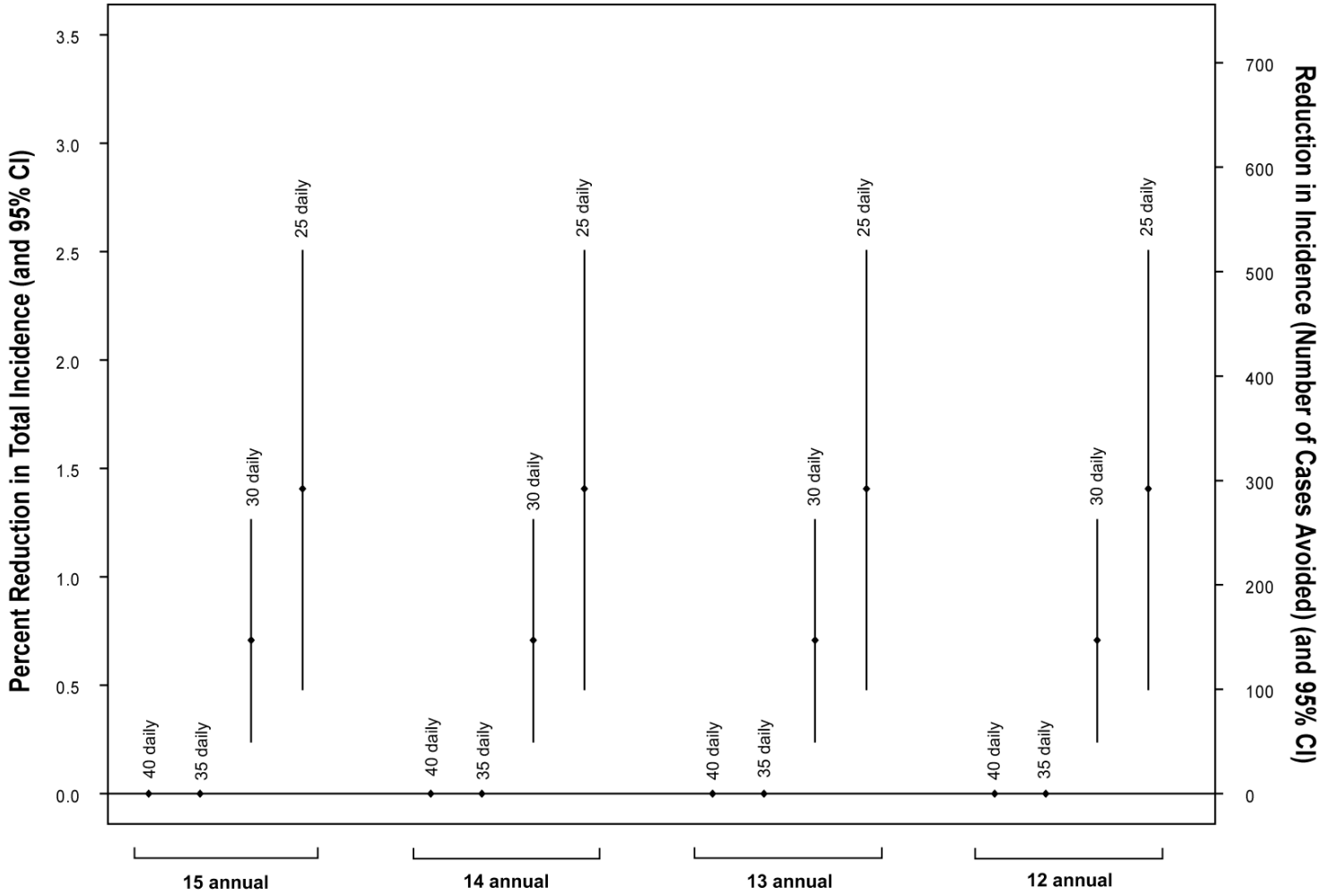
*Based on Pope et al. (2002) - ACS extended

Figure G.4. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Boston, MA, 2003*



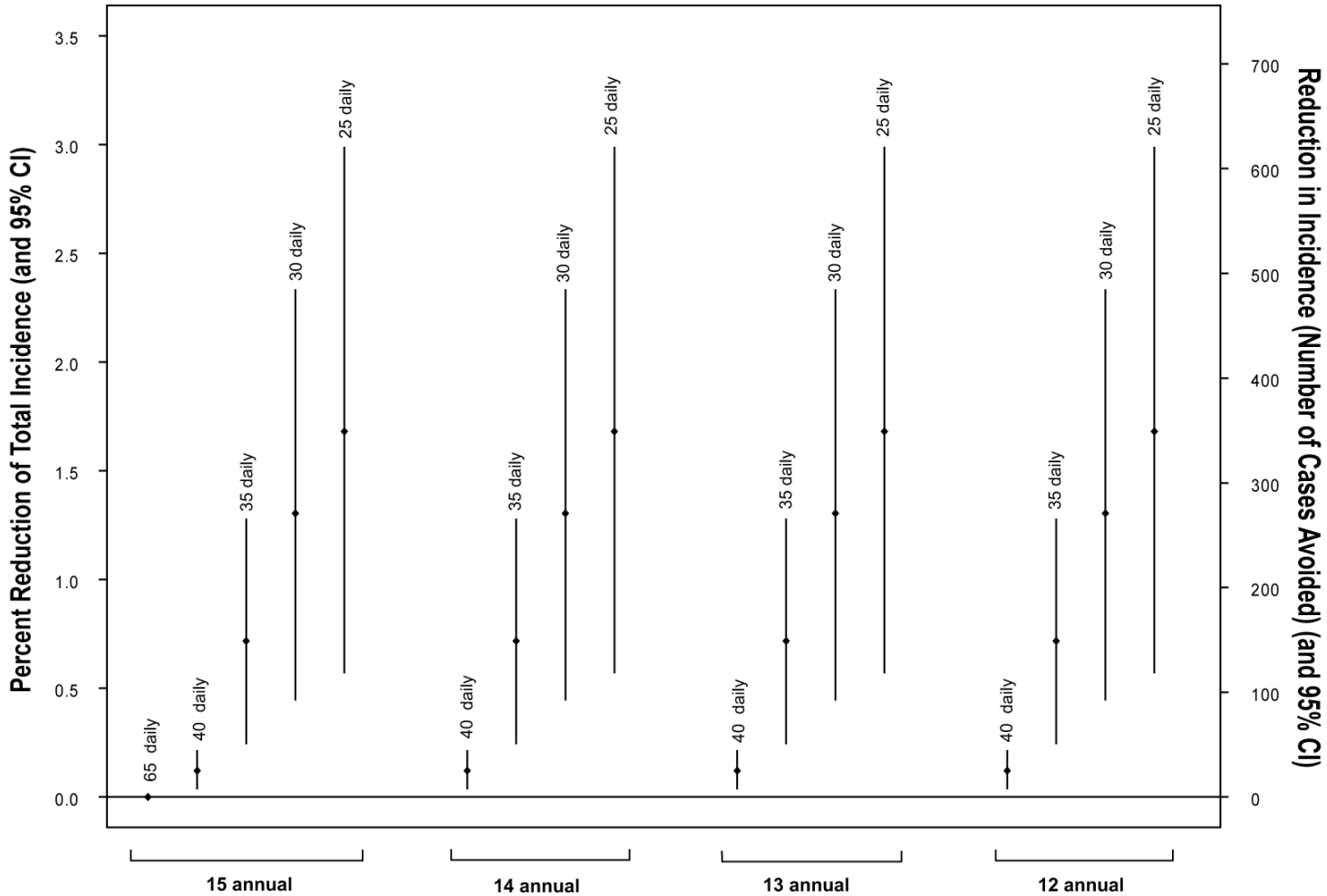
*Based on Pope et al. (2002) - ACS extended

Figure G.5. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Phoenix, AZ, 2001*



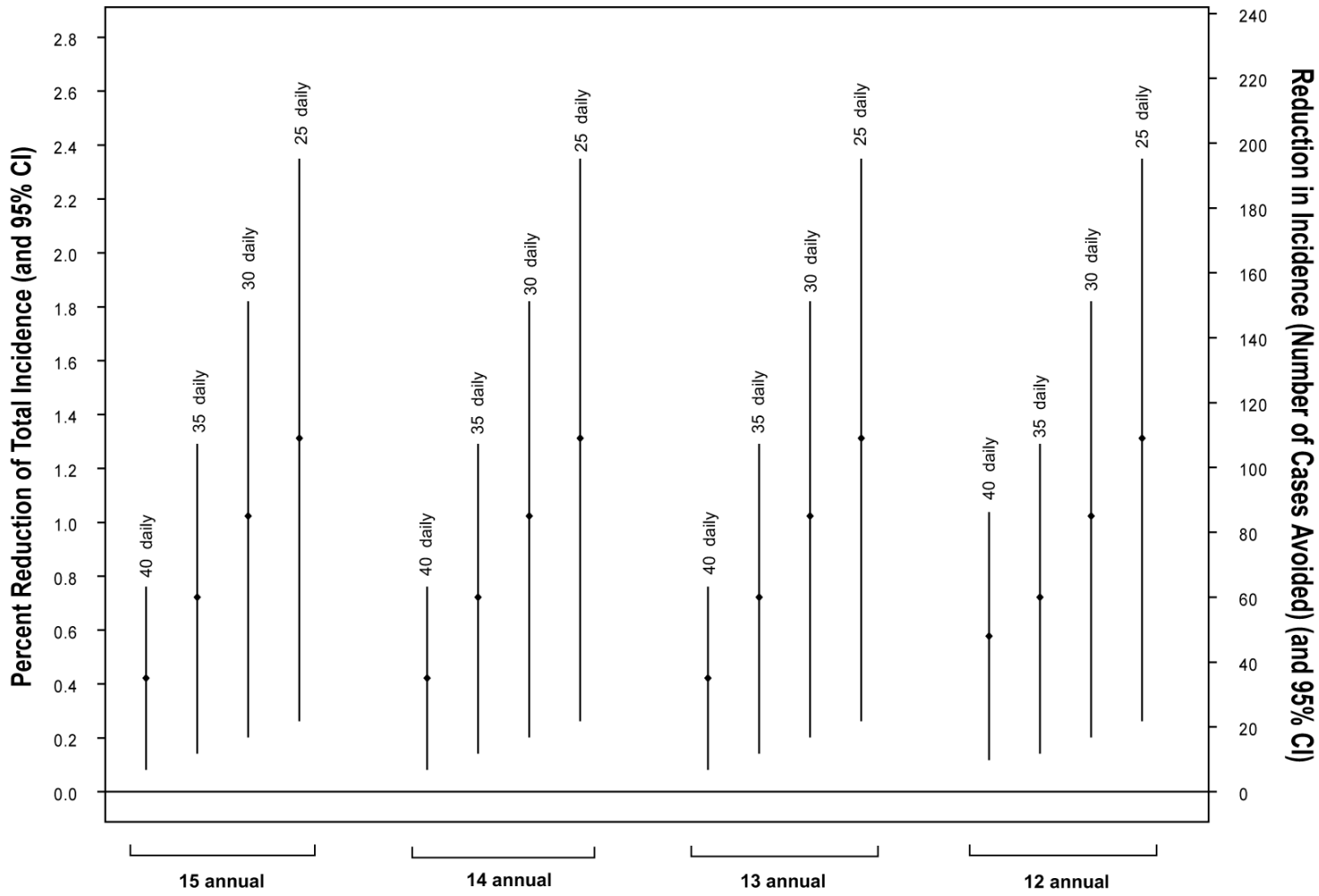
*Based on Pope et al. (2002) - ACS extended

Figure G.6. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Phoenix, AZ, 2001*



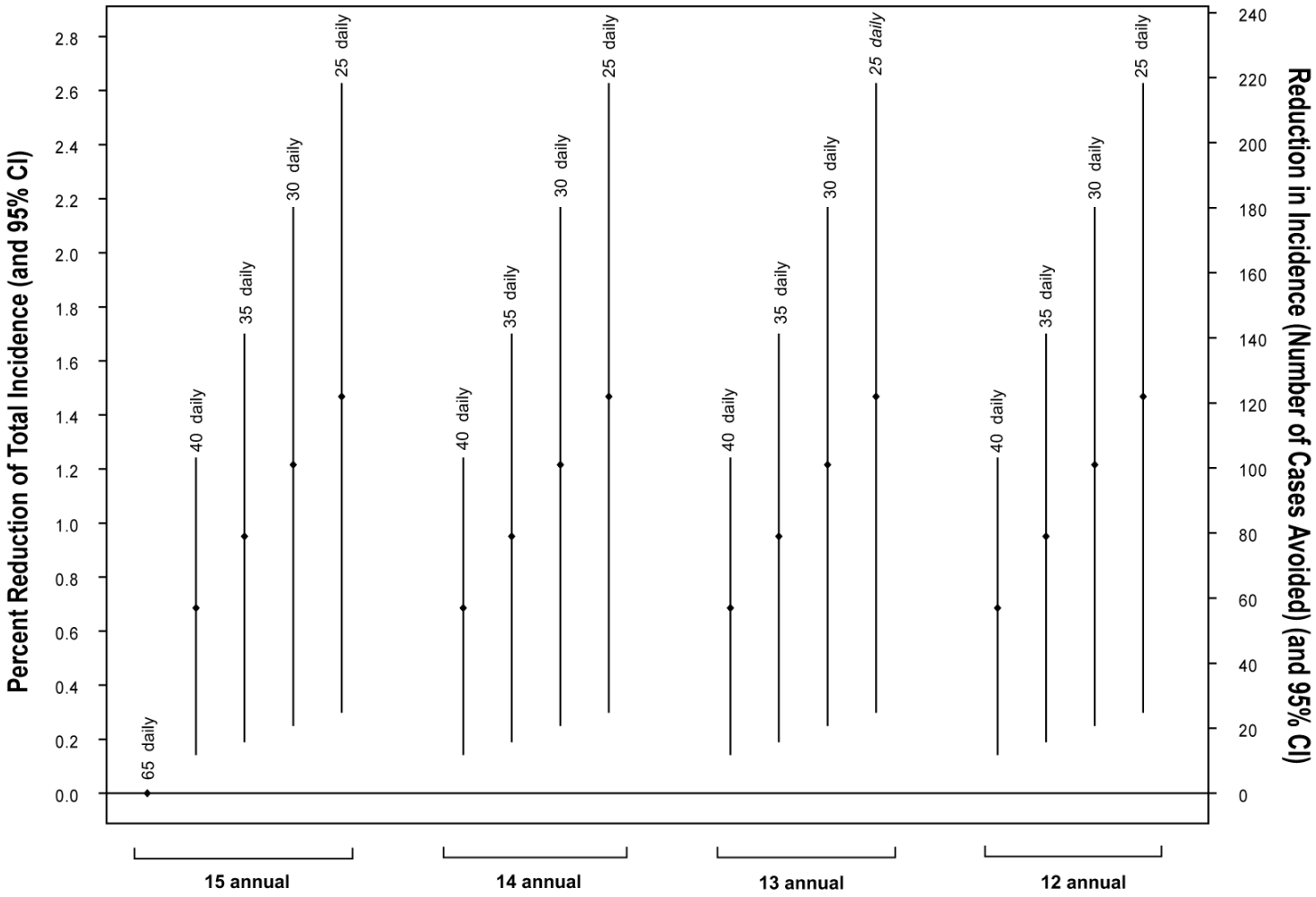
*Based on Pope et al. (2002) - ACS extended

Figure G.7. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: San Jose, CA, 2003*



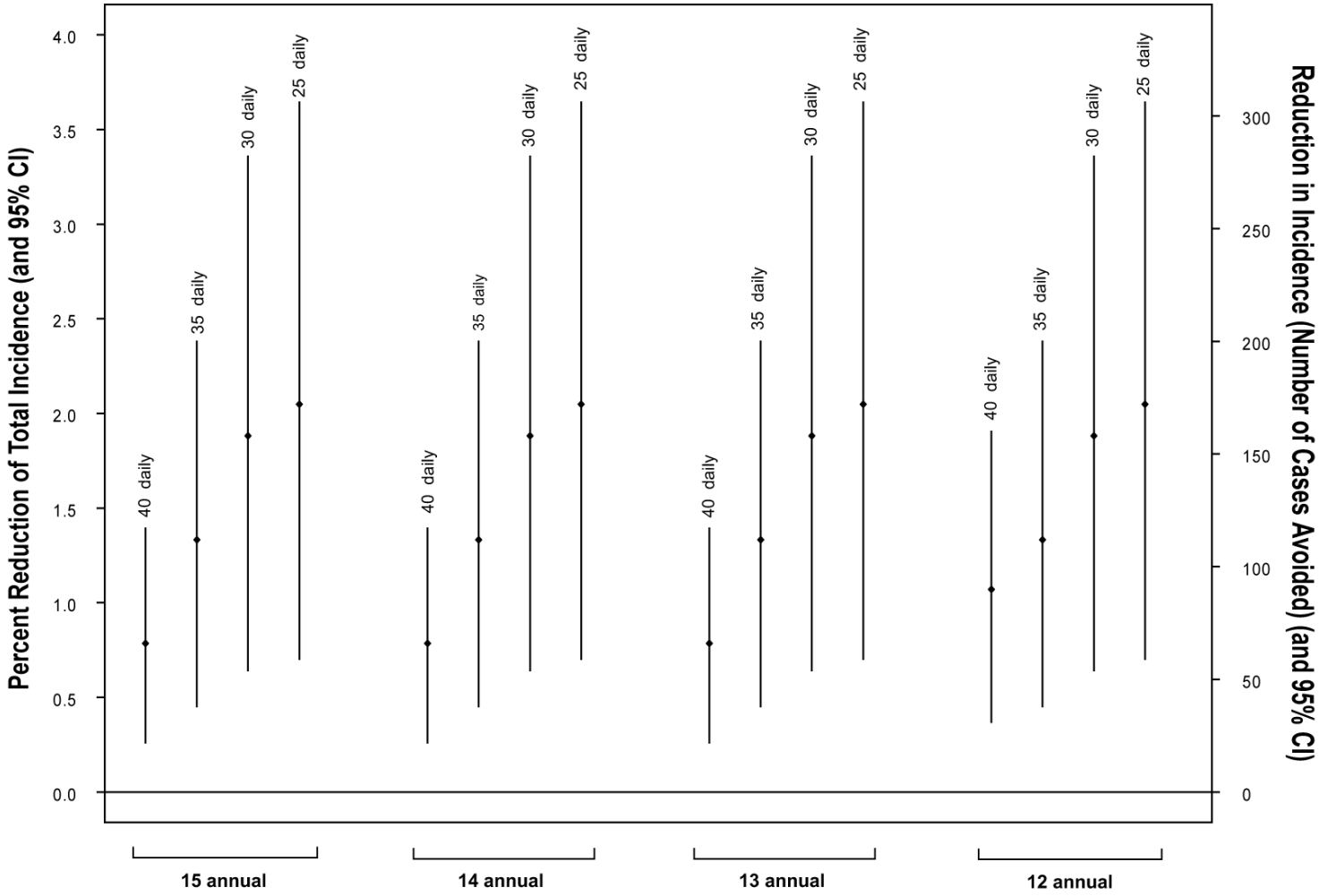
*Based on Fairley (2003)

Figure G.8. Estimated Annual Reduction in Short-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: San Jose, CA, 2003*



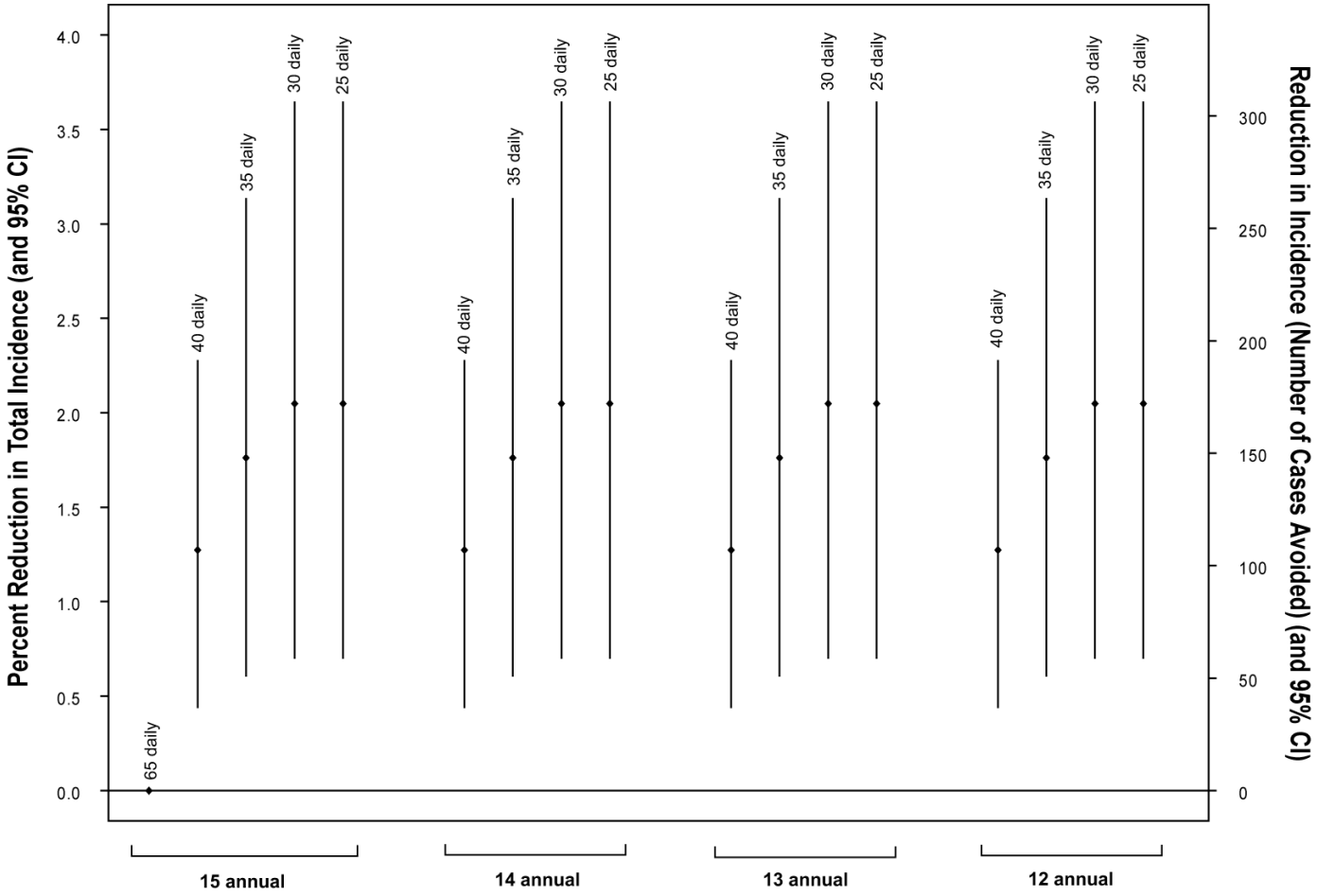
*Based on Fairley (2003)

Figure G.9. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: San Jose, CA, 2003*



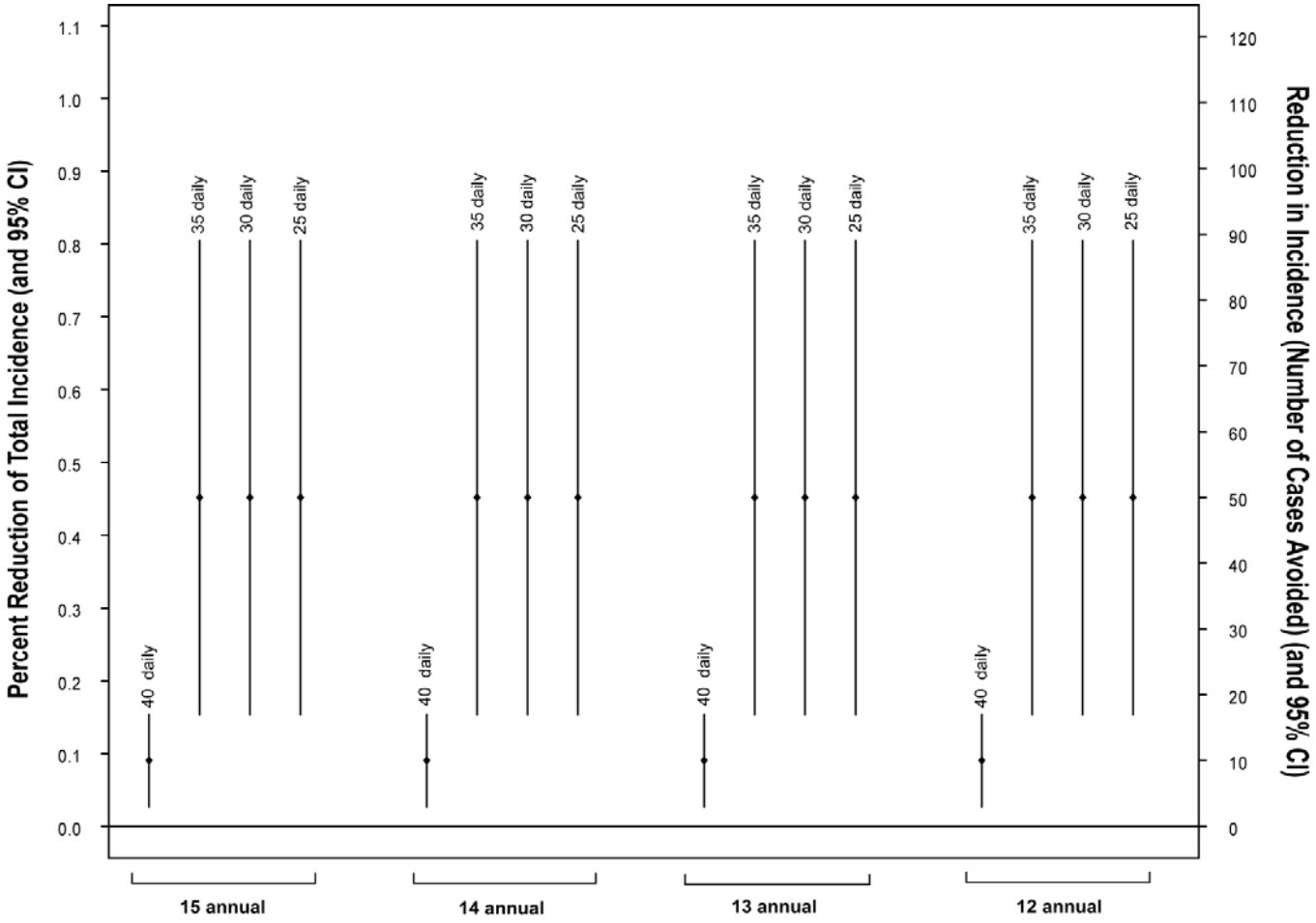
*Based on Pope et al. (2002) - ACS extended

Figure G.10. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: San Jose, CA, 2003*



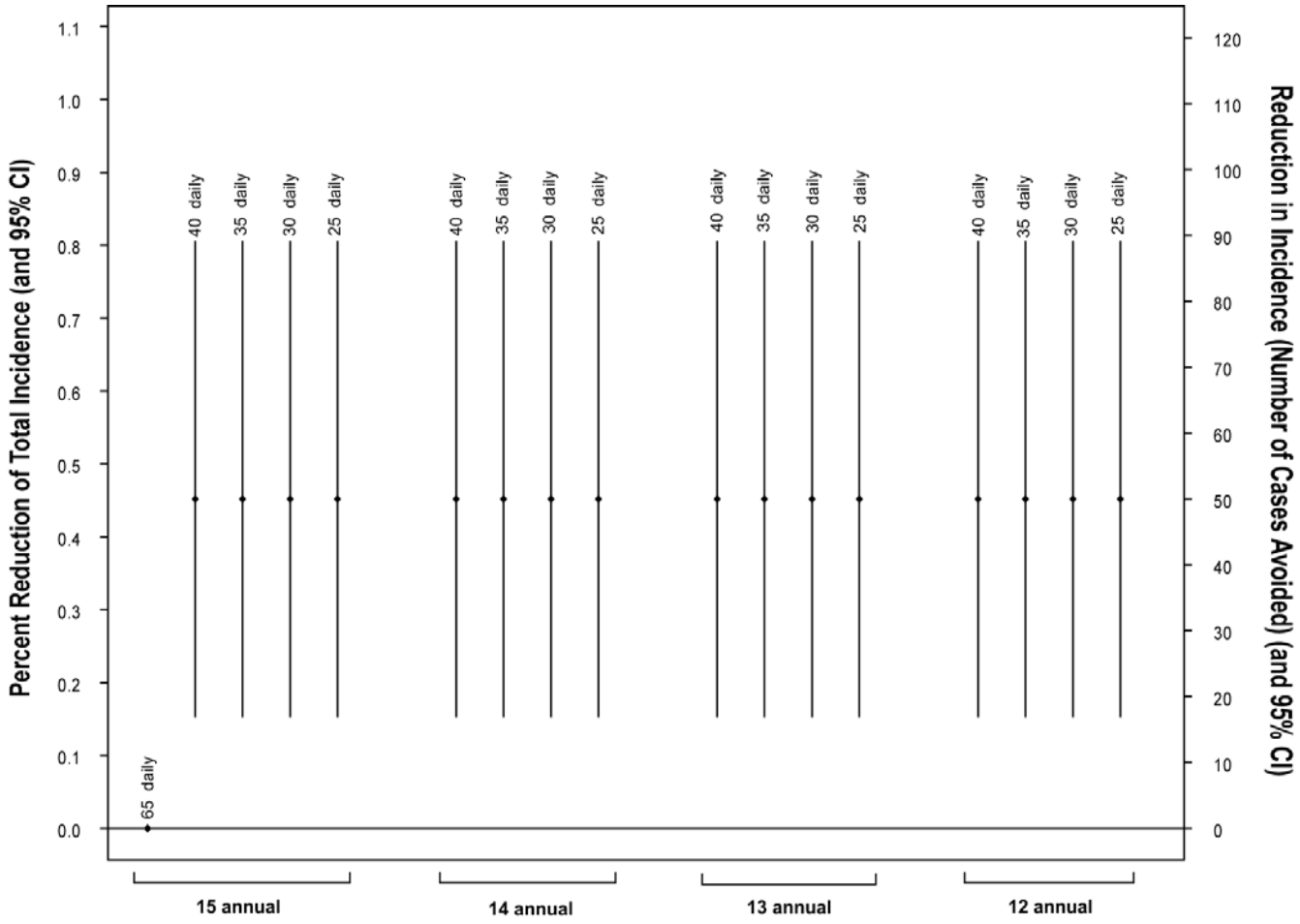
*Based on Pope et al. (2002) - ACS extended

Figure G.11. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 98th Percentile Standards: Seattle, WA, 2003*



*Based on Pope et al. (2002) - ACS extended

Figure G.12. Estimated Annual Reduction in Long-Term Exposure Mortality Associated with Rolling Back "As Is" $PM_{2.5}$ Concentrations to $PM_{2.5}$ Concentrations that Just Meet Alternative Suites of $PM_{2.5}$ Annual and Daily 99th Percentile Standards: Seattle, WA, 2003*



*Based on Pope et al. (2002) - ACS extended

Exhibit G.1a. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards* Boston, MA, 2003

(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	39 (26 - 52) 10.0% 0.2%	88 (59 - 116) 22.5% 0.4%	136 (92 - 180) 34.9% 0.6%	184 (125 - 243) 47.3% 0.9%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	26 (19 - 33) 10.0% 0.1%	58 (42 - 75) 22.4% 0.3%	91 (65 - 116) 34.8% 0.4%	123 (88 - 158) 47.1% 0.6%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	2 (-1 - 6) 10.0% 0.2%	5 (-3 - 13) 22.6% 0.5%	8 (-4 - 20) 35.0% 0.8%	12 (-6 - 27) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	8 (4 - 11) 10.0% 0.2%	18 (10 - 25) 22.5% 0.5%	28 (15 - 39) 35.0% 0.8%	37 (21 - 53) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	4 (2 - 6) 10.2% 0.5%	8 (4 - 12) 22.9% 1.1%	13 (6 - 19) 35.4% 1.7%	17 (8 - 26) 47.9% 2.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	2 (0 - 4) 10.0% 0.2%	5 (0 - 9) 22.5% 0.4%	7 (0 - 13) 34.9% 0.7%	9 (0 - 18) 47.3% 0.9%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	5 (3 - 7) 10.0% 0.2%	12 (7 - 16) 22.4% 0.4%	18 (11 - 26) 34.8% 0.5%	25 (15 - 35) 47.2% 0.7%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	3 (1 - 4) 10.1% 0.4%	6 (3 - 9) 22.7% 0.8%	9 (4 - 13) 35.2% 1.2%	12 (6 - 18) 47.6% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	237 (79 - 394) 75.9% 1.1%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	88 (45 - 135) 40.2% 0.4%	197 (102 - 302) 90.3% 0.9%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	119 (40 - 195) 75.9% 1.4%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	78 (50 - 108) 40.3% 0.8%	174 (112 - 242) 90.3% 1.8%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	111 (38 - 198) 18.6% 0.5%	248 (85 - 443) 41.8% 1.1%	385 (132 - 685) 64.8% 1.7%	521 (178 - 924) 87.6% 2.3%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	71 (24 - 122) 18.7% 0.7%	159 (55 - 273) 41.9% 1.6%	247 (85 - 421) 64.9% 2.5%	333 (116 - 567) 87.7% 3.4%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	17 (5 - 27) 18.9% 1.1%	38 (12 - 60) 42.2% 2.5%	59 (18 - 92) 65.2% 3.8%	79 (24 - 124) 87.8% 5.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	128 (74 - 185) 40.3% 0.6%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	154 (81 - 221) 40.3% 0.7%	345 (182 - 493) 90.3% 1.5%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	128 (74 - 185) 40.3% 0.6%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	23 (-40 - 95) 40.1% 0.1%	52 (-90 - 213) 90.2% 0.2%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	900 (400 - 1700) 11.2% 1.7%	1900 (900 - 3700) 24.8% 3.8%	3000 (1400 - 5600) 37.9% 5.7%	4000 (1800 - 7500) 50.5% 7.6%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	1300 (-100 - 2700) 10.4% 0.9%	2900 (-200 - 6000) 23.3% 1.9%	4500 (-300 - 9100) 36.0% 3.0%	6100 (-400 - 12200) 48.5% 4.0%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	800 (200 - 1700) 11.1% 1.5%	1700 (500 - 3700) 24.5% 3.4%	2700 (800 - 5600) 37.5% 5.1%	3600 (1000 - 7400) 50.1% 6.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	600 (-900 - 2000) 10.1% 0.4%	1300 (-2100 - 4500) 22.7% 0.9%	2100 (-3300 - 6900) 35.2% 1.4%	2800 (-4500 - 9300) 47.6% 1.9%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1b. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	0 (0 - 0) 0.0% 0.0%	139 (94 - 184) 35.7% 0.6%	174 (118 - 230) 44.6% 0.8%	208 (141 - 275) 53.4% 1.0%	243 (165 - 321) 62.3% 1.1%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	0 (0 - 0) 0.0% 0.0%	93 (66 - 119) 35.6% 0.4%	116 (83 - 149) 44.5% 0.5%	139 (99 - 178) 53.3% 0.6%	162 (116 - 208) 62.2% 0.7%
	Single Pollutant Models (Cause-Specific Mortality)										
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	0 (0 - 0) 0.0% 0.0%	9 (-4 - 21) 35.8% 0.9%	11 (-5 - 26) 44.7% 1.1%	13 (-6 - 31) 53.6% 1.3%	15 (-7 - 36) 62.4% 1.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	0 (0 - 0) 0.0% 0.0%	28 (16 - 40) 35.8% 0.8%	35 (20 - 50) 44.7% 1.0%	42 (24 - 60) 53.6% 1.2%	49 (28 - 70) 62.4% 1.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	0 (0 - 0) 0.0% 0.0%	13 (6 - 20) 36.3% 1.8%	16 (7 - 24) 45.2% 2.2%	19 (9 - 29) 54.1% 2.6%	22 (10 - 34) 62.9% 3.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	0 (0 - 0) 0.0% 0.0%	7 (0 - 14) 35.8% 0.7%	9 (0 - 17) 44.6% 0.9%	11 (0 - 21) 53.5% 1.1%	13 (1 - 24) 62.3% 1.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	0 (0 - 0) 0.0% 0.0%	19 (12 - 26) 35.7% 0.6%	24 (15 - 33) 44.6% 0.7%	28 (17 - 39) 53.4% 0.8%	33 (20 - 46) 62.2% 1.0%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	0 (0 - 0) 0.0% 0.0%	9 (4 - 14) 36.0% 1.2%	11 (5 - 17) 44.9% 1.6%	14 (6 - 20) 53.8% 1.9%	16 (8 - 24) 62.6% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	0 (0 - 0) 0.0% 0.0%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	0 (0 - 0) 0.0% 0.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	0 (0 - 0) 0.0% 0.0%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	0 (0 - 0) 0.0% 0.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	0 (0 - 0) 0.0% 0.0%	394 (135 - 701) 66.3% 1.8%	492 (168 - 873) 82.7% 2.2%	589 (202 - 1043) 99.0% 2.6%	594 (204 - 1053) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	0 (0 - 0) 0.0% 0.0%	253 (87 - 431) 66.5% 2.6%	315 (109 - 536) 82.8% 3.2%	376 (131 - 639) 99.0% 3.9%	380 (132 - 645) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	0 (0 - 0) 0.0% 0.0%	60 (18 - 94) 66.7% 3.9%	75 (23 - 117) 83.0% 4.9%	90 (27 - 139) 99.1% 5.8%	91 (28 - 141) 100.0% 5.9%
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	0 (0 - 0) 0.0% 0.0%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	0 (0 - 0) 0.0% 0.0%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	0 (0 - 0) 0.0% 0.0%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	0 (0 - 0) 0.0% 0.0%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%
Respiratory Symptoms	**Single Pollutant Models**										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	0 (0 - 0) 0.0% 0.0%	3000 (1400 - 5800) 38.7% 5.9%	3800 (1700 - 7100) 47.8% 7.2%	4500 (2100 - 8400) 56.6% 8.6%	5100 (2400 - 9600) 65.2% 9.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	0 (0 - 0) 0.0% 0.0%	4600 (-300 - 9300) 36.8% 3.0%	5700 (-400 - 11500) 45.8% 3.8%	6800 (-500 - 13700) 54.6% 4.5%	7900 (-600 - 15800) 63.4% 5.2%
	Multi-Pollutant Models										
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	0 (0 - 0) 0.0% 0.0%	2700 (800 - 5700) 38.4% 5.3%	3400 (1000 - 7000) 47.4% 6.5%	4000 (1200 - 8300) 56.3% 7.7%	4600 (1400 - 9500) 64.9% 8.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	0 (0 - 0) 0.0% 0.0%	2100 (-3400 - 7100) 36.1% 1.4%	2700 (-4300 - 8800) 45.0% 1.8%	3200 (-5100 - 10500) 53.8% 2.1%	3700 (-6000 - 12100) 62.6% 2.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1c. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	39 (26 - 52) 10.0% 0.2%	88 (59 - 116) 22.5% 0.4%	136 (92 - 180) 34.9% 0.6%	184 (125 - 243) 47.3% 0.9%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	26 (19 - 33) 10.0% 0.1%	58 (42 - 75) 22.4% 0.3%	91 (65 - 116) 34.8% 0.4%	123 (88 - 158) 47.1% 0.6%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	2 (-1 - 6) 10.0% 0.2%	5 (-3 - 13) 22.6% 0.5%	8 (-4 - 20) 35.0% 0.8%	12 (-6 - 27) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	8 (4 - 11) 10.0% 0.2%	18 (10 - 25) 22.5% 0.5%	28 (15 - 39) 35.0% 0.8%	37 (21 - 53) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	4 (2 - 6) 10.2% 0.5%	8 (4 - 12) 22.9% 1.1%	13 (6 - 19) 35.4% 1.7%	17 (8 - 26) 47.9% 2.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	2 (0 - 4) 10.0% 0.2%	5 (0 - 9) 22.5% 0.4%	7 (0 - 13) 34.9% 0.7%	9 (0 - 18) 47.3% 0.9%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	5 (3 - 7) 10.0% 0.2%	12 (7 - 16) 22.4% 0.4%	18 (11 - 26) 34.8% 0.5%	25 (15 - 35) 47.2% 0.7%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	3 (1 - 4) 10.1% 0.4%	6 (3 - 9) 22.7% 0.8%	9 (4 - 13) 35.2% 1.2%	12 (6 - 18) 47.6% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	237 (79 - 394) 75.9% 1.1%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	88 (45 - 135) 40.2% 0.4%	197 (102 - 302) 90.3% 0.9%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	119 (40 - 195) 75.9% 1.4%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	78 (50 - 108) 40.3% 0.8%	174 (112 - 242) 90.3% 1.8%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	111 (38 - 198) 18.6% 0.5%	248 (85 - 443) 41.8% 1.1%	385 (132 - 685) 64.8% 1.7%	521 (178 - 924) 87.6% 2.3%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	71 (24 - 122) 18.7% 0.7%	159 (55 - 273) 41.9% 1.6%	247 (85 - 421) 64.9% 2.5%	333 (116 - 567) 87.7% 3.4%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	17 (5 - 27) 18.9% 1.1%	38 (12 - 60) 42.2% 2.5%	59 (18 - 92) 65.2% 3.8%	79 (24 - 124) 87.8% 5.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	128 (74 - 185) 40.3% 0.6%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	154 (81 - 221) 40.3% 0.7%	345 (182 - 493) 90.3% 1.5%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	128 (74 - 185) 40.3% 0.6%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	23 (-40 - 95) 40.1% 0.1%	52 (-90 - 213) 90.2% 0.2%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	900 (400 - 1700) 11.2% 1.7%	1900 (900 - 3700) 24.8% 3.8%	3000 (1400 - 5600) 37.9% 5.7%	4000 (1800 - 7500) 50.5% 7.6%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	1300 (-100 - 2700) 10.4% 0.9%	2900 (-200 - 6000) 23.3% 1.9%	4500 (-300 - 9100) 36.0% 3.0%	6100 (-400 - 12200) 48.5% 4.0%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	800 (200 - 1700) 11.1% 1.5%	1700 (500 - 3700) 24.5% 3.4%	2700 (800 - 5600) 37.5% 5.1%	3600 (1000 - 7400) 50.1% 6.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	600 (-900 - 2000) 10.1% 0.4%	1300 (-2100 - 4500) 22.7% 0.9%	2100 (-3300 - 6900) 35.2% 1.4%	2800 (-4500 - 9300) 47.6% 1.9%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1d. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	139 (94 - 184) 35.7% 0.6%	174 (118 - 230) 44.6% 0.8%	208 (141 - 275) 53.4% 1.0%	243 (165 - 321) 62.3% 1.1%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	93 (66 - 119) 35.6% 0.4%	116 (83 - 149) 44.5% 0.5%	139 (99 - 178) 53.3% 0.6%	162 (116 - 208) 62.2% 0.7%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	9 (-4 - 21) 35.8% 0.9%	11 (-5 - 26) 44.7% 1.1%	13 (-6 - 31) 53.6% 1.3%	15 (-7 - 36) 62.4% 1.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	28 (16 - 40) 35.8% 0.8%	35 (20 - 50) 44.7% 1.0%	42 (24 - 60) 53.6% 1.2%	49 (28 - 70) 62.4% 1.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	13 (6 - 20) 36.3% 1.8%	16 (7 - 24) 45.2% 2.2%	19 (9 - 29) 54.1% 2.6%	22 (10 - 34) 62.9% 3.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	7 (0 - 14) 35.8% 0.7%	9 (0 - 17) 44.6% 0.9%	11 (0 - 21) 53.5% 1.1%	13 (1 - 24) 62.3% 1.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	19 (12 - 26) 35.7% 0.6%	24 (15 - 33) 44.6% 0.7%	28 (17 - 39) 53.4% 0.8%	33 (20 - 46) 62.2% 1.0%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	9 (4 - 14) 36.0% 1.2%	11 (5 - 17) 44.9% 1.6%	14 (6 - 20) 53.8% 1.9%	16 (8 - 24) 62.6% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	394 (135 - 701) 66.3% 1.8%	492 (168 - 873) 82.7% 2.2%	589 (202 - 1043) 99.0% 2.6%	594 (204 - 1053) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	253 (87 - 431) 66.5% 2.6%	315 (109 - 536) 82.8% 3.2%	376 (131 - 639) 99.0% 3.9%	380 (132 - 645) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	60 (18 - 94) 66.7% 3.9%	75 (23 - 117) 83.0% 4.9%	90 (27 - 139) 99.1% 5.8%	91 (28 - 141) 100.0% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	3000 (1400 - 5800) 38.7% 5.9%	3800 (1700 - 7100) 47.8% 7.2%	4500 (2100 - 8400) 56.6% 8.6%	5100 (2400 - 9600) 65.2% 9.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	4600 (-300 - 9300) 36.8% 3.0%	5700 (-400 - 11500) 45.8% 3.8%	6800 (-500 - 13700) 54.6% 4.5%	7900 (-600 - 15800) 63.4% 5.2%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	2700 (800 - 5700) 38.4% 5.3%	3400 (1000 - 7000) 47.4% 6.5%	4000 (1200 - 8300) 56.3% 7.7%	4600 (1400 - 9500) 64.9% 8.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	2100 (-3400 - 7100) 36.1% 1.4%	2700 (-4300 - 8800) 45.0% 1.8%	3200 (-5100 - 10500) 53.8% 2.1%	3700 (-6000 - 12100) 62.6% 2.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1e. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	51 (34 - 67) 13.0% 0.2%	88 (59 - 116) 22.5% 0.4%	136 (92 - 180) 34.9% 0.6%	184 (125 - 243) 47.3% 0.9%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	34 (24 - 43) 13.0% 0.2%	58 (42 - 75) 22.4% 0.3%	91 (65 - 116) 34.8% 0.4%	123 (88 - 158) 47.1% 0.6%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	3 (-2 - 8) 13.1% 0.3%	5 (-3 - 13) 22.6% 0.5%	8 (-4 - 20) 35.0% 0.8%	12 (-6 - 27) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	10 (6 - 15) 13.1% 0.3%	18 (10 - 25) 22.5% 0.5%	28 (15 - 39) 35.0% 0.8%	37 (21 - 53) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	5 (2 - 7) 13.3% 0.7%	8 (4 - 12) 22.9% 1.1%	13 (6 - 19) 35.4% 1.7%	17 (8 - 26) 47.9% 2.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	3 (0 - 5) 13.0% 0.3%	5 (0 - 9) 22.5% 0.4%	7 (0 - 13) 34.9% 0.7%	9 (0 - 18) 47.3% 0.9%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	7 (4 - 10) 13.0% 0.2%	12 (7 - 16) 22.4% 0.4%	18 (11 - 26) 34.8% 0.5%	25 (15 - 35) 47.2% 0.7%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	3 (2 - 5) 13.2% 0.5%	6 (3 - 9) 22.7% 0.8%	9 (4 - 13) 35.2% 1.2%	12 (6 - 18) 47.6% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	308 (103 - 511) 98.5% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	114 (59 - 175) 52.3% 0.5%	197 (102 - 302) 90.3% 0.9%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	155 (52 - 253) 98.5% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	101 (65 - 141) 52.4% 1.0%	174 (112 - 242) 90.3% 1.8%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	144 (49 - 257) 24.2% 0.6%	248 (85 - 443) 41.8% 1.1%	385 (132 - 685) 64.8% 1.7%	521 (178 - 924) 87.6% 2.3%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	92 (32 - 159) 24.3% 1.0%	159 (55 - 273) 41.9% 1.6%	247 (85 - 421) 64.9% 2.5%	333 (116 - 567) 87.7% 3.4%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	22 (7 - 35) 24.5% 1.4%	38 (12 - 60) 42.2% 2.5%	59 (18 - 92) 65.2% 3.8%	79 (24 - 124) 87.8% 5.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	167 (96 - 240) 52.3% 0.8%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	200 (105 - 286) 52.4% 0.9%	345 (182 - 493) 90.3% 1.5%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	167 (96 - 240) 52.3% 0.8%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	30 (-52 - 123) 52.2% 0.1%	52 (-90 - 213) 90.2% 0.2%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	1100 (500 - 2200) 14.5% 2.2%	1900 (900 - 3700) 24.8% 3.8%	3000 (1400 - 5600) 37.9% 5.7%	4000 (1800 - 7500) 50.5% 7.6%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	1700 (-100 - 3500) 13.6% 1.1%	2900 (-200 - 6000) 23.3% 1.9%	4500 (-300 - 9100) 36.0% 3.0%	6100 (-400 - 12200) 48.5% 4.0%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	1000 (300 - 2200) 14.4% 2.0%	1700 (500 - 3700) 24.5% 3.4%	2700 (800 - 5600) 37.5% 5.1%	3600 (1000 - 7400) 50.1% 6.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	800 (-1200 - 2600) 13.2% 0.5%	1300 (-2100 - 4500) 22.7% 0.9%	2100 (-3300 - 6900) 35.2% 1.4%	2800 (-4500 - 9300) 47.6% 1.9%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1f. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	139 (94 - 184) 35.7% 0.6%	174 (118 - 230) 44.6% 0.8%	208 (141 - 275) 53.4% 1.0%	243 (165 - 321) 62.3% 1.1%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	93 (66 - 119) 35.6% 0.4%	116 (83 - 149) 44.5% 0.5%	139 (99 - 178) 53.3% 0.6%	162 (116 - 208) 62.2% 0.7%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	9 (-4 - 21) 35.8% 0.9%	11 (-5 - 26) 44.7% 1.1%	13 (-6 - 31) 53.6% 1.3%	15 (-7 - 36) 62.4% 1.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	28 (16 - 40) 35.8% 0.8%	35 (20 - 50) 44.7% 1.0%	42 (24 - 60) 53.6% 1.2%	49 (28 - 70) 62.4% 1.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	13 (6 - 20) 36.3% 1.8%	16 (7 - 24) 45.2% 2.2%	19 (9 - 29) 54.1% 2.6%	22 (10 - 34) 62.9% 3.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	7 (0 - 14) 35.8% 0.7%	9 (0 - 17) 44.6% 0.9%	11 (0 - 21) 53.5% 1.1%	13 (1 - 24) 62.3% 1.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	19 (12 - 26) 35.7% 0.6%	24 (15 - 33) 44.6% 0.7%	28 (17 - 39) 53.4% 0.8%	33 (20 - 46) 62.2% 1.0%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	9 (4 - 14) 36.0% 1.2%	11 (5 - 17) 44.9% 1.6%	14 (6 - 20) 53.8% 1.9%	16 (8 - 24) 62.6% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	394 (135 - 701) 66.3% 1.8%	492 (168 - 873) 82.7% 2.2%	589 (202 - 1043) 99.0% 2.6%	594 (204 - 1053) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	253 (87 - 431) 66.5% 2.6%	315 (109 - 536) 82.8% 3.2%	376 (131 - 639) 99.0% 3.9%	380 (132 - 645) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	60 (18 - 94) 66.7% 3.9%	75 (23 - 117) 83.0% 4.9%	90 (27 - 139) 99.1% 5.8%	91 (28 - 141) 100.0% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	3000 (1400 - 5800) 38.7% 5.9%	3800 (1700 - 7100) 47.8% 7.2%	4500 (2100 - 8400) 56.6% 8.6%	5100 (2400 - 9600) 65.2% 9.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	4600 (-300 - 9300) 36.8% 3.0%	5700 (-400 - 11500) 45.8% 3.8%	6800 (-500 - 13700) 54.6% 4.5%	7900 (-600 - 15800) 63.4% 5.2%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	2700 (800 - 5700) 38.4% 5.3%	3400 (1000 - 7000) 47.4% 6.5%	4000 (1200 - 8300) 56.3% 7.7%	4600 (1400 - 9500) 64.9% 8.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	2100 (-3400 - 7100) 36.1% 1.4%	2700 (-4300 - 8800) 45.0% 1.8%	3200 (-5100 - 10500) 53.8% 2.1%	3700 (-6000 - 12100) 62.6% 2.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1g. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	87 (59 - 115) 22.3% 0.4%	88 (59 - 116) 22.5% 0.4%	136 (92 - 180) 34.9% 0.6%	184 (125 - 243) 47.3% 0.9%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	58 (41 - 74) 22.2% 0.3%	58 (42 - 75) 22.4% 0.3%	91 (65 - 116) 34.8% 0.4%	123 (88 - 158) 47.1% 0.6%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	5 (-3 - 13) 22.3% 0.5%	5 (-3 - 13) 22.6% 0.5%	8 (-4 - 20) 35.0% 0.8%	12 (-6 - 27) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	18 (10 - 25) 22.3% 0.5%	18 (10 - 25) 22.5% 0.5%	28 (15 - 39) 35.0% 0.8%	37 (21 - 53) 47.4% 1.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	8 (4 - 12) 22.7% 1.1%	8 (4 - 12) 22.9% 1.1%	13 (6 - 19) 35.4% 1.7%	17 (8 - 26) 47.9% 2.3%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	4 (0 - 9) 22.3% 0.4%	5 (0 - 9) 22.5% 0.4%	7 (0 - 13) 34.9% 0.7%	9 (0 - 18) 47.3% 0.9%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	12 (7 - 16) 22.2% 0.4%	12 (7 - 16) 22.4% 0.4%	18 (11 - 26) 34.8% 0.5%	25 (15 - 35) 47.2% 0.7%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	6 (3 - 9) 22.5% 0.8%	6 (3 - 9) 22.7% 0.8%	9 (4 - 13) 35.2% 1.2%	12 (6 - 18) 47.6% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	196 (101 - 299) 89.4% 0.9%	197 (102 - 302) 90.3% 0.9%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	173 (111 - 240) 89.5% 1.8%	174 (112 - 242) 90.3% 1.8%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	246 (84 - 439) 41.4% 1.1%	248 (85 - 443) 41.8% 1.1%	385 (132 - 685) 64.8% 1.7%	521 (178 - 924) 87.6% 2.3%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	158 (54 - 270) 41.6% 1.6%	159 (55 - 273) 41.9% 1.6%	247 (85 - 421) 64.9% 2.5%	333 (116 - 567) 87.7% 3.4%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	38 (11 - 59) 41.8% 2.5%	38 (12 - 60) 42.2% 2.5%	59 (18 - 92) 65.2% 3.8%	79 (24 - 124) 87.8% 5.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	285 (165 - 410) 89.5% 1.3%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	342 (180 - 489) 89.5% 1.5%	345 (182 - 493) 90.3% 1.5%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	285 (165 - 410) 89.5% 1.3%	288 (166 - 414) 90.3% 1.3%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	51 (-89 - 211) 89.4% 0.2%	52 (-90 - 213) 90.2% 0.2%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	1900 (900 - 3700) 24.6% 3.7%	1900 (900 - 3700) 24.8% 3.8%	3000 (1400 - 5600) 37.9% 5.7%	4000 (1800 - 7500) 50.5% 7.6%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	2900 (-200 - 5900) 23.1% 1.9%	2900 (-200 - 6000) 23.3% 1.9%	4500 (-300 - 9100) 36.0% 3.0%	6100 (-400 - 12200) 48.5% 4.0%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	1700 (500 - 3600) 24.3% 3.3%	1700 (500 - 3700) 24.5% 3.4%	2700 (800 - 5600) 37.5% 5.1%	3600 (1000 - 7400) 50.1% 6.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	1300 (-2100 - 4500) 22.5% 0.9%	1300 (-2100 - 4500) 22.7% 0.9%	2100 (-3300 - 6900) 35.2% 1.4%	2800 (-4500 - 9300) 47.6% 1.9%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.1h. Estimated Changes in Health Risks Associated with Reducing "As Is" $PM_{2.5}$ Concentrations to Just Meet Alternative $PM_{2.5}$ Standards*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)]	Non-accidental	all	mean of lag 0 & 1		390 (265 - 514)	139 (94 - 184) 35.7% 0.6%	174 (118 - 230) 44.6% 0.8%	208 (141 - 275) 53.4% 1.0%	243 (165 - 321) 62.3% 1.1%
	Schwartz (2003b) [reanalysis of Schwartz et al. (1996)] -- 6 cities	Non-accidental	all	mean of lag 0 & 1		261 (186 - 334)	93 (66 - 119) 35.6% 0.4%	116 (83 - 149) 44.5% 0.5%	139 (99 - 178) 53.3% 0.6%	162 (116 - 208) 62.2% 0.7%
	Single Pollutant Models (Cause-Specific Mortality)									
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	COPD	all	0 day		24 (-12 - 56)	9 (-4 - 21) 35.8% 0.9%	11 (-5 - 26) 44.7% 1.1%	13 (-6 - 31) 53.6% 1.3%	15 (-7 - 36) 62.4% 1.5%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Ischemic heart disease	all	0 day		79 (44 - 112)	28 (16 - 40) 35.8% 0.8%	35 (20 - 50) 44.7% 1.0%	42 (24 - 60) 53.6% 1.2%	49 (28 - 70) 62.4% 1.4%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Pneumonia	all	0 day		36 (16 - 53)	13 (6 - 20) 36.3% 1.8%	16 (7 - 24) 45.2% 2.2%	19 (9 - 29) 54.1% 2.6%	22 (10 - 34) 62.9% 3.1%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	COPD	all	0 day		20 (1 - 38)	7 (0 - 14) 35.8% 0.7%	9 (0 - 17) 44.6% 0.9%	11 (0 - 21) 53.5% 1.1%	13 (1 - 24) 62.3% 1.2%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Ischemic heart disease	all	0 day		53 (33 - 73)	19 (12 - 26) 35.7% 0.6%	24 (15 - 33) 44.6% 0.7%	28 (17 - 39) 53.4% 0.8%	33 (20 - 46) 62.2% 1.0%
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Pneumonia	all	0 day		25 (12 - 37)	9 (4 - 14) 36.0% 1.2%	11 (5 - 17) 44.9% 1.6%	14 (6 - 20) 53.8% 1.9%	16 (8 - 24) 62.6% 2.2%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - Six Cities	All cause	25+			313 (105 - 519)	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%	313 (105 - 519) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+			219 (113 - 335)	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%	219 (113 - 335) 100.0% 1.0%
	Krewski et al. (2000) - Six Cities	Cardiopulmonary	25+			157 (52 - 257)	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%	157 (52 - 257) 100.0% 1.9%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			193 (124 - 268)	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%	193 (124 - 268) 100.0% 2.0%
	Pope et al. (2002) - ACS extended	All cause	30+			594 (204 - 1053)	394 (135 - 701) 66.3% 1.8%	492 (168 - 873) 82.7% 2.2%	589 (202 - 1043) 99.0% 2.6%	594 (204 - 1053) 100.0% 2.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			380 (132 - 645)	253 (87 - 431) 66.5% 2.6%	315 (109 - 536) 82.8% 3.2%	376 (131 - 639) 99.0% 3.9%	380 (132 - 645) 100.0% 3.9%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			91 (28 - 141)	60 (18 - 94) 66.7% 3.9%	75 (23 - 117) 83.0% 4.9%	90 (27 - 139) 99.1% 5.8%	91 (28 - 141) 100.0% 5.9%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	319 (184 - 459)	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	382 (201 - 546)	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%	382 (201 - 546) 100.0% 1.7%
	Krewski et al. (2000) - ACS	All cause	30+		O3	319 (184 - 459)	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%	319 (184 - 459) 100.0% 1.4%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	57 (-100 - 236)	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%	57 (-100 - 236) 100.0% 0.3%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% Confidence Interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day		7900 (3800 - 14500)	3000 (1400 - 5800) 38.7% 5.9%	3800 (1700 - 7100) 47.8% 7.2%	4500 (2100 - 8400) 56.6% 8.6%	5100 (2400 - 9600) 65.2% 9.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day		12500 (-900 - 24300)	4600 (-300 - 9300) 36.8% 3.0%	5700 (-400 - 11500) 45.8% 3.8%	6800 (-500 - 13700) 54.6% 4.5%	7900 (-600 - 15800) 63.4% 5.2%
	Multi-Pollutant Models									
	Schwartz and Neas (2000) -- 6 cities	Lower respiratory symptoms	7-14	1 day	PM10-2.5	7100 (2200 - 14300)	2700 (800 - 5700) 38.4% 5.3%	3400 (1000 - 7000) 47.4% 6.5%	4000 (1200 - 8300) 56.3% 7.7%	4600 (1400 - 9500) 64.9% 8.9%
	Schwartz and Neas (2000) -- 6 cities	Cough	7-14	0 day	PM10-2.5	5900 (-9900 - 18900)	2100 (-3400 - 7100) 36.1% 1.4%	2700 (-4300 - 8800) 45.0% 1.8%	3200 (-5100 - 10500) 53.8% 2.1%	3700 (-6000 - 12100) 62.6% 2.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with "as is" PM2.5 levels reflects the number of cases attributable to "as is" PM2.5 above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" PM2.5 levels. For example, if incidence under "as is" levels is 80 and incidence under an alternative standard is 50, then incidence reduction due to the alternative standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence

NOTE: Incidence and incidence reduction is rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100.

Exhibit G.2a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Phoenix, AZ, 2001

(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	29 (-8 - 66) 15.7% 0.5%	58 (-16 - 130) 31.3% 0.9%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	52 (15 - 88) 16.0% 0.8%	102 (30 - 173) 31.7% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	147 (50 - 262) 42.1% 0.7%	292 (100 - 520) 83.9% 1.4%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	100 (34 - 172) 42.2% 1.0%	199 (69 - 340) 83.9% 2.1%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	20 (6 - 32) 42.3% 1.6%	40 (12 - 63) 84.0% 3.1%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**										
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	0 (0 - 0) 0.0% 0.0%	5 (-1 - 11) 2.7% 0.1%	29 (-8 - 66) 15.9% 0.5%	54 (-15 - 121) 29.1% 0.8%	78 (-22 - 175) 42.1% 1.2%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	0 (0 - 0) 0.0% 0.0%	9 (3 - 15) 2.7% 0.1%	52 (15 - 89) 16.2% 0.8%	95 (28 - 161) 29.5% 1.5%	138 (41 - 232) 42.6% 2.1%
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0 (0 - 0) 0.0% 0.0%	20 (10 - 30) 50.7% 0.1%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0 (0 - 0) 0.0% 0.0%	19 (12 - 26) 50.8% 0.2%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	0 (0 - 0) 0.0% 0.0%	25 (8 - 44) 7.1% 0.1%	149 (51 - 265) 42.6% 0.7%	271 (93 - 484) 77.9% 1.3%	349 (119 - 620) 100.0% 1.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	0 (0 - 0) 0.0% 0.0%	17 (6 - 29) 7.2% 0.2%	101 (35 - 174) 42.7% 1.1%	185 (64 - 316) 78.0% 1.9%	237 (82 - 405) 100.0% 2.5%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	0 (0 - 0) 0.0% 0.0%	3 (1 - 5) 7.2% 0.3%	20 (6 - 32) 42.9% 1.6%	37 (11 - 58) 78.1% 2.9%	48 (14 - 74) 100.0% 3.7%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0 (0 - 0) 0.0% 0.0%	35 (18 - 50) 50.8% 0.2%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0 (0 - 0) 0.0% 0.0%	5 (-9 - 21) 50.7% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	29 (-8 - 66) 15.7% 0.5%	58 (-16 - 130) 31.3% 0.9%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	52 (15 - 88) 16.0% 0.8%	102 (30 - 173) 31.7% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	147 (50 - 262) 42.1% 0.7%	292 (100 - 520) 83.9% 1.4%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	100 (34 - 172) 42.2% 1.0%	199 (69 - 340) 83.9% 2.1%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	20 (6 - 32) 42.3% 1.6%	40 (12 - 63) 84.0% 3.1%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	5 (-1 - 11) 2.7% 0.1%	29 (-8 - 66) 15.9% 0.5%	54 (-15 - 121) 29.1% 0.8%	78 (-22 - 175) 42.1% 1.2%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	9 (3 - 15) 2.7% 0.1%	52 (15 - 89) 16.2% 0.8%	95 (28 - 161) 29.5% 1.5%	138 (41 - 232) 42.6% 2.1%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	20 (10 - 30) 50.7% 0.1%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	19 (12 - 26) 50.8% 0.2%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	25 (8 - 44) 7.1% 0.1%	149 (51 - 265) 42.6% 0.7%	271 (93 - 484) 77.9% 1.3%	349 (119 - 620) 100.0% 1.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	17 (6 - 29) 7.2% 0.2%	101 (35 - 174) 42.7% 1.1%	185 (64 - 316) 78.0% 1.9%	237 (82 - 405) 100.0% 2.5%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	3 (1 - 5) 7.2% 0.3%	20 (6 - 32) 42.9% 1.6%	37 (11 - 58) 78.1% 2.9%	48 (14 - 74) 100.0% 3.7%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	35 (18 - 50) 50.8% 0.2%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	5 (-9 - 21) 50.7% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	29 (-8 - 66) 15.7% 0.5%	58 (-16 - 130) 31.3% 0.9%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	52 (15 - 88) 16.0% 0.8%	102 (30 - 173) 31.7% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	147 (50 - 262) 42.1% 0.7%	292 (100 - 520) 83.9% 1.4%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	100 (34 - 172) 42.2% 1.0%	199 (69 - 340) 83.9% 2.1%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	20 (6 - 32) 42.3% 1.6%	40 (12 - 63) 84.0% 3.1%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	5 (-1 - 11) 2.7% 0.1%	29 (-8 - 66) 15.9% 0.5%	54 (-15 - 121) 29.1% 0.8%	78 (-22 - 175) 42.1% 1.2%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	9 (3 - 15) 2.7% 0.1%	52 (15 - 89) 16.2% 0.8%	95 (28 - 161) 29.5% 1.5%	138 (41 - 232) 42.6% 2.1%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	20 (10 - 30) 50.7% 0.1%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	19 (12 - 26) 50.8% 0.2%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	25 (8 - 44) 7.1% 0.1%	149 (51 - 265) 42.6% 0.7%	271 (93 - 484) 77.9% 1.3%	349 (119 - 620) 100.0% 1.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	17 (6 - 29) 7.2% 0.2%	101 (35 - 174) 42.7% 1.1%	185 (64 - 316) 78.0% 1.9%	237 (82 - 405) 100.0% 2.5%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	3 (1 - 5) 7.2% 0.3%	20 (6 - 32) 42.9% 1.6%	37 (11 - 58) 78.1% 2.9%	48 (14 - 74) 100.0% 3.7%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	35 (18 - 50) 50.8% 0.2%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	5 (-9 - 21) 50.7% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	29 (-8 - 66) 15.7% 0.5%	58 (-16 - 130) 31.3% 0.9%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	52 (15 - 88) 16.0% 0.8%	102 (30 - 173) 31.7% 1.6%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	147 (50 - 262) 42.1% 0.7%	292 (100 - 520) 83.9% 1.4%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	100 (34 - 172) 42.2% 1.0%	199 (69 - 340) 83.9% 2.1%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	20 (6 - 32) 42.3% 1.6%	40 (12 - 63) 84.0% 3.1%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.
**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.
NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.2h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*
Phoenix, AZ, 2001
(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**									
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	0 day		185 (-52 - 407)	5 (-1 - 11) 2.7% 0.1%	29 (-8 - 66) 15.9% 0.5%	54 (-15 - 121) 29.1% 0.8%	78 (-22 - 175) 42.1% 1.2%
	Mar (2003) [reanalysis of Mar (2000)]	Cardiovascular	65+	1 day		323 (97 - 536)	9 (3 - 15) 2.7% 0.1%	52 (15 - 89) 16.2% 0.8%	95 (28 - 161) 29.5% 1.5%	138 (41 - 232) 42.6% 2.1%
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			39 (20 - 60)	20 (10 - 30) 50.7% 0.1%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%	39 (20 - 60) 100.0% 0.2%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			37 (24 - 51)	19 (12 - 26) 50.8% 0.2%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%	37 (24 - 51) 100.0% 0.4%
	Pope et al. (2002) - ACS extended	All cause	30+			349 (119 - 620)	25 (8 - 44) 7.1% 0.1%	149 (51 - 265) 42.6% 0.7%	271 (93 - 484) 77.9% 1.3%	349 (119 - 620) 100.0% 1.7%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			237 (82 - 405)	17 (6 - 29) 7.2% 0.2%	101 (35 - 174) 42.7% 1.1%	185 (64 - 316) 78.0% 1.9%	237 (82 - 405) 100.0% 2.5%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			48 (14 - 74)	3 (1 - 5) 7.2% 0.3%	20 (6 - 32) 42.9% 1.6%	37 (11 - 58) 78.1% 2.9%	48 (14 - 74) 100.0% 3.7%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	57 (33 - 82)	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	68 (36 - 98)	35 (18 - 50) 50.8% 0.2%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%	68 (36 - 98) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		O3	57 (33 - 82)	29 (17 - 42) 50.8% 0.1%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%	57 (33 - 82) 100.0% 0.3%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	10 (-18 - 42)	5 (-9 - 21) 50.7% 0.0%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%	10 (-18 - 42) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	35 (7 - 63) 16.0% 0.4%	60 (12 - 107) 27.4% 0.7%	85 (17 - 151) 38.8% 1.0%	109 (22 - 195) 50.0% 1.3%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	5 (-5 - 15) 16.2% 0.6%	9 (-8 - 25) 27.6% 1.0%	12 (-12 - 36) 39.0% 1.4%	16 (-15 - 45) 50.3% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	12 (-8 - 31) 16.0% 0.3%	20 (-13 - 52) 27.3% 0.6%	28 (-19 - 74) 38.6% 0.8%	36 (-25 - 95) 49.9% 1.0%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	45 (12 - 77) 16.1% 0.5%	76 (20 - 132) 27.6% 0.9%	108 (29 - 186) 38.9% 1.3%	139 (37 - 239) 50.2% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	40 (9 - 71) 16.1% 0.5%	69 (16 - 120) 27.5% 0.8%	98 (23 - 170) 38.8% 1.2%	126 (30 - 218) 50.1% 1.5%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	38 (9 - 66) 16.1% 0.5%	65 (16 - 113) 27.5% 0.8%	92 (23 - 159) 38.8% 1.1%	118 (30 - 204) 50.1% 1.4%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	66 (22 - 117) 38.1% 0.8%	112 (38 - 200) 65.1% 1.3%	158 (54 - 282) 92.0% 1.9%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	48 (16 - 82) 38.2% 1.2%	82 (28 - 140) 65.2% 2.0%	115 (40 - 197) 92.0% 2.8%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	9 (3 - 14) 38.4% 1.8%	15 (4 - 23) 65.4% 3.0%	21 (6 - 33) 92.1% 4.2%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**										
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	0 (0 - 0) 0.0% 0.0%	57 (12 - 103) 26.2% 0.7%	79 (16 - 141) 36.2% 1.0%	101 (21 - 180) 46.1% 1.2%	122 (25 - 218) 56.0% 1.5%
	Single Pollutant Models (Cause-Specific Mortality)										
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	0 (0 - 0) 0.0% 0.0%	8 (-8 - 24) 26.4% 1.0%	12 (-11 - 33) 36.4% 1.3%	15 (-14 - 42) 46.4% 1.7%	18 (-17 - 51) 56.3% 2.1%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	0 (0 - 0) 0.0% 0.0%	19 (-13 - 50) 26.1% 0.5%	26 (-18 - 69) 36.1% 0.8%	33 (-23 - 88) 46.0% 1.0%	40 (-28 - 106) 55.9% 1.2%
	Multi-Pollutant Models (Total Mortality)										
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	0 (0 - 0) 0.0% 0.0%	73 (19 - 126) 26.3% 0.9%	101 (27 - 174) 36.3% 1.2%	128 (34 - 221) 46.3% 1.5%	156 (41 - 268) 56.2% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	0 (0 - 0) 0.0% 0.0%	66 (15 - 115) 26.3% 0.8%	91 (21 - 159) 36.3% 1.1%	116 (27 - 202) 46.2% 1.4%	141 (33 - 244) 56.1% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	0 (0 - 0) 0.0% 0.0%	62 (15 - 107) 26.2% 0.7%	85 (21 - 148) 36.2% 1.0%	109 (27 - 189) 46.2% 1.3%	132 (33 - 229) 56.1% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	0 (0 - 0) 0.0% 0.0%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	0 (0 - 0) 0.0% 0.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	0 (0 - 0) 0.0% 0.0%	107 (37 - 191) 62.2% 1.3%	148 (51 - 263) 85.9% 1.8%	172 (59 - 306) 100.0% 2.1%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	0 (0 - 0) 0.0% 0.0%	78 (27 - 133) 62.3% 1.9%	108 (37 - 184) 85.9% 2.6%	125 (43 - 213) 100.0% 3.0%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	0 (0 - 0) 0.0% 0.0%	14 (4 - 22) 62.5% 2.9%	19 (6 - 30) 86.0% 3.9%	23 (7 - 35) 100.0% 4.6%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models										
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	0 (0 - 0) 0.0% 0.0%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	0 (0 - 0) 0.0% 0.0%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	0 (0 - 0) 0.0% 0.0%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	0 (0 - 0) 0.0% 0.0%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	35 (7 - 63) 16.0% 0.4%	60 (12 - 107) 27.4% 0.7%	85 (17 - 151) 38.8% 1.0%	109 (22 - 195) 50.0% 1.3%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	5 (-5 - 15) 16.2% 0.6%	9 (-8 - 25) 27.6% 1.0%	12 (-12 - 36) 39.0% 1.4%	16 (-15 - 45) 50.3% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	12 (-8 - 31) 16.0% 0.3%	20 (-13 - 52) 27.3% 0.6%	28 (-19 - 74) 38.6% 0.8%	36 (-25 - 95) 49.9% 1.0%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	45 (12 - 77) 16.1% 0.5%	76 (20 - 132) 27.6% 0.9%	108 (29 - 186) 38.9% 1.3%	139 (37 - 239) 50.2% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	40 (9 - 71) 16.1% 0.5%	69 (16 - 120) 27.5% 0.8%	98 (23 - 170) 38.8% 1.2%	126 (30 - 218) 50.1% 1.5%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	38 (9 - 66) 16.1% 0.5%	65 (16 - 113) 27.5% 0.8%	92 (23 - 159) 38.8% 1.1%	118 (30 - 204) 50.1% 1.4%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	66 (22 - 117) 38.1% 0.8%	112 (38 - 200) 65.1% 1.3%	158 (54 - 282) 92.0% 1.9%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	48 (16 - 82) 38.2% 1.2%	82 (28 - 140) 65.2% 2.0%	115 (40 - 197) 92.0% 2.8%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	9 (3 - 14) 38.4% 1.8%	15 (4 - 23) 65.4% 3.0%	21 (6 - 33) 92.1% 4.2%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	57 (12 - 103) 26.2% 0.7%	79 (16 - 141) 36.2% 1.0%	101 (21 - 180) 46.1% 1.2%	122 (25 - 218) 56.0% 1.5%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	8 (-8 - 24) 26.4% 1.0%	12 (-11 - 33) 36.4% 1.3%	15 (-14 - 42) 46.4% 1.7%	18 (-17 - 51) 56.3% 2.1%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	19 (-13 - 50) 26.1% 0.5%	26 (-18 - 69) 36.1% 0.8%	33 (-23 - 88) 46.0% 1.0%	40 (-28 - 106) 55.9% 1.2%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	73 (19 - 126) 26.3% 0.9%	101 (27 - 174) 36.3% 1.2%	128 (34 - 221) 46.3% 1.5%	156 (41 - 268) 56.2% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	66 (15 - 115) 26.3% 0.8%	91 (21 - 159) 36.3% 1.1%	116 (27 - 202) 46.2% 1.4%	141 (33 - 244) 56.1% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	62 (15 - 107) 26.2% 0.7%	85 (21 - 148) 36.2% 1.0%	109 (27 - 189) 46.2% 1.3%	132 (33 - 229) 56.1% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	107 (37 - 191) 62.2% 1.3%	148 (51 - 263) 85.9% 1.8%	172 (59 - 306) 100.0% 2.1%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	78 (27 - 133) 62.3% 1.9%	108 (37 - 184) 85.9% 2.6%	125 (43 - 213) 100.0% 3.0%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	14 (4 - 22) 62.5% 2.9%	19 (6 - 30) 86.0% 3.9%	23 (7 - 35) 100.0% 4.6%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	35 (7 - 63) 16.0% 0.4%	60 (12 - 107) 27.4% 0.7%	85 (17 - 151) 38.8% 1.0%	109 (22 - 195) 50.0% 1.3%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	5 (-5 - 15) 16.2% 0.6%	9 (-8 - 25) 27.6% 1.0%	12 (-12 - 36) 39.0% 1.4%	16 (-15 - 45) 50.3% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	12 (-8 - 31) 16.0% 0.3%	20 (-13 - 52) 27.3% 0.6%	28 (-19 - 74) 38.6% 0.8%	36 (-25 - 95) 49.9% 1.0%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	45 (12 - 77) 16.1% 0.5%	76 (20 - 132) 27.6% 0.9%	108 (29 - 186) 38.9% 1.3%	139 (37 - 239) 50.2% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	40 (9 - 71) 16.1% 0.5%	69 (16 - 120) 27.5% 0.8%	98 (23 - 170) 38.8% 1.2%	126 (30 - 218) 50.1% 1.5%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	38 (9 - 66) 16.1% 0.5%	65 (16 - 113) 27.5% 0.8%	92 (23 - 159) 38.8% 1.1%	118 (30 - 204) 50.1% 1.4%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	66 (22 - 117) 38.1% 0.8%	112 (38 - 200) 65.1% 1.3%	158 (54 - 282) 92.0% 1.9%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	48 (16 - 82) 38.2% 1.2%	82 (28 - 140) 65.2% 2.0%	115 (40 - 197) 92.0% 2.8%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	9 (3 - 14) 38.4% 1.8%	15 (4 - 23) 65.4% 3.0%	21 (6 - 33) 92.1% 4.2%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	57 (12 - 103) 26.2% 0.7%	79 (16 - 141) 36.2% 1.0%	101 (21 - 180) 46.1% 1.2%	122 (25 - 218) 56.0% 1.5%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	8 (-8 - 24) 26.4% 1.0%	12 (-11 - 33) 36.4% 1.3%	15 (-14 - 42) 46.4% 1.7%	18 (-17 - 51) 56.3% 2.1%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	19 (-13 - 50) 26.1% 0.5%	26 (-18 - 69) 36.1% 0.8%	33 (-23 - 88) 46.0% 1.0%	40 (-28 - 106) 55.9% 1.2%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	73 (19 - 126) 26.3% 0.9%	101 (27 - 174) 36.3% 1.2%	128 (34 - 221) 46.3% 1.5%	156 (41 - 268) 56.2% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	66 (15 - 115) 26.3% 0.8%	91 (21 - 159) 36.3% 1.1%	116 (27 - 202) 46.2% 1.4%	141 (33 - 244) 56.1% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	62 (15 - 107) 26.2% 0.7%	85 (21 - 148) 36.2% 1.0%	109 (27 - 189) 46.2% 1.3%	132 (33 - 229) 56.1% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	107 (37 - 191) 62.2% 1.3%	148 (51 - 263) 85.9% 1.8%	172 (59 - 306) 100.0% 2.1%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	78 (27 - 133) 62.3% 1.9%	108 (37 - 184) 85.9% 2.6%	125 (43 - 213) 100.0% 3.0%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	14 (4 - 22) 62.5% 2.9%	19 (6 - 30) 86.0% 3.9%	23 (7 - 35) 100.0% 4.6%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	48 (10 - 86) 21.9% 0.6%	60 (12 - 107) 27.4% 0.7%	85 (17 - 151) 38.8% 1.0%	109 (22 - 195) 50.0% 1.3%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	7 (-7 - 20) 22.1% 0.8%	9 (-8 - 25) 27.6% 1.0%	12 (-12 - 36) 39.0% 1.4%	16 (-15 - 45) 50.3% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	16 (-11 - 42) 21.8% 0.5%	20 (-13 - 52) 27.3% 0.6%	28 (-19 - 74) 38.6% 0.8%	36 (-25 - 95) 49.9% 1.0%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	61 (16 - 106) 22.0% 0.7%	76 (20 - 132) 27.6% 0.9%	108 (29 - 186) 38.9% 1.3%	139 (37 - 239) 50.2% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	55 (13 - 96) 21.9% 0.7%	69 (16 - 120) 27.5% 0.8%	98 (23 - 170) 38.8% 1.2%	126 (30 - 218) 50.1% 1.5%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	52 (13 - 90) 21.9% 0.6%	65 (16 - 113) 27.5% 0.8%	92 (23 - 159) 38.8% 1.1%	118 (30 - 204) 50.1% 1.4%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	90 (31 - 160) 51.9% 1.1%	112 (38 - 200) 65.1% 1.3%	158 (54 - 282) 92.0% 1.9%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	65 (22 - 112) 52.1% 1.6%	82 (28 - 140) 65.2% 2.0%	115 (40 - 197) 92.0% 2.8%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	12 (4 - 19) 52.3% 2.4%	15 (4 - 23) 65.4% 3.0%	21 (6 - 33) 92.1% 4.2%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.3h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		218 (45 - 387)	57 (12 - 103) 26.2% 0.7%	79 (16 - 141) 36.2% 1.0%	101 (21 - 180) 46.1% 1.2%	122 (25 - 218) 56.0% 1.5%
	Single Pollutant Models (Cause-Specific Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		32 (-32 - 88)	8 (-8 - 24) 26.4% 1.0%	12 (-11 - 33) 36.4% 1.3%	15 (-14 - 42) 46.4% 1.7%	18 (-17 - 51) 56.3% 2.1%
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		72 (-50 - 188)	19 (-13 - 50) 26.1% 0.5%	26 (-18 - 69) 36.1% 0.8%	33 (-23 - 88) 46.0% 1.0%	40 (-28 - 106) 55.9% 1.2%
	Multi-Pollutant Models (Total Mortality)									
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	NO2	277 (74 - 472)	73 (19 - 126) 26.3% 0.9%	101 (27 - 174) 36.3% 1.2%	128 (34 - 221) 46.3% 1.5%	156 (41 - 268) 56.2% 1.9%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	CO	251 (60 - 432)	66 (15 - 115) 26.3% 0.8%	91 (21 - 159) 36.3% 1.1%	116 (27 - 202) 46.2% 1.4%	141 (33 - 244) 56.1% 1.7%
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day	O3 - 8hr	236 (60 - 404)	62 (15 - 107) 26.2% 0.7%	85 (21 - 148) 36.2% 1.0%	109 (27 - 189) 46.2% 1.3%	132 (33 - 229) 56.1% 1.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Krewski et al. (2000) - ACS	All cause	30+			41 (21 - 63)	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%	41 (21 - 63) 100.0% 0.5%
	Krewski et al. (2000) - ACS	Cardiopulmonary	30+			41 (27 - 57)	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%	41 (27 - 57) 100.0% 1.0%
	Pope et al. (2002) - ACS extended	All cause	30+			172 (59 - 306)	107 (37 - 191) 62.2% 1.3%	148 (51 - 263) 85.9% 1.8%	172 (59 - 306) 100.0% 2.1%	172 (59 - 306) 100.0% 2.1%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			125 (43 - 213)	78 (27 - 133) 62.3% 1.9%	108 (37 - 184) 85.9% 2.6%	125 (43 - 213) 100.0% 3.0%	125 (43 - 213) 100.0% 3.0%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			23 (7 - 35)	14 (4 - 22) 62.5% 2.9%	19 (6 - 30) 86.0% 3.9%	23 (7 - 35) 100.0% 4.6%	23 (7 - 35) 100.0% 4.6%

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
	Multi-Pollutant Models									
	Krewski et al. (2000) - ACS	All cause	30+		CO	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		NO2	72 (38 - 103)	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%	72 (38 - 103) 100.0% 0.9%
	Krewski et al. (2000) - ACS	All cause	30+		O3	60 (34 - 86)	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%	60 (34 - 86) 100.0% 0.7%
	Krewski et al. (2000) - ACS	All cause	30+		SO2	11 (-19 - 44)	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%	11 (-19 - 44) 100.0% 0.1%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.4a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							15 ug/m3 annual and 40 ug/m3 daily 98th percentile value	15 ug/m3 annual and 35 ug/m3 daily 98th percentile value	15 ug/m3 annual and 30 ug/m3 daily 98th percentile value	15 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	10 (3 - 17) 19.4% 0.1%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	6 (2 - 11) 19.4% 0.1%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	1 (0 - 2) 19.4% 0.2%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	1 (0 - 1) 2.6% 0.1%	5 (1 - 7) 15.8% 0.3%	9 (2 - 13) 28.9% 0.6%	13 (3 - 19) 42.0% 0.8%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitte exhibit.

Exhibit G.4b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							15 ug/m3 annual and 65 ug/m3 daily 99th percentile value	15 ug/m3 annual and 40 ug/m3 daily 99th percentile value	15 ug/m3 annual and 35 ug/m3 daily 99th percentile value	15 ug/m3 annual and 30 ug/m3 daily 99th percentile value	15 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**										
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	0 (0 - 0) 0.0% 0.0%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	0 (0 - 0) 0.0% 0.0%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	0 (0 - 0) 0.0% 0.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**										
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	0 (0 - 0) 0.0% 0.0%	5 (1 - 8) 17.8% 0.3%	9 (2 - 13) 28.9% 0.6%	12 (3 - 18) 40.0% 0.8%	15 (4 - 23) 51.0% 1.0%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit G.4c. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 98th percentile value	14 ug/m3 annual and 35 ug/m3 daily 98th percentile value	14 ug/m3 annual and 30 ug/m3 daily 98th percentile value	14 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	10 (3 - 17) 19.4% 0.1%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	6 (2 - 11) 19.4% 0.1%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	1 (0 - 2) 19.4% 0.2%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	1 (0 - 1) 2.6% 0.1%	5 (1 - 7) 15.8% 0.3%	9 (2 - 13) 28.9% 0.6%	13 (3 - 19) 42.0% 0.8%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit G.4d. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							14 ug/m3 annual and 40 ug/m3 daily 99th percentile value	14 ug/m3 annual and 35 ug/m3 daily 99th percentile value	14 ug/m3 annual and 30 ug/m3 daily 99th percentile value	14 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	5 (1 - 8) 17.8% 0.3%	9 (2 - 13) 28.9% 0.6%	12 (3 - 18) 40.0% 0.8%	15 (4 - 23) 51.0% 1.0%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit G.4e. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 98th percentile value	13 ug/m3 annual and 35 ug/m3 daily 98th percentile value	13 ug/m3 annual and 30 ug/m3 daily 98th percentile value	13 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	10 (3 - 17) 19.4% 0.1%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	6 (2 - 11) 19.4% 0.1%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	1 (0 - 2) 19.4% 0.2%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	1 (0 - 1) 2.6% 0.1%	5 (1 - 7) 15.8% 0.3%	9 (2 - 13) 28.9% 0.6%	13 (3 - 19) 42.0% 0.8%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

Exhibit G.4f. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							13 ug/m3 annual and 40 ug/m3 daily 99th percentile value	13 ug/m3 annual and 35 ug/m3 daily 99th percentile value	13 ug/m3 annual and 30 ug/m3 daily 99th percentile value	13 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	5 (1 - 8) 17.8% 0.3%	9 (2 - 13) 28.9% 0.6%	12 (3 - 18) 40.0% 0.8%	15 (4 - 23) 51.0% 1.0%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit G.4g. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 98th percentile value	12 ug/m3 annual and 35 ug/m3 daily 98th percentile value	12 ug/m3 annual and 30 ug/m3 daily 98th percentile value	12 ug/m3 annual and 25 ug/m3 daily 98th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	10 (3 - 17) 19.4% 0.1%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	6 (2 - 11) 19.4% 0.1%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	1 (0 - 2) 19.4% 0.2%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	1 (0 - 1) 2.6% 0.1%	5 (1 - 7) 15.8% 0.3%	9 (2 - 13) 28.9% 0.6%	13 (3 - 19) 42.0% 0.8%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3.5 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 8 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and th the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

Exhibit G.4h. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{2.5}$ Standards*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	PM2.5-Related Incidence Associated with "As Is" Concentrations (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence			
							12 ug/m3 annual and 40 ug/m3 daily 99th percentile value	12 ug/m3 annual and 35 ug/m3 daily 99th percentile value	12 ug/m3 annual and 30 ug/m3 daily 99th percentile value	12 ug/m3 annual and 25 ug/m3 daily 99th percentile value
Long-Term Exposure Mortality	**Single Pollutant Models**									
	Pope et al. (2002) - ACS extended	All cause	30+			50 (17 - 89)	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%	50 (17 - 89) 100.0% 0.5%
	Pope et al. (2002) - ACS extended	Cardiopulmonary	30+			33 (11 - 57)	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%	33 (11 - 57) 100.0% 0.7%
	Pope et al. (2002) - ACS extended	Lung cancer	30+			8 (2 - 12)	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%	8 (2 - 12) 100.0% 1.0%
Hospital Admissions	**Single Pollutant Models**									
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		30 (8 - 45)	5 (1 - 8) 17.8% 0.3%	9 (2 - 13) 28.9% 0.6%	12 (3 - 18) 40.0% 0.8%	15 (4 - 23) 51.0% 1.0%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background PM2.5 is taken to be 3 ug/m3 in the East and 2.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to PM2.5 unless otherwise specified.

***PM-related incidence associated with current standards is calculated by subtracting the number of cases avoided if current standards were just met from the number of cases attributable to "as is" PM above policy relevant background. Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM2.5 coefficient.

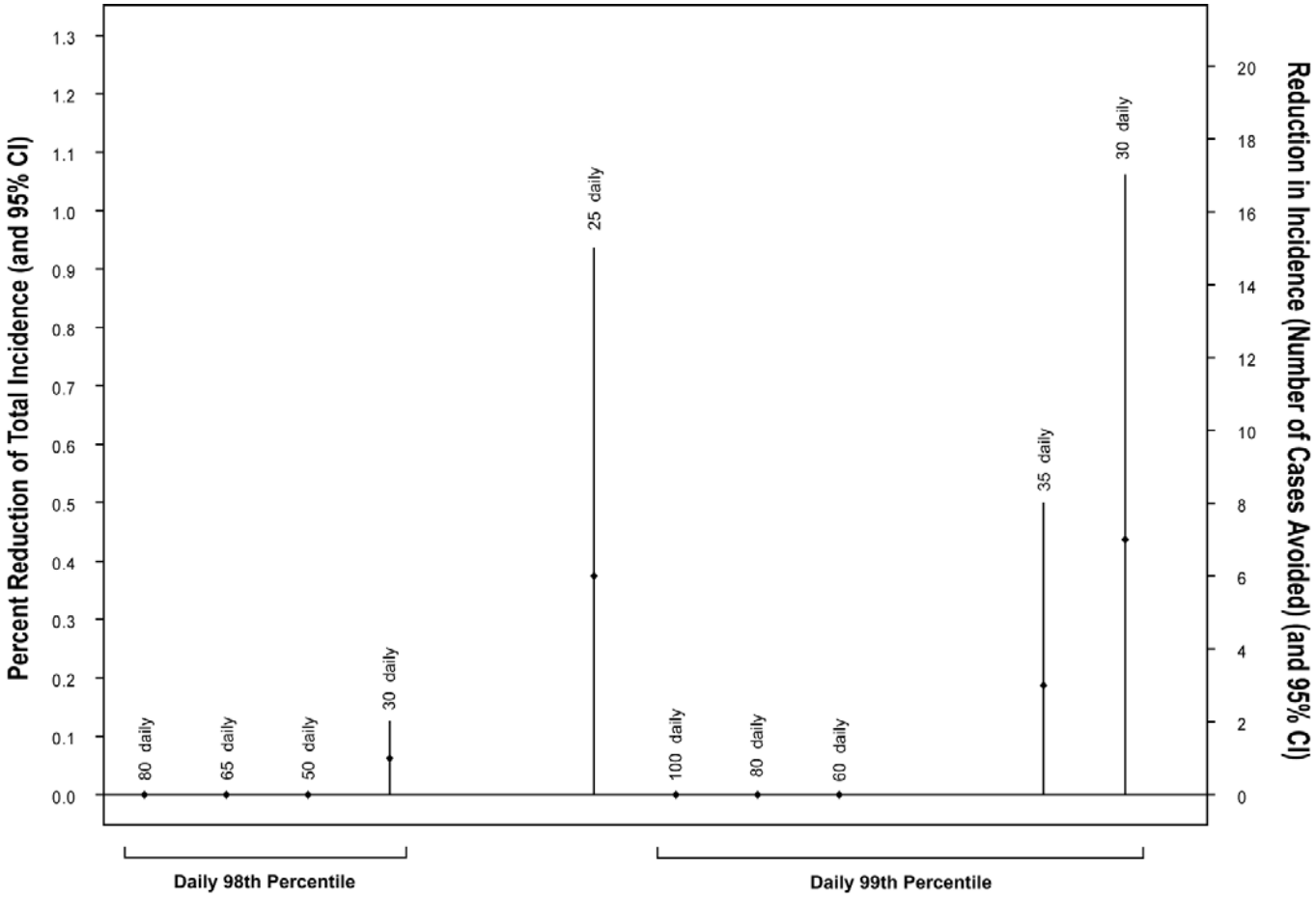
****Incidence reduction is reduction from incidence under current standards. For example, if incidence under current standards is 80 and incidence under a more stringent standard is 50, then incidence reduction due to the more stringent standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the PM2.5 coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with current standards. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number.

NOTE 2: The annual average PM2.5 concentration in Seattle in 2003 was lower than the lowest measured level in Krewski et al. (2000) - ACS (10 ug/m3). Therefore all incidences predicted by this study would be zero. The study was therefore omitted from this exhibit.

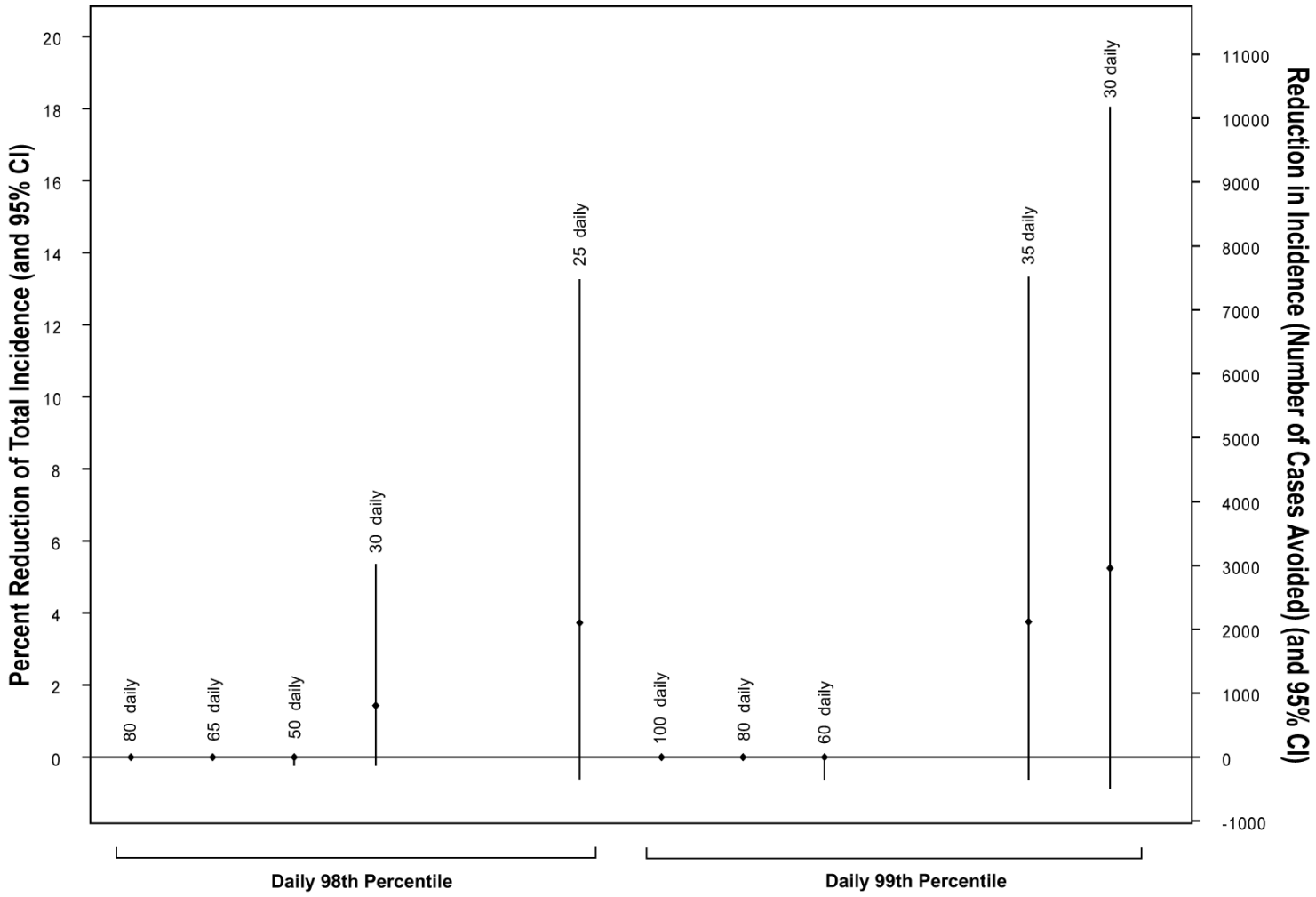
G.3. Figures: $PM_{10-2.5}$

Figure G.13. Estimated Annual Reduction of Hospital Admissions for Asthma Associated with Rolling Back "As Is" $PM_{10-2.5}$ Concentrations to $PM_{10-2.5}$ Concentrations that Just Meet Alternative $PM_{10-2.5}$ Daily Standards: Seattle, WA, 2003*



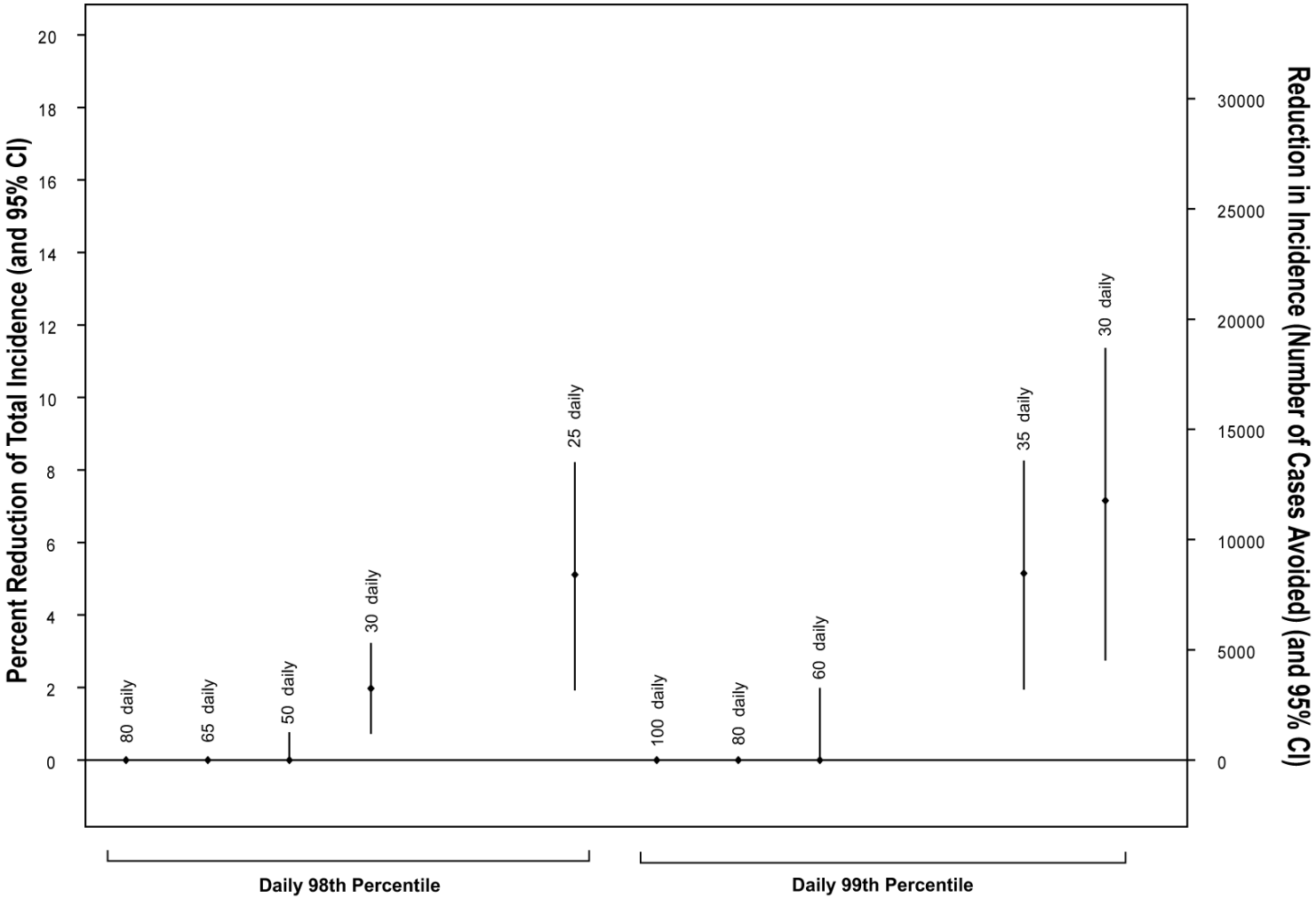
*Based on Sheppard (2003)

Figure G.14. Estimated Annual Reduction of Lower Respiratory Symptoms in Children Associated with Rolling Back "As Is" $PM_{10-2.5}$ Concentrations to $PM_{10-2.5}$ Concentrations that Just Meet Alternative $PM_{10-2.5}$ Daily Standards: St. Louis, MO, 2003*



*Based on Schwartz and Neas (2000) – 6 cities

Figure G.15. Estimated Annual Reduction of Cough in Children Associated with Rolling Back "As Is" $PM_{10-2.5}$ Concentrations to $PM_{10-2.5}$ Concentrations that Just Meet Alternative $PM_{10-2.5}$ Daily Standards: St. Louis, MO, 2003*



*Based on Schwartz and Neas (2000) – 6 cities

Exhibit G.5a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{10-2.5}$ Standards*

Seattle, WA, 2003

(As Is = 11.4 ug/m3 Annual Average; 26.2 ug/m3 98th Percentile Daily Value)

Health Effects	Study	Type	Ages	Lag	Other Pollutants in Model	$PM_{10-2.5}$-Related Incidence Associated with "As Is" $PM_{10-2.5}$ Levels (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							80 ug/m3 daily 98th percentile value	65 ug/m3 daily 98th percentile value	50 ug/m3 daily 98th percentile value	30 ug/m3 daily 98th percentile value	25 ug/m3 daily 98th percentile value
Hospital Admissions	Single Pollutant Models										
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		27 (0 - 65)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	1 (0 - 2) 3.7% 0.1%	6 (0 - 15) 22.0% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background $PM_{10-2.5}$ is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to $PM_{10-2.5}$. Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily $PM_{10-2.5}$ values obtained from nephelometer measurements rather than from air quality monitors.

***Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM10-2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" $PM_{10-2.5}$ levels. For example, if incidence under "as is" $PM_{10-2.5}$ levels is 80 and incidence under a given standard is 50, then incidence reduction due to the standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with "as is" $PM_{10-2.5}$ levels. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Exhibit G.5b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{10-2.5}$ Standards*

Seattle, WA, 2003

(As Is = 11.4 ug/m3 Annual Average; 26.2 ug/m3 98th Percentile Daily Value)

Health Effects	Study	Type	Ages	Lag	Other Pollutants in Model	$PM_{10-2.5}$-Related Incidence Associated with "As Is" $PM_{10-2.5}$ Levels (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							100 ug/m3 daily 99th percentile value	80 ug/m3 daily 99th percentile value	60 ug/m3 daily 99th percentile value	35 ug/m3 daily 99th percentile value	30 ug/m3 daily 99th percentile value
	Single Pollutant Models										
Hospital Admissions	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]**	Asthma	<65	1 day		27 (0 - 65)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	3 (0 - 8) 11.4% 0.2%	7 (0 - 17) 25.6% 0.4%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background $PM_{10-2.5}$ is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to $PM_{10-2.5}$. Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily $PM_{10-2.5}$ values obtained from nephelometer measurements rather than from air quality monitors.

***Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the PM10-2.5 coefficient.

****Incidence reduction is reduction from incidence under "as is" $PM_{10-2.5}$ levels. For example, if incidence under "as is" $PM_{10-2.5}$ levels is 80 and incidence under a given standard is 50, then incidence reduction due to the standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with "as is" $PM_{10-2.5}$ levels. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Exhibit G.6a. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{10-2.5}$ Standards*

St. Louis, MO, 2003

(As Is = 12.0 ug/m3 Annual Average; 24.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	$PM_{10-2.5}$-Related Incidence Associated with "As Is" $PM_{10-2.5}$ Levels (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							80 ug/m3 daily 98th percentile value	65 ug/m3 daily 98th percentile value	50 ug/m3 daily 98th percentile value	30 ug/m3 daily 98th percentile value	25 ug/m3 daily 98th percentile value
Respiratory Symptoms	**Single Pollutant Models**										
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day		6936 (-1215 - 20803)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	805 (-126 - 3009) 11.6% 1.4%	2104 (-337 - 7465) 30.3% 3.7%
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day		27017 (10973 - 40891)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	3243 (1216 - 5282) 12.0% 2.0%	8415 (3210 - 13477) 31.2% 5.1%
	Multi-Pollutant Models										
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day	PM2.5	2762 (-6872 - 10345)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	302 (-662 - 1263) 10.9% 0.5%	799 (-1794 - 3264) 28.9% 1.4%
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day	PM2.5	24839 (6515 - 40080)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	2949 (707 - 5154) 11.9% 1.8%	7670 (1874 - 13166) 30.9% 4.7%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background $PM_{10-2.5}$ is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to $PM_{10-2.5}$ unless otherwise specified.

***Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

****Incidence reduction is reduction from incidence under "as is" $PM_{10-2.5}$ levels. For example, if incidence under "as is" $PM_{10-2.5}$ levels is 80 and incidence under a given standard is 50, then incidence reduction due to the standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with "as is" $PM_{10-2.5}$ levels. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number; percents are rounded to the nearest tenth.

Exhibit G.6b. Estimated Changes in Health Risks Associated with Just Meeting Alternative $PM_{10-2.5}$ Standards*

St. Louis, MO, 2003

(As Is = 12.0 ug/m3 Annual Average; 24.1 ug/m3 98th Percentile Daily Value)

Health Effects**	Study	Type	Ages	Lag	Other Pollutants in Model	$PM_{10-2.5}$-Related Incidence Associated with "As Is" $PM_{10-2.5}$ Levels (95% Confidence Interval)***	Reduced Incidence from that Associated with "As Is" Concentrations**** (95% confidence interval) Percent Reduction in PM-Associated Incidence Percent Reduction in Total Incidence				
							100 ug/m3 daily 99th percentile value	80 ug/m3 daily 99th percentile value	60 ug/m3 daily 99th percentile value	35 ug/m3 daily 99th percentile value	30 ug/m3 daily 99th percentile value
Respiratory Symptoms	**Single Pollutant Models**										
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day		6936 (-1215 - 20803)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	2116 (-339 - 7505) 30.5% 3.8%	2958 (-481 - 10163) 42.6% 5.3%
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day		27017 (10973 - 40891)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	8463 (3229 - 13551) 31.3% 5.1%	11776 (4543 - 18661) 43.6% 7.2%
	Multi-Pollutant Models										
	Schwartz and Neas, 2000 -- 6 cities	Lower respiratory symptoms	7-14	0 day	PM2.5	2762 (-6872 - 10345)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	804 (-1805 - 3282) 29.1% 1.4%	1133 (-2587 - 4557) 41.0% 2.0%
	Schwartz and Neas, 2000 -- 6 cities	Cough	7-14	0 day	PM2.5	24839 (6515 - 40080)	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	0 (0 - 0) 0.0% 0.0%	7714 (1885 - 13238) 31.1% 4.7%	10751 (2659 - 18241) 43.3% 6.5%

*Health effects incidence or incidence reduction was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Average policy relevant background $PM_{10-2.5}$ is taken to be 4.5 ug/m3 in the East and 3.5 ug/m3 in the West.

**Health effects are associated with short-term exposure to $PM_{10-2.5}$ unless otherwise specified.

***Numbers in parentheses are the 95% confidence interval based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

****Incidence reduction is reduction from incidence under "as is" $PM_{10-2.5}$ levels. For example, if incidence under "as is" $PM_{10-2.5}$ levels is 80 and incidence under a given standard is 50, then incidence reduction due to the standard is 80 - 50 = 30. Incidence reduction is followed by its 95% confidence interval (in parentheses) based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient. The confidence interval is followed by the percent reduction in PM-associated incidence and then the percent reduction in total incidence. The percent reduction in PM-associated incidence is the reduction in incidence divided by the incidence associated with "as is" $PM_{10-2.5}$ levels. The percent reduction in total incidence is the reduction in incidence divided by the total incidence.

NOTE: Incidence and incidence reduction is rounded to the nearest whole number; percents are rounded to the nearest tenth.

Appendix H. Estimated Annual Health Risk Reductions Associated with Just Meeting Current and Alternative Suites of PM Standards, in the Base Case and Under Different Hypothetical Threshold Assumptions

Exhibit H.1. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, Using Alternative Hypothetical Threshold Models*
Boston, MA, 2003
(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	390 (265 - 514)	173 (118 - 228)	82 (56 - 109)	41 (28 - 53)
15	40, 98th percentile value	351 (239 - 462)	139 (95 - 183)	60 (41 - 79)	27 (19 - 36)
15	35, 98th percentile value	302 (206 - 398)	99 (67 - 130)	37 (25 - 48)	16 (11 - 20)
15	30, 98th percentile value	254 (173 - 334)	63 (43 - 83)	20 (14 - 26)	7 (5 - 9)
15	25, 98th percentile value	206 (140 - 270)	35 (24 - 46)	9 (6 - 12)	2 (1 - 2)
15	65, 99th percentile value	390 (265 - 514)	173 (118 - 228)	82 (56 - 109)	41 (28 - 53)
15	40, 99th percentile value	251 (171 - 330)	61 (42 - 80)	19 (13 - 25)	6 (4 - 8)
15	35, 99th percentile value	216 (147 - 284)	40 (28 - 53)	11 (7 - 14)	2 (2 - 3)
15	30, 99th percentile value	182 (124 - 239)	24 (16 - 31)	5 (3 - 7)	1 (1 - 1)
15	25, 99th percentile value	147 (100 - 193)	11 (8 - 15)	1 (1 - 2)	0 (0 - 0)
14	40, 98th percentile value	351 (239 - 462)	139 (95 - 183)	60 (41 - 79)	27 (19 - 36)
14	35, 98th percentile value	302 (206 - 398)	99 (67 - 130)	37 (25 - 48)	16 (11 - 20)
14	30, 98th percentile value	254 (173 - 334)	63 (43 - 83)	20 (14 - 26)	7 (5 - 9)
14	25, 98th percentile value	206 (140 - 270)	35 (24 - 46)	9 (6 - 12)	2 (1 - 2)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	40, 99th percentile value	251 (171 - 330)	61 (42 - 80)	19 (13 - 25)	6 (4 - 8)
14	35, 99th percentile value	216 (147 - 284)	40 (28 - 53)	11 (7 - 14)	2 (2 - 3)
14	30, 99th percentile value	182 (124 - 239)	24 (16 - 31)	5 (3 - 7)	1 (1 - 1)
14	25, 99th percentile value	147 (100 - 193)	11 (8 - 15)	1 (1 - 2)	0 (0 - 0)
13	40, 98th percentile value	339 (231 - 447)	129 (88 - 170)	54 (37 - 71)	24 (16 - 32)
13	35, 98th percentile value	302 (206 - 398)	99 (67 - 130)	37 (25 - 48)	16 (11 - 20)
13	30, 98th percentile value	254 (173 - 334)	63 (43 - 83)	20 (14 - 26)	7 (5 - 9)
13	25, 98th percentile value	206 (140 - 270)	35 (24 - 46)	9 (6 - 12)	2 (1 - 2)
13	40, 99th percentile value	251 (171 - 330)	61 (42 - 80)	19 (13 - 25)	6 (4 - 8)
13	35, 99th percentile value	216 (147 - 284)	40 (28 - 53)	11 (7 - 14)	2 (2 - 3)
13	30, 99th percentile value	182 (124 - 239)	24 (16 - 31)	5 (3 - 7)	1 (1 - 1)
13	25, 99th percentile value	147 (100 - 193)	11 (8 - 15)	1 (1 - 2)	0 (0 - 0)
12	40, 98th percentile value	303 (206 - 399)	99 (68 - 131)	37 (25 - 49)	16 (11 - 21)
12	35, 98th percentile value	302 (206 - 398)	99 (67 - 130)	37 (25 - 48)	16 (11 - 20)
12	30, 98th percentile value	254 (173 - 334)	63 (43 - 83)	20 (14 - 26)	7 (5 - 9)
12	25, 98th percentile value	206 (140 - 270)	35 (24 - 46)	9 (6 - 12)	2 (1 - 2)
12	40, 99th percentile value	251 (171 - 330)	61 (42 - 80)	19 (13 - 25)	6 (4 - 8)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =3.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	35, 99th percentile value	216 (147 - 284)	40 (28 - 53)	11 (7 - 14)	2 (2 - 3)
12	30, 99th percentile value	182 (124 - 239)	24 (16 - 31)	5 (3 - 7)	1 (1 - 1)
12	25, 99th percentile value	147 (100 - 193)	11 (8 - 15)	1 (1 - 2)	0 (0 - 0)

*This sensitivity analysis was performed using Schwartz (2003b). See text for an explanation of the slope adjustment method.

**Short-term exposure mortality incidence was quantified across the range of PM2.5 concentrations observed in the study. Incidences are rounded to the nearest

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.2. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, Using Alternative Hypothetical Boston, MA, 2003

(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value***	594 (204 - 1053)	309 (106 - 551)	20 (7 - 36)
15	40, 98th percentile value	484 (166 - 855)	185 (63 - 328)	0 (0 - 0)
15	35, 98th percentile value	346 (119 - 611)	30 (10 - 53)	0 (0 - 0)
15	30, 98th percentile value	209 (72 - 368)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	73 (25 - 129)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	594 (204 - 1053)	309 (106 - 551)	20 (7 - 36)
15	40, 99th percentile value	200 (69 - 352)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	103 (35 - 180)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	484 (166 - 855)	185 (63 - 328)	0 (0 - 0)
14	35, 98th percentile value	346 (119 - 611)	30 (10 - 53)	0 (0 - 0)
14	30, 98th percentile value	209 (72 - 368)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	73 (25 - 129)	0 (0 - 0)	0 (0 - 0)
14	40, 99th percentile value	200 (69 - 352)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	35, 99th percentile value	103 (35 - 180)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	451 (155 - 796)	147 (50 - 262)	0 (0 - 0)
13	35, 98th percentile value	346 (119 - 611)	30 (10 - 53)	0 (0 - 0)
13	30, 98th percentile value	209 (72 - 368)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	73 (25 - 129)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	200 (69 - 352)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	103 (35 - 180)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	348 (120 - 615)	33 (11 - 58)	0 (0 - 0)
12	35, 98th percentile value	346 (119 - 611)	30 (10 - 53)	0 (0 - 0)
12	30, 98th percentile value	209 (72 - 368)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	73 (25 - 129)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	200 (69 - 352)	0 (0 - 0)	0 (0 - 0)
12	35, 99th percentile value	103 (35 - 180)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	30, 99th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

***Long-term exposure mortality incidence was quantified across the range of PM2.5 concentrations observed in the study. The lowest measured PM2.5 level in the study was 7.5 ug/m3. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.3. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, Using Alternative Hypothetical Threshold Models*

Boston, MA, 2003

(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value***	380 (132 - 645)	198 (68 - 339)	13 (4 - 22)
15	40, 98th percentile value	309 (108 - 523)	118 (41 - 202)	0 (0 - 0)
15	35, 98th percentile value	221 (77 - 372)	19 (7 - 33)	0 (0 - 0)
15	30, 98th percentile value	133 (47 - 224)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	47 (16 - 78)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	380 (132 - 645)	198 (68 - 339)	13 (4 - 22)
15	40, 99th percentile value	127 (45 - 214)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	65 (23 - 110)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	309 (108 - 523)	118 (41 - 202)	0 (0 - 0)
14	35, 98th percentile value	221 (77 - 372)	19 (7 - 33)	0 (0 - 0)
14	30, 98th percentile value	133 (47 - 224)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	47 (16 - 78)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	127 (45 - 214)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	65 (23 - 110)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	288 (100 - 487)	94 (33 - 161)	0 (0 - 0)
13	35, 98th percentile value	221 (77 - 372)	19 (7 - 33)	0 (0 - 0)
13	30, 98th percentile value	133 (47 - 224)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	47 (16 - 78)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	127 (45 - 214)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	65 (23 - 110)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	222 (78 - 375)	21 (7 - 35)	0 (0 - 0)
12	35, 98th percentile value	221 (77 - 372)	19 (7 - 33)	0 (0 - 0)
12	30, 98th percentile value	133 (47 - 224)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	47 (16 - 78)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	127 (45 - 214)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	65 (23 - 110)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

***Cardiopulmonary mortality incidence was quantified across the range of PM2.5 concentrations observed in the study. The lowest measured PM2.5 level in the study was 7.5 ug/m3. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.4. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, Using Alternative Hypothetical Threshold Models*

Boston, MA, 2003

(As Is = 12.1 ug/m3 Annual Average; 34.1 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value***	91 (28 - 141)	47 (14 - 74)	3 (1 - 5)
15	40, 98th percentile value	73 (23 - 114)	28 (9 - 44)	0 (0 - 0)
15	35, 98th percentile value	52 (16 - 81)	5 (1 - 7)	0 (0 - 0)
15	30, 98th percentile value	32 (10 - 48)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	11 (3 - 17)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	91 (28 - 141)	47 (14 - 74)	3 (1 - 5)
15	40, 99th percentile value	30 (9 - 46)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	15 (5 - 24)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	73 (23 - 114)	28 (9 - 44)	0 (0 - 0)
14	35, 98th percentile value	52 (16 - 81)	5 (1 - 7)	0 (0 - 0)
14	30, 98th percentile value	32 (10 - 48)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	11 (3 - 17)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	30 (9 - 46)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	15 (5 - 24)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	68 (21 - 106)	23 (7 - 35)	0 (0 - 0)
13	35, 98th percentile value	52 (16 - 81)	5 (1 - 7)	0 (0 - 0)
13	30, 98th percentile value	32 (10 - 48)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	11 (3 - 17)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	30 (9 - 46)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	15 (5 - 24)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	53 (16 - 81)	5 (2 - 8)	0 (0 - 0)
12	35, 98th percentile value	52 (16 - 81)	5 (1 - 7)	0 (0 - 0)
12	30, 98th percentile value	32 (10 - 48)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	11 (3 - 17)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	30 (9 - 46)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Above Hypothetical Threshold**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	15 (5 - 24)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

***Lung cancer mortality incidence was quantified across the range of PM2.5 concentrations observed in the study. The lowest measured PM2.5 level in the study was 7.5 ug/m3. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.5. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Los Angeles, CA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =4 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	248 (-31 - 519)	115 (-14 - 240)	58 (-7 - 121)	29 (-4 - 61)
15	40, 98th percentile value	248 (-31 - 519)	115 (-14 - 240)	58 (-7 - 121)	29 (-4 - 61)
15	35, 98th percentile value	225 (-28 - 471)	96 (-12 - 200)	45 (-6 - 94)	22 (-3 - 46)
15	30, 98th percentile value	184 (-23 - 384)	65 (-8 - 135)	26 (-3 - 54)	12 (-2 - 25)
15	25, 98th percentile value	142 (-18 - 297)	39 (-5 - 80)	13 (-2 - 27)	5 (-1 - 11)
15	65, 99th percentile value	248 (-31 - 519)	115 (-14 - 240)	58 (-7 - 121)	29 (-4 - 61)
15	40, 99th percentile value	154 (-19 - 321)	45 (-6 - 94)	16 (-2 - 33)	7 (-1 - 14)
15	35, 99th percentile value	127 (-16 - 266)	30 (-4 - 63)	10 (-1 - 20)	3 (0 - 7)
15	30, 99th percentile value	101 (-13 - 211)	18 (-2 - 37)	5 (-1 - 10)	1 (0 - 3)
15	25, 99th percentile value	76 (-10 - 158)	9 (-1 - 18)	2 (0 - 4)	0 (0 - 1)
14	40, 98th percentile value	224 (-28 - 470)	96 (-12 - 199)	45 (-6 - 93)	22 (-3 - 45)
14	35, 98th percentile value	224 (-28 - 470)	96 (-12 - 199)	45 (-6 - 93)	22 (-3 - 45)
14	30, 98th percentile value	184 (-23 - 384)	65 (-8 - 135)	26 (-3 - 54)	12 (-2 - 25)
14	25, 98th percentile value	142 (-18 - 297)	39 (-5 - 80)	13 (-2 - 27)	5 (-1 - 11)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =4 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	40, 99th percentile value	154 (-19 - 321)	45 (-6 - 94)	16 (-2 - 33)	7 (-1 - 14)
14	35, 99th percentile value	127 (-16 - 266)	30 (-4 - 63)	10 (-1 - 20)	3 (0 - 7)
14	30, 99th percentile value	101 (-13 - 211)	18 (-2 - 37)	5 (-1 - 10)	1 (0 - 3)
14	25, 99th percentile value	76 (-10 - 158)	9 (-1 - 18)	2 (0 - 4)	0 (0 - 1)
13	40, 98th percentile value	201 (-25 - 421)	77 (-10 - 161)	34 (-4 - 69)	16 (-2 - 33)
13	35, 98th percentile value	201 (-25 - 421)	77 (-10 - 161)	34 (-4 - 69)	16 (-2 - 33)
13	30, 98th percentile value	184 (-23 - 384)	65 (-8 - 135)	26 (-3 - 54)	12 (-2 - 25)
13	25, 98th percentile value	142 (-18 - 297)	39 (-5 - 80)	13 (-2 - 27)	5 (-1 - 11)
13	40, 99th percentile value	154 (-19 - 321)	45 (-6 - 94)	16 (-2 - 33)	7 (-1 - 14)
13	35, 99th percentile value	127 (-16 - 266)	30 (-4 - 63)	10 (-1 - 20)	3 (0 - 7)
13	30, 99th percentile value	101 (-13 - 211)	18 (-2 - 37)	5 (-1 - 10)	1 (0 - 3)
13	25, 99th percentile value	76 (-10 - 158)	9 (-1 - 18)	2 (0 - 4)	0 (0 - 1)
12	40, 98th percentile value	178 (-22 - 372)	61 (-8 - 126)	24 (-3 - 50)	11 (-1 - 23)
12	35, 98th percentile value	178 (-22 - 372)	61 (-8 - 126)	24 (-3 - 50)	11 (-1 - 23)
12	30, 98th percentile value	178 (-22 - 372)	61 (-8 - 126)	24 (-3 - 50)	11 (-1 - 23)
12	25, 98th percentile value	142 (-18 - 297)	39 (-5 - 80)	13 (-2 - 27)	5 (-1 - 11)
12	40, 99th percentile value	154 (-19 - 321)	45 (-6 - 94)	16 (-2 - 33)	7 (-1 - 14)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =4 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	35, 99th percentile value	127 (-16 - 266)	30 (-4 - 63)	10 (-1 - 20)	3 (0 - 7)
12	30, 99th percentile value	101 (-13 - 211)	18 (-2 - 37)	5 (-1 - 10)	1 (0 - 3)
12	25, 99th percentile value	76 (-10 - 158)	9 (-1 - 18)	2 (0 - 4)	0 (0 - 1)

*This sensitivity analysis was performed using Moolgavkar (2003). See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.6. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Los Angeles, CA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	1507 (531 - 2587)	823 (290 - 1415)	138 (48 - 237)
15	40, 98th percentile value	1507 (531 - 2587)	823 (290 - 1415)	138 (48 - 237)
15	35, 98th percentile value	1265 (446 - 2168)	553 (195 - 949)	0 (0 - 0)
15	30, 98th percentile value	829 (293 - 1416)	65 (23 - 111)	0 (0 - 0)
15	25, 98th percentile value	396 (140 - 675)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	1507 (531 - 2587)	823 (290 - 1415)	138 (48 - 237)
15	40, 99th percentile value	514 (182 - 876)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	240 (85 - 408)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	1259 (444 - 2158)	546 (192 - 937)	0 (0 - 0)
14	35, 98th percentile value	1259 (444 - 2158)	546 (192 - 937)	0 (0 - 0)
14	30, 98th percentile value	829 (293 - 1416)	65 (23 - 111)	0 (0 - 0)
14	25, 98th percentile value	396 (140 - 675)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	514 (182 - 876)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	240 (85 - 408)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	1013 (358 - 1732)	270 (95 - 463)	0 (0 - 0)
13	35, 98th percentile value	1013 (358 - 1732)	270 (95 - 463)	0 (0 - 0)
13	30, 98th percentile value	829 (293 - 1416)	65 (23 - 111)	0 (0 - 0)
13	25, 98th percentile value	396 (140 - 675)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	514 (182 - 876)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	240 (85 - 408)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	767 (271 - 1310)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	767 (271 - 1310)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	767 (271 - 1310)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	396 (140 - 675)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	514 (182 - 876)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	240 (85 - 408)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.7. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Los Angeles, CA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	1151 (416 - 1873)	629 (227 - 1025)	105 (38 - 172)
15	40, 98th percentile value	1151 (416 - 1873)	629 (227 - 1025)	105 (38 - 172)
15	35, 98th percentile value	966 (350 - 1567)	422 (153 - 686)	0 (0 - 0)
15	30, 98th percentile value	632 (230 - 1020)	50 (18 - 80)	0 (0 - 0)
15	25, 98th percentile value	301 (110 - 485)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	1151 (416 - 1873)	629 (227 - 1025)	105 (38 - 172)
15	40, 99th percentile value	391 (143 - 630)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	182 (67 - 292)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	961 (348 - 1559)	417 (151 - 677)	0 (0 - 0)
14	35, 98th percentile value	961 (348 - 1559)	417 (151 - 677)	0 (0 - 0)
14	30, 98th percentile value	632 (230 - 1020)	50 (18 - 80)	0 (0 - 0)
14	25, 98th percentile value	301 (110 - 485)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	391 (143 - 630)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	182 (67 - 292)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	772 (280 - 1250)	206 (75 - 334)	0 (0 - 0)
13	35, 98th percentile value	772 (280 - 1250)	206 (75 - 334)	0 (0 - 0)
13	30, 98th percentile value	632 (230 - 1020)	50 (18 - 80)	0 (0 - 0)
13	25, 98th percentile value	301 (110 - 485)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	391 (143 - 630)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	182 (67 - 292)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	584 (213 - 943)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	584 (213 - 943)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	584 (213 - 943)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	301 (110 - 485)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	391 (143 - 630)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	182 (67 - 292)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.8. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Los Angeles, CA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	179 (58 - 264)	98 (32 - 145)	16 (5 - 24)
15	40, 98th percentile value	179 (58 - 264)	98 (32 - 145)	16 (5 - 24)
15	35, 98th percentile value	150 (49 - 221)	66 (21 - 97)	0 (0 - 0)
15	30, 98th percentile value	98 (32 - 143)	8 (3 - 11)	0 (0 - 0)
15	25, 98th percentile value	47 (15 - 68)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	179 (58 - 264)	98 (32 - 145)	16 (5 - 24)
15	40, 99th percentile value	60 (20 - 88)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	150 (49 - 220)	65 (21 - 96)	0 (0 - 0)
14	35, 98th percentile value	150 (49 - 220)	65 (21 - 96)	0 (0 - 0)
14	30, 98th percentile value	98 (32 - 143)	8 (3 - 11)	0 (0 - 0)
14	25, 98th percentile value	47 (15 - 68)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	60 (20 - 88)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	120 (39 - 176)	32 (10 - 47)	0 (0 - 0)
13	35, 98th percentile value	120 (39 - 176)	32 (10 - 47)	0 (0 - 0)
13	30, 98th percentile value	98 (32 - 143)	8 (3 - 11)	0 (0 - 0)
13	25, 98th percentile value	47 (15 - 68)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	60 (20 - 88)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	91 (30 - 132)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	91 (30 - 132)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	91 (30 - 132)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	47 (15 - 68)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	60 (20 - 88)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.9. Sensitivity Analysis: Estimated Annual Cardiovascular Mortality Associated with Short-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Philadelphia, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	367 (175 - 560)	189 (90 - 288)	106 (51 - 162)	57 (27 - 87)
15	40, 98th percentile value	317 (151 - 482)	143 (68 - 218)	71 (34 - 107)	34 (16 - 51)
15	35, 98th percentile value	273 (130 - 416)	106 (50 - 161)	45 (22 - 69)	18 (9 - 28)
15	30, 98th percentile value	230 (110 - 350)	71 (34 - 108)	25 (12 - 38)	7 (3 - 11)
15	25, 98th percentile value	187 (89 - 284)	41 (20 - 63)	11 (5 - 16)	2 (1 - 3)
15	65, 99th percentile value	297 (142 - 451)	126 (60 - 191)	58 (28 - 89)	26 (12 - 40)
15	40, 99th percentile value	176 (84 - 268)	35 (17 - 53)	8 (4 - 12)	1 (1 - 2)
15	35, 99th percentile value	152 (72 - 231)	22 (11 - 34)	3 (2 - 5)	0 (0 - 1)
15	30, 99th percentile value	128 (61 - 195)	12 (6 - 19)	1 (1 - 2)	0 (0 - 0)
15	25, 99th percentile value	104 (49 - 158)	5 (2 - 8)	0 (0 - 0)	0 (0 - 0)
14	65, 98th percentile value	336 (160 - 511)	160 (76 - 243)	83 (40 - 127)	42 (20 - 63)
14	40, 98th percentile value	317 (151 - 482)	143 (68 - 218)	71 (34 - 107)	34 (16 - 51)
14	35, 98th percentile value	273 (130 - 416)	106 (50 - 161)	45 (22 - 69)	18 (9 - 28)
14	30, 98th percentile value	230 (110 - 350)	71 (34 - 108)	25 (12 - 38)	7 (3 - 11)
14	25, 98th percentile value	187 (89 - 284)	41 (20 - 63)	11 (5 - 16)	2 (1 - 3)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	40, 99th percentile value	176 (84 - 268)	35 (17 - 53)	8 (4 - 12)	1 (1 - 2)
14	35, 99th percentile value	152 (72 - 231)	22 (11 - 34)	3 (2 - 5)	0 (0 - 1)
14	30, 99th percentile value	128 (61 - 195)	12 (6 - 19)	1 (1 - 2)	0 (0 - 0)
14	25, 99th percentile value	104 (49 - 158)	5 (2 - 8)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	304 (145 - 462)	132 (63 - 200)	62 (30 - 95)	29 (14 - 44)
13	35, 98th percentile value	273 (130 - 416)	106 (50 - 161)	45 (22 - 69)	18 (9 - 28)
13	30, 98th percentile value	230 (110 - 350)	71 (34 - 108)	25 (12 - 38)	7 (3 - 11)
13	25, 98th percentile value	187 (89 - 284)	41 (20 - 63)	11 (5 - 16)	2 (1 - 3)
13	40, 99th percentile value	176 (84 - 268)	35 (17 - 53)	8 (4 - 12)	1 (1 - 2)
13	35, 99th percentile value	152 (72 - 231)	22 (11 - 34)	3 (2 - 5)	0 (0 - 1)
13	30, 99th percentile value	128 (61 - 195)	12 (6 - 19)	1 (1 - 2)	0 (0 - 0)
13	25, 99th percentile value	104 (49 - 158)	5 (2 - 8)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	272 (130 - 414)	104 (50 - 159)	44 (21 - 68)	18 (9 - 27)
12	35, 98th percentile value	272 (130 - 414)	104 (50 - 159)	44 (21 - 68)	18 (9 - 27)
12	30, 98th percentile value	230 (110 - 350)	71 (34 - 108)	25 (12 - 38)	7 (3 - 11)
12	25, 98th percentile value	187 (89 - 284)	41 (20 - 63)	11 (5 - 16)	2 (1 - 3)
12	40, 99th percentile value	176 (84 - 268)	35 (17 - 53)	8 (4 - 12)	1 (1 - 2)
12	35, 99th percentile value	152 (72 - 231)	22 (11 - 34)	3 (2 - 5)	0 (0 - 1)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =3.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	30, 99th percentile value	128 (61 - 195)	12 (6 - 19)	1 (1 - 2)	0 (0 - 0)
12	25, 99th percentile value	104 (49 - 158)	5 (2 - 8)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Lipfert et al. (2000). See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.10. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Philadelphia, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	536 (185 - 943)	338 (116 - 597)	137 (47 - 244)
15	40, 98th percentile value	408 (141 - 716)	194 (67 - 341)	0 (0 - 0)
15	35, 98th percentile value	299 (104 - 524)	72 (25 - 126)	0 (0 - 0)
15	30, 98th percentile value	191 (67 - 334)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	84 (29 - 146)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	357 (124 - 626)	137 (47 - 241)	0 (0 - 0)
15	40, 99th percentile value	58 (20 - 101)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	65, 98th percentile value	456 (157 - 799)	247 (85 - 435)	37 (13 - 65)
14	40, 98th percentile value	408 (141 - 716)	194 (67 - 341)	0 (0 - 0)
14	35, 98th percentile value	299 (104 - 524)	72 (25 - 126)	0 (0 - 0)
14	30, 98th percentile value	191 (67 - 334)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	25, 98th percentile value	84 (29 - 146)	0 (0 - 0)	0 (0 - 0)
14	40, 99th percentile value	58 (20 - 101)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	375 (130 - 657)	157 (54 - 276)	0 (0 - 0)
13	35, 98th percentile value	299 (104 - 524)	72 (25 - 126)	0 (0 - 0)
13	30, 98th percentile value	191 (67 - 334)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	84 (29 - 146)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	58 (20 - 101)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	295 (102 - 516)	67 (23 - 118)	0 (0 - 0)
12	35, 98th percentile value	295 (102 - 516)	67 (23 - 118)	0 (0 - 0)
12	30, 98th percentile value	191 (67 - 334)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	84 (29 - 146)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	40, 99th percentile value	58 (20 - 101)	0 (0 - 0)	0 (0 - 0)
12	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.11. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Philadelphia, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	349 (122 - 586)	220 (77 - 372)	90 (31 - 153)
15	40, 98th percentile value	265 (93 - 443)	126 (44 - 212)	0 (0 - 0)
15	35, 98th percentile value	194 (69 - 324)	47 (16 - 78)	0 (0 - 0)
15	30, 98th percentile value	124 (44 - 206)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	54 (19 - 90)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	232 (82 - 387)	89 (31 - 149)	0 (0 - 0)
15	40, 99th percentile value	37 (13 - 62)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	65, 98th percentile value	296 (104 - 496)	161 (56 - 271)	24 (8 - 41)
14	40, 98th percentile value	265 (93 - 443)	126 (44 - 212)	0 (0 - 0)
14	35, 98th percentile value	194 (69 - 324)	47 (16 - 78)	0 (0 - 0)
14	30, 98th percentile value	124 (44 - 206)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	25, 98th percentile value	54 (19 - 90)	0 (0 - 0)	0 (0 - 0)
14	40, 99th percentile value	37 (13 - 62)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	243 (86 - 407)	102 (36 - 171)	0 (0 - 0)
13	35, 98th percentile value	194 (69 - 324)	47 (16 - 78)	0 (0 - 0)
13	30, 98th percentile value	124 (44 - 206)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	54 (19 - 90)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	37 (13 - 62)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	191 (68 - 319)	44 (15 - 73)	0 (0 - 0)
12	35, 98th percentile value	191 (68 - 319)	44 (15 - 73)	0 (0 - 0)
12	30, 98th percentile value	124 (44 - 206)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	54 (19 - 90)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	40, 99th percentile value	37 (13 - 62)	0 (0 - 0)	0 (0 - 0)
12	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.12. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Philadelphia, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	77 (24 - 118)	49 (15 - 75)	20 (6 - 31)
15	40, 98th percentile value	58 (18 - 89)	28 (9 - 43)	0 (0 - 0)
15	35, 98th percentile value	43 (13 - 65)	10 (3 - 16)	0 (0 - 0)
15	30, 98th percentile value	27 (9 - 41)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	12 (4 - 18)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	51 (16 - 78)	20 (6 - 30)	0 (0 - 0)
15	40, 99th percentile value	8 (3 - 12)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	65, 98th percentile value	65 (20 - 100)	36 (11 - 55)	5 (2 - 8)
14	40, 98th percentile value	58 (18 - 89)	28 (9 - 43)	0 (0 - 0)
14	35, 98th percentile value	43 (13 - 65)	10 (3 - 16)	0 (0 - 0)
14	30, 98th percentile value	27 (9 - 41)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	25, 98th percentile value	12 (4 - 18)	0 (0 - 0)	0 (0 - 0)
14	40, 99th percentile value	8 (3 - 12)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	54 (17 - 82)	23 (7 - 34)	0 (0 - 0)
13	35, 98th percentile value	43 (13 - 65)	10 (3 - 16)	0 (0 - 0)
13	30, 98th percentile value	27 (9 - 41)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	12 (4 - 18)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	8 (3 - 12)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	42 (13 - 64)	10 (3 - 15)	0 (0 - 0)
12	35, 98th percentile value	42 (13 - 64)	10 (3 - 15)	0 (0 - 0)
12	30, 98th percentile value	27 (9 - 41)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	12 (4 - 18)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	40, 99th percentile value	8 (3 - 12)	0 (0 - 0)	0 (0 - 0)
12	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.13. Sensitivity Analysis: Estimated Annual Cardiovascular Mortality Associated with Short-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Phoenix, AZ, 2001

(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
15	40, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
15	35, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
15	30, 98th percentile value	272 (82 - 449)	78 (24 - 127)	40 (13 - 64)	22 (7 - 35)
15	25, 98th percentile value	221 (67 - 363)	48 (15 - 76)	21 (7 - 33)	8 (3 - 12)
15	65, 99th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
15	40, 99th percentile value	314 (94 - 521)	109 (33 - 178)	62 (19 - 101)	39 (12 - 63)
15	35, 99th percentile value	271 (82 - 447)	78 (24 - 126)	40 (13 - 64)	22 (7 - 34)
15	30, 99th percentile value	228 (69 - 375)	52 (16 - 82)	24 (8 - 37)	10 (3 - 15)
15	25, 99th percentile value	185 (56 - 304)	30 (10 - 46)	11 (4 - 16)	4 (2 - 6)
14	40, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
14	35, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
14	30, 98th percentile value	272 (82 - 449)	78 (24 - 127)	40 (13 - 64)	22 (7 - 35)
14	25, 98th percentile value	221 (67 - 363)	48 (15 - 76)	21 (7 - 33)	8 (3 - 12)
14	40, 99th percentile value	314 (94 - 521)	109 (33 - 178)	62 (19 - 101)	39 (12 - 63)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	35, 99th percentile value	271 (82 - 447)	78 (24 - 126)	40 (13 - 64)	22 (7 - 34)
14	30, 99th percentile value	228 (69 - 375)	52 (16 - 82)	24 (8 - 37)	10 (3 - 15)
14	25, 99th percentile value	185 (56 - 304)	30 (10 - 46)	11 (4 - 16)	4 (2 - 6)
13	40, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
13	35, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
13	30, 98th percentile value	272 (82 - 449)	78 (24 - 127)	40 (13 - 64)	22 (7 - 35)
13	25, 98th percentile value	221 (67 - 363)	48 (15 - 76)	21 (7 - 33)	8 (3 - 12)
13	40, 99th percentile value	314 (94 - 521)	109 (33 - 178)	62 (19 - 101)	39 (12 - 63)
13	35, 99th percentile value	271 (82 - 447)	78 (24 - 126)	40 (13 - 64)	22 (7 - 34)
13	30, 99th percentile value	228 (69 - 375)	52 (16 - 82)	24 (8 - 37)	10 (3 - 15)
13	25, 99th percentile value	185 (56 - 304)	30 (10 - 46)	11 (4 - 16)	4 (2 - 6)
12	40, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
12	35, 98th percentile value	323 (97 - 536)	115 (35 - 190)	67 (21 - 109)	43 (13 - 69)
12	30, 98th percentile value	272 (82 - 449)	78 (24 - 127)	40 (13 - 64)	22 (7 - 35)
12	25, 98th percentile value	221 (67 - 363)	48 (15 - 76)	21 (7 - 33)	8 (3 - 12)
12	40, 99th percentile value	314 (94 - 521)	109 (33 - 178)	62 (19 - 101)	39 (12 - 63)
12	35, 99th percentile value	271 (82 - 447)	78 (24 - 126)	40 (13 - 64)	22 (7 - 34)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =2.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	30, 99th percentile value	228 (69 - 375)	52 (16 - 82)	24 (8 - 37)	10 (3 - 15)
12	25, 99th percentile value	185 (56 - 304)	30 (10 - 46)	11 (4 - 16)	4 (2 - 6)

*This sensitivity analysis was performed using Mar et al. (2003), 1-day lag model. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.14. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Phoenix, AZ, 2001

(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
15	40, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
15	35, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
15	30, 98th percentile value	202 (69 - 358)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	56 (19 - 100)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
15	40, 99th percentile value	324 (111 - 576)	27 (9 - 48)	0 (0 - 0)
15	35, 99th percentile value	200 (69 - 355)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	77 (26 - 136)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
14	35, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
14	30, 98th percentile value	202 (69 - 358)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	56 (19 - 100)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	324 (111 - 576)	27 (9 - 48)	0 (0 - 0)
14	35, 99th percentile value	200 (69 - 355)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	77 (26 - 136)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
13	35, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
13	30, 98th percentile value	202 (69 - 358)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	56 (19 - 100)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	324 (111 - 576)	27 (9 - 48)	0 (0 - 0)
13	35, 99th percentile value	200 (69 - 355)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	77 (26 - 136)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
12	35, 98th percentile value	349 (119 - 620)	55 (19 - 98)	0 (0 - 0)
12	30, 98th percentile value	202 (69 - 358)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	56 (19 - 100)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	40, 99th percentile value	324 (111 - 576)	27 (9 - 48)	0 (0 - 0)
12	35, 99th percentile value	200 (69 - 355)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	77 (26 - 136)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.15. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Phoenix, AZ, 2001

(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
15	40, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
15	35, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
15	30, 98th percentile value	137 (48 - 233)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	38 (13 - 65)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
15	40, 99th percentile value	220 (76 - 376)	19 (6 - 32)	0 (0 - 0)
15	35, 99th percentile value	136 (47 - 231)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	52 (18 - 89)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
14	35, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
14	30, 98th percentile value	137 (48 - 233)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	38 (13 - 65)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	220 (76 - 376)	19 (6 - 32)	0 (0 - 0)
14	35, 99th percentile value	136 (47 - 231)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	52 (18 - 89)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
13	35, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
13	30, 98th percentile value	137 (48 - 233)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	38 (13 - 65)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	220 (76 - 376)	19 (6 - 32)	0 (0 - 0)
13	35, 99th percentile value	136 (47 - 231)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	52 (18 - 89)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
12	35, 98th percentile value	237 (82 - 405)	38 (13 - 65)	0 (0 - 0)
12	30, 98th percentile value	137 (48 - 233)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	38 (13 - 65)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	220 (76 - 376)	19 (6 - 32)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	136 (47 - 231)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	52 (18 - 89)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.16. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Phoenix, AZ, 2001

(As Is = 10.4 ug/m3 Annual Average; 28.9 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
15	40, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
15	35, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
15	30, 98th percentile value	27 (8 - 43)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
15	40, 99th percentile value	44 (13 - 69)	4 (1 - 6)	0 (0 - 0)
15	35, 99th percentile value	27 (8 - 42)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	10 (3 - 16)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
14	35, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
14	30, 98th percentile value	27 (8 - 43)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	44 (13 - 69)	4 (1 - 6)	0 (0 - 0)
14	35, 99th percentile value	27 (8 - 42)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	10 (3 - 16)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
13	35, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
13	30, 98th percentile value	27 (8 - 43)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	44 (13 - 69)	4 (1 - 6)	0 (0 - 0)
13	35, 99th percentile value	27 (8 - 42)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	10 (3 - 16)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
12	35, 98th percentile value	48 (14 - 74)	8 (2 - 12)	0 (0 - 0)
12	30, 98th percentile value	27 (8 - 43)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	44 (13 - 69)	4 (1 - 6)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	27 (8 - 42)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	10 (3 - 16)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.17. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Pittsburgh, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	50 (-108 - 200)	22 (-48 - 87)	10 (-23 - 41)	5 (-11 - 18)
15	40, 98th percentile value	47 (-102 - 189)	19 (-43 - 77)	9 (-19 - 34)	4 (-9 - 15)
15	35, 98th percentile value	41 (-88 - 162)	14 (-31 - 56)	5 (-12 - 21)	2 (-5 - 8)
15	30, 98th percentile value	34 (-74 - 136)	9 (-21 - 37)	3 (-6 - 11)	1 (-2 - 4)
15	25, 98th percentile value	28 (-60 - 110)	5 (-12 - 20)	1 (-3 - 5)	0 (-1 - 2)
15	65, 99th percentile value	50 (-108 - 200)	22 (-48 - 87)	10 (-23 - 41)	5 (-11 - 18)
15	40, 99th percentile value	42 (-92 - 168)	15 (-34 - 61)	6 (-13 - 24)	3 (-6 - 10)
15	35, 99th percentile value	36 (-79 - 145)	11 (-24 - 43)	4 (-8 - 14)	1 (-3 - 5)
15	30, 99th percentile value	31 (-67 - 122)	7 (-15 - 27)	2 (-4 - 7)	1 (-2 - 3)
15	25, 99th percentile value	25 (-54 - 99)	4 (-8 - 14)	1 (-2 - 3)	0 (-1 - 1)
14	40, 98th percentile value	46 (-99 - 182)	18 (-40 - 72)	8 (-17 - 31)	3 (-8 - 13)
14	35, 98th percentile value	41 (-88 - 162)	14 (-31 - 56)	5 (-12 - 21)	2 (-5 - 8)
14	30, 98th percentile value	34 (-74 - 136)	9 (-21 - 37)	3 (-6 - 11)	1 (-2 - 4)
14	25, 98th percentile value	28 (-60 - 110)	5 (-12 - 20)	1 (-3 - 5)	0 (-1 - 2)
14	40, 99th percentile value	42 (-92 - 168)	15 (-34 - 61)	6 (-13 - 24)	3 (-6 - 10)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	35, 99th percentile value	36 (-79 - 145)	11 (-24 - 43)	4 (-8 - 14)	1 (-3 - 5)
14	30, 99th percentile value	31 (-67 - 122)	7 (-15 - 27)	2 (-4 - 7)	1 (-2 - 3)
14	25, 99th percentile value	25 (-54 - 99)	4 (-8 - 14)	1 (-2 - 3)	0 (-1 - 1)
13	40, 98th percentile value	41 (-90 - 165)	15 (-32 - 58)	6 (-13 - 22)	2 (-5 - 9)
13	35, 98th percentile value	41 (-88 - 162)	14 (-31 - 56)	5 (-12 - 21)	2 (-5 - 8)
13	30, 98th percentile value	34 (-74 - 136)	9 (-21 - 37)	3 (-6 - 11)	1 (-2 - 4)
13	25, 98th percentile value	28 (-60 - 110)	5 (-12 - 20)	1 (-3 - 5)	0 (-1 - 2)
13	40, 99th percentile value	41 (-90 - 165)	15 (-32 - 58)	6 (-13 - 22)	2 (-5 - 9)
13	35, 99th percentile value	36 (-79 - 145)	11 (-24 - 43)	4 (-8 - 14)	1 (-3 - 5)
13	30, 99th percentile value	31 (-67 - 122)	7 (-15 - 27)	2 (-4 - 7)	1 (-2 - 3)
13	25, 99th percentile value	25 (-54 - 99)	4 (-8 - 14)	1 (-2 - 3)	0 (-1 - 1)
12	40, 98th percentile value	37 (-80 - 147)	11 (-25 - 44)	4 (-8 - 15)	1 (-3 - 6)
12	35, 98th percentile value	37 (-80 - 147)	11 (-25 - 44)	4 (-8 - 15)	1 (-3 - 6)
12	30, 98th percentile value	34 (-74 - 136)	9 (-21 - 37)	3 (-6 - 11)	1 (-2 - 4)
12	25, 98th percentile value	28 (-60 - 110)	5 (-12 - 20)	1 (-3 - 5)	0 (-1 - 2)
12	40, 99th percentile value	37 (-80 - 147)	11 (-25 - 44)	4 (-8 - 15)	1 (-3 - 6)
12	35, 99th percentile value	36 (-79 - 145)	11 (-24 - 43)	4 (-8 - 14)	1 (-3 - 5)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =3.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	30, 99th percentile value	31 (-67 - 122)	7 (-15 - 27)	2 (-4 - 7)	1 (-2 - 3)
12	25, 99th percentile value	25 (-54 - 99)	4 (-8 - 14)	1 (-2 - 3)	0 (-1 - 1)

*This sensitivity analysis was performed using Chock et al. (2000), age 75+ model. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.18. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Pittsburgh, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	403 (141 - 699)	215 (75 - 373)	25 (9 - 43)
15	40, 98th percentile value	361 (126 - 626)	168 (58 - 291)	0 (0 - 0)
15	35, 98th percentile value	264 (93 - 456)	59 (21 - 102)	0 (0 - 0)
15	30, 98th percentile value	168 (59 - 289)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	72 (25 - 124)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	403 (141 - 699)	215 (75 - 373)	25 (9 - 43)
15	40, 99th percentile value	287 (100 - 495)	84 (29 - 145)	0 (0 - 0)
15	35, 99th percentile value	200 (70 - 345)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	114 (40 - 197)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	29 (10 - 50)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	338 (118 - 585)	141 (49 - 245)	0 (0 - 0)
14	35, 98th percentile value	264 (93 - 456)	59 (21 - 102)	0 (0 - 0)
14	30, 98th percentile value	168 (59 - 289)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	72 (25 - 124)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	287 (100 - 495)	84 (29 - 145)	0 (0 - 0)
14	35, 99th percentile value	200 (70 - 345)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	114 (40 - 197)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	29 (10 - 50)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	273 (96 - 471)	68 (24 - 118)	0 (0 - 0)
13	35, 98th percentile value	264 (93 - 456)	59 (21 - 102)	0 (0 - 0)
13	30, 98th percentile value	168 (59 - 289)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	72 (25 - 124)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	273 (96 - 471)	68 (24 - 118)	0 (0 - 0)
13	35, 99th percentile value	200 (70 - 345)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	114 (40 - 197)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	29 (10 - 50)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	208 (73 - 358)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	208 (73 - 358)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	168 (59 - 289)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	72 (25 - 124)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	208 (73 - 358)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	200 (70 - 345)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	114 (40 - 197)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	29 (10 - 50)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.19. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Pittsburgh, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	282 (101 - 464)	150 (53 - 248)	17 (6 - 29)
15	40, 98th percentile value	252 (90 - 415)	117 (42 - 193)	0 (0 - 0)
15	35, 98th percentile value	184 (66 - 302)	41 (15 - 68)	0 (0 - 0)
15	30, 98th percentile value	117 (42 - 191)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	50 (18 - 82)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	282 (101 - 464)	150 (53 - 248)	17 (6 - 29)
15	40, 99th percentile value	200 (72 - 328)	59 (21 - 96)	0 (0 - 0)
15	35, 99th percentile value	139 (50 - 228)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	80 (29 - 130)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	20 (7 - 33)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	236 (84 - 388)	99 (35 - 163)	0 (0 - 0)
14	35, 98th percentile value	184 (66 - 302)	41 (15 - 68)	0 (0 - 0)
14	30, 98th percentile value	117 (42 - 191)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	50 (18 - 82)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	200 (72 - 328)	59 (21 - 96)	0 (0 - 0)
14	35, 99th percentile value	139 (50 - 228)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	80 (29 - 130)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	20 (7 - 33)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	190 (68 - 312)	48 (17 - 78)	0 (0 - 0)
13	35, 98th percentile value	184 (66 - 302)	41 (15 - 68)	0 (0 - 0)
13	30, 98th percentile value	117 (42 - 191)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	50 (18 - 82)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	190 (68 - 312)	48 (17 - 78)	0 (0 - 0)
13	35, 99th percentile value	139 (50 - 228)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	80 (29 - 130)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	20 (7 - 33)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	145 (52 - 237)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	145 (52 - 237)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	117 (42 - 191)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	50 (18 - 82)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	145 (52 - 237)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	139 (50 - 228)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	80 (29 - 130)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	20 (7 - 33)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.20. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
Pittsburgh, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	56 (18 - 84)	30 (10 - 45)	4 (1 - 5)
15	40, 98th percentile value	50 (16 - 75)	23 (7 - 35)	0 (0 - 0)
15	35, 98th percentile value	37 (12 - 55)	8 (3 - 12)	0 (0 - 0)
15	30, 98th percentile value	23 (8 - 34)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	10 (3 - 15)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	56 (18 - 84)	30 (10 - 45)	4 (1 - 5)
15	40, 99th percentile value	40 (13 - 59)	12 (4 - 17)	0 (0 - 0)
15	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	16 (5 - 23)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	47 (15 - 70)	20 (6 - 30)	0 (0 - 0)
14	35, 98th percentile value	37 (12 - 55)	8 (3 - 12)	0 (0 - 0)
14	30, 98th percentile value	23 (8 - 34)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	10 (3 - 15)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	40 (13 - 59)	12 (4 - 17)	0 (0 - 0)
14	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	16 (5 - 23)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	38 (12 - 56)	10 (3 - 14)	0 (0 - 0)
13	35, 98th percentile value	37 (12 - 55)	8 (3 - 12)	0 (0 - 0)
13	30, 98th percentile value	23 (8 - 34)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	10 (3 - 15)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	38 (12 - 56)	10 (3 - 14)	0 (0 - 0)
13	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	16 (5 - 23)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	29 (9 - 43)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	29 (9 - 43)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	23 (8 - 34)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	10 (3 - 15)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	29 (9 - 43)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	28 (9 - 41)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	16 (5 - 23)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	4 (1 - 6)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.21. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	218 (45 - 387)	80 (17 - 141)	44 (9 - 77)	28 (6 - 50)
15	40, 98th percentile value	183 (38 - 324)	55 (11 - 96)	29 (6 - 50)	17 (3 - 29)
15	35, 98th percentile value	158 (33 - 279)	39 (8 - 68)	20 (4 - 34)	10 (2 - 17)
15	30, 98th percentile value	134 (28 - 235)	26 (6 - 45)	12 (3 - 20)	5 (1 - 8)
15	25, 98th percentile value	109 (23 - 191)	16 (3 - 27)	6 (1 - 10)	1 (0 - 2)
15	65, 99th percentile value	218 (45 - 387)	80 (17 - 141)	44 (9 - 77)	28 (6 - 50)
15	40, 99th percentile value	161 (33 - 284)	41 (9 - 71)	21 (4 - 36)	11 (2 - 18)
15	35, 99th percentile value	139 (29 - 245)	29 (6 - 50)	13 (3 - 23)	6 (1 - 10)
15	30, 99th percentile value	118 (24 - 207)	19 (4 - 33)	8 (2 - 13)	2 (0 - 4)
15	25, 99th percentile value	96 (20 - 168)	11 (2 - 20)	3 (1 - 6)	1 (0 - 1)
14	40, 98th percentile value	183 (38 - 324)	55 (11 - 96)	29 (6 - 50)	17 (3 - 29)
14	35, 98th percentile value	158 (33 - 279)	39 (8 - 68)	20 (4 - 34)	10 (2 - 17)
14	30, 98th percentile value	134 (28 - 235)	26 (6 - 45)	12 (3 - 20)	5 (1 - 8)
14	25, 98th percentile value	109 (23 - 191)	16 (3 - 27)	6 (1 - 10)	1 (0 - 2)
14	40, 99th percentile value	161 (33 - 284)	41 (9 - 71)	21 (4 - 36)	11 (2 - 18)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	35, 99th percentile value	139 (29 - 245)	29 (6 - 50)	13 (3 - 23)	6 (1 - 10)
14	30, 99th percentile value	118 (24 - 207)	19 (4 - 33)	8 (2 - 13)	2 (0 - 4)
14	25, 99th percentile value	96 (20 - 168)	11 (2 - 20)	3 (1 - 6)	1 (0 - 1)
13	40, 98th percentile value	183 (38 - 324)	55 (11 - 96)	29 (6 - 50)	17 (3 - 29)
13	35, 98th percentile value	158 (33 - 279)	39 (8 - 68)	20 (4 - 34)	10 (2 - 17)
13	30, 98th percentile value	134 (28 - 235)	26 (6 - 45)	12 (3 - 20)	5 (1 - 8)
13	25, 98th percentile value	109 (23 - 191)	16 (3 - 27)	6 (1 - 10)	1 (0 - 2)
13	40, 99th percentile value	161 (33 - 284)	41 (9 - 71)	21 (4 - 36)	11 (2 - 18)
13	35, 99th percentile value	139 (29 - 245)	29 (6 - 50)	13 (3 - 23)	6 (1 - 10)
13	30, 99th percentile value	118 (24 - 207)	19 (4 - 33)	8 (2 - 13)	2 (0 - 4)
13	25, 99th percentile value	96 (20 - 168)	11 (2 - 20)	3 (1 - 6)	1 (0 - 1)
12	40, 98th percentile value	171 (35 - 301)	47 (10 - 81)	24 (5 - 41)	13 (3 - 22)
12	35, 98th percentile value	158 (33 - 279)	39 (8 - 68)	20 (4 - 34)	10 (2 - 17)
12	30, 98th percentile value	134 (28 - 235)	26 (6 - 45)	12 (3 - 20)	5 (1 - 8)
12	25, 98th percentile value	109 (23 - 191)	16 (3 - 27)	6 (1 - 10)	1 (0 - 2)
12	40, 99th percentile value	161 (33 - 284)	41 (9 - 71)	21 (4 - 36)	11 (2 - 18)
12	35, 99th percentile value	139 (29 - 245)	29 (6 - 50)	13 (3 - 23)	6 (1 - 10)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =2.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	30, 99th percentile value	118 (24 - 207)	19 (4 - 33)	8 (2 - 13)	2 (0 - 4)
12	25, 99th percentile value	96 (20 - 168)	11 (2 - 20)	3 (1 - 6)	1 (0 - 1)

*This sensitivity analysis was performed using Fairley (2003). See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.22. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	172 (59 - 306)	58 (20 - 104)	0 (0 - 0)
15	40, 98th percentile value	107 (37 - 189)	0 (0 - 0)	0 (0 - 0)
15	35, 98th percentile value	60 (21 - 106)	0 (0 - 0)	0 (0 - 0)
15	30, 98th percentile value	14 (5 - 24)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	172 (59 - 306)	58 (20 - 104)	0 (0 - 0)
15	40, 99th percentile value	65 (22 - 115)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	24 (8 - 43)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	107 (37 - 189)	0 (0 - 0)	0 (0 - 0)
14	35, 98th percentile value	60 (21 - 106)	0 (0 - 0)	0 (0 - 0)
14	30, 98th percentile value	14 (5 - 24)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	65 (22 - 115)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	24 (8 - 43)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	107 (37 - 189)	0 (0 - 0)	0 (0 - 0)
13	35, 98th percentile value	60 (21 - 106)	0 (0 - 0)	0 (0 - 0)
13	30, 98th percentile value	14 (5 - 24)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	65 (22 - 115)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	24 (8 - 43)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	83 (28 - 146)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	60 (21 - 106)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	14 (5 - 24)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	65 (22 - 115)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	24 (8 - 43)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.23. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	125 (43 - 213)	42 (15 - 73)	0 (0 - 0)
15	40, 98th percentile value	77 (27 - 131)	0 (0 - 0)	0 (0 - 0)
15	35, 98th percentile value	44 (15 - 74)	0 (0 - 0)	0 (0 - 0)
15	30, 98th percentile value	10 (4 - 17)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	125 (43 - 213)	42 (15 - 73)	0 (0 - 0)
15	40, 99th percentile value	47 (16 - 80)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	18 (6 - 30)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	77 (27 - 131)	0 (0 - 0)	0 (0 - 0)
14	35, 98th percentile value	44 (15 - 74)	0 (0 - 0)	0 (0 - 0)
14	30, 98th percentile value	10 (4 - 17)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	47 (16 - 80)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	18 (6 - 30)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	77 (27 - 131)	0 (0 - 0)	0 (0 - 0)
13	35, 98th percentile value	44 (15 - 74)	0 (0 - 0)	0 (0 - 0)
13	30, 98th percentile value	10 (4 - 17)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	47 (16 - 80)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	18 (6 - 30)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	60 (21 - 102)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	44 (15 - 74)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	10 (4 - 17)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	47 (16 - 80)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	18 (6 - 30)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.24. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

San Jose, CA, 2003

(As Is = 11.1 ug/m3 Annual Average; 37.6 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	23 (7 - 35)	8 (2 - 12)	0 (0 - 0)
15	40, 98th percentile value	14 (4 - 22)	0 (0 - 0)	0 (0 - 0)
15	35, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
15	30, 98th percentile value	2 (1 - 3)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	23 (7 - 35)	8 (2 - 12)	0 (0 - 0)
15	40, 99th percentile value	8 (3 - 13)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	3 (1 - 5)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	14 (4 - 22)	0 (0 - 0)	0 (0 - 0)
14	35, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
14	30, 98th percentile value	2 (1 - 3)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	8 (3 - 13)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	3 (1 - 5)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	14 (4 - 22)	0 (0 - 0)	0 (0 - 0)
13	35, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
13	30, 98th percentile value	2 (1 - 3)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	8 (3 - 13)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	3 (1 - 5)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	11 (3 - 17)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	2 (1 - 3)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	8 (3 - 13)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	3 (1 - 5)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.25. Sensitivity Analysis: Estimated Annual Hospital Admissions for Asthma (for Ages < 65) Associated with Short-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	30 (8 - 45)	7 (2 - 11)	3 (1 - 4)	1 (0 - 1)
15	40, 98th percentile value	29 (8 - 43)	7 (2 - 10)	2 (1 - 3)	0 (0 - 1)
15	35, 98th percentile value	25 (7 - 37)	4 (1 - 7)	1 (0 - 2)	0 (0 - 0)
15	30, 98th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
15	25, 98th percentile value	18 (5 - 26)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	30 (8 - 45)	7 (2 - 11)	3 (1 - 4)	1 (0 - 1)
15	40, 99th percentile value	25 (6 - 37)	4 (1 - 6)	1 (0 - 2)	0 (0 - 0)
15	35, 99th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
15	30, 99th percentile value	18 (5 - 27)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	15 (4 - 22)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	29 (8 - 43)	7 (2 - 10)	2 (1 - 3)	0 (0 - 1)
14	35, 98th percentile value	25 (7 - 37)	4 (1 - 7)	1 (0 - 2)	0 (0 - 0)
14	30, 98th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
14	25, 98th percentile value	18 (5 - 26)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
14	40, 99th percentile value	25 (6 - 37)	4 (1 - 6)	1 (0 - 2)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =2.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	35, 99th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
14	30, 99th percentile value	18 (5 - 27)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	15 (4 - 22)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	29 (8 - 43)	7 (2 - 10)	2 (1 - 3)	0 (0 - 1)
13	35, 98th percentile value	25 (7 - 37)	4 (1 - 7)	1 (0 - 2)	0 (0 - 0)
13	30, 98th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
13	25, 98th percentile value	18 (5 - 26)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	25 (6 - 37)	4 (1 - 6)	1 (0 - 2)	0 (0 - 0)
13	35, 99th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
13	30, 99th percentile value	18 (5 - 27)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	15 (4 - 22)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	29 (8 - 43)	7 (2 - 10)	2 (1 - 3)	0 (0 - 1)
12	35, 98th percentile value	25 (7 - 37)	4 (1 - 7)	1 (0 - 2)	0 (0 - 0)
12	30, 98th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)
12	25, 98th percentile value	18 (5 - 26)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	25 (6 - 37)	4 (1 - 6)	1 (0 - 2)	0 (0 - 0)
12	35, 99th percentile value	21 (6 - 32)	3 (1 - 4)	0 (0 - 1)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =2.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	30, 99th percentile value	18 (5 - 27)	1 (0 - 2)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	15 (4 - 22)	1 (0 - 1)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Sheppard (2003). See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.26. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	50 (17 - 89)	0 (0 - 0)	0 (0 - 0)
15	40, 98th percentile value	40 (14 - 72)	0 (0 - 0)	0 (0 - 0)
15	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	50 (17 - 89)	0 (0 - 0)	0 (0 - 0)
15	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	40 (14 - 72)	0 (0 - 0)	0 (0 - 0)
14	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	40 (14 - 72)	0 (0 - 0)	0 (0 - 0)
13	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	40 (14 - 72)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.27. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	33 (11 - 57)	0 (0 - 0)	0 (0 - 0)
15	40, 98th percentile value	27 (9 - 46)	0 (0 - 0)	0 (0 - 0)
15	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	33 (11 - 57)	0 (0 - 0)	0 (0 - 0)
15	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	27 (9 - 46)	0 (0 - 0)	0 (0 - 0)
14	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	27 (9 - 46)	0 (0 - 0)	0 (0 - 0)
13	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	27 (9 - 46)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.28. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Seattle, WA, 2003

(As Is = 8.3 ug/m3 Annual Average; 21.7 ug/m3 98th Percentile Daily Value)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
15	40, 98th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
15	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	8 (2 - 12)	0 (0 - 0)	0 (0 - 0)
15	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
15	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
14	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
14	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
13	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
13	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	6 (2 - 10)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	0 (0 - 0)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.29. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
St. Louis, MO, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value	191 (70 - 311)	75 (28 - 122)	29 (11 - 46)	9 (3 - 14)
15	40, 98th percentile value	191 (70 - 311)	75 (28 - 122)	29 (11 - 46)	9 (3 - 14)
15	35, 98th percentile value	190 (70 - 310)	75 (27 - 121)	28 (10 - 46)	8 (3 - 14)
15	30, 98th percentile value	160 (59 - 260)	49 (18 - 80)	14 (5 - 23)	3 (1 - 4)
15	25, 98th percentile value	130 (48 - 211)	28 (10 - 45)	5 (2 - 8)	1 (0 - 1)
15	65, 99th percentile value	191 (70 - 311)	75 (28 - 122)	29 (11 - 46)	9 (3 - 14)
15	40, 99th percentile value	191 (70 - 311)	75 (28 - 122)	29 (11 - 46)	9 (3 - 14)
15	35, 99th percentile value	172 (63 - 280)	59 (22 - 96)	19 (7 - 31)	5 (2 - 7)
15	30, 99th percentile value	145 (53 - 235)	38 (14 - 62)	9 (3 - 14)	2 (1 - 3)
15	25, 99th percentile value	118 (43 - 191)	20 (7 - 33)	3 (1 - 4)	0 (0 - 1)
14	40, 98th percentile value	175 (64 - 284)	61 (22 - 99)	20 (7 - 33)	5 (2 - 8)
14	35, 98th percentile value	175 (64 - 284)	61 (22 - 99)	20 (7 - 33)	5 (2 - 8)
14	30, 98th percentile value	160 (59 - 260)	49 (18 - 80)	14 (5 - 23)	3 (1 - 4)
14	25, 98th percentile value	130 (48 - 211)	28 (10 - 45)	5 (2 - 8)	1 (0 - 1)
14	40, 99th percentile value	175 (64 - 284)	61 (22 - 99)	20 (7 - 33)	5 (2 - 8)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
14	35, 99th percentile value	172 (63 - 280)	59 (22 - 96)	19 (7 - 31)	5 (2 - 7)
14	30, 99th percentile value	145 (53 - 235)	38 (14 - 62)	9 (3 - 14)	2 (1 - 3)
14	25, 99th percentile value	118 (43 - 191)	20 (7 - 33)	3 (1 - 4)	0 (0 - 1)
13	40, 98th percentile value	158 (58 - 256)	47 (17 - 77)	13 (5 - 21)	3 (1 - 4)
13	35, 98th percentile value	158 (58 - 256)	47 (17 - 77)	13 (5 - 21)	3 (1 - 4)
13	30, 98th percentile value	158 (58 - 256)	47 (17 - 77)	13 (5 - 21)	3 (1 - 4)
13	25, 98th percentile value	130 (48 - 211)	28 (10 - 45)	5 (2 - 8)	1 (0 - 1)
13	40, 99th percentile value	158 (58 - 256)	47 (17 - 77)	13 (5 - 21)	3 (1 - 4)
13	35, 99th percentile value	158 (58 - 256)	47 (17 - 77)	13 (5 - 21)	3 (1 - 4)
13	30, 99th percentile value	145 (53 - 235)	38 (14 - 62)	9 (3 - 14)	2 (1 - 3)
13	25, 99th percentile value	118 (43 - 191)	20 (7 - 33)	3 (1 - 4)	0 (0 - 1)
12	40, 98th percentile value	141 (52 - 229)	35 (13 - 57)	8 (3 - 12)	1 (1 - 2)
12	35, 98th percentile value	141 (52 - 229)	35 (13 - 57)	8 (3 - 12)	1 (1 - 2)
12	30, 98th percentile value	141 (52 - 229)	35 (13 - 57)	8 (3 - 12)	1 (1 - 2)
12	25, 98th percentile value	130 (48 - 211)	28 (10 - 45)	5 (2 - 8)	1 (0 - 1)
12	40, 99th percentile value	141 (52 - 229)	35 (13 - 57)	8 (3 - 12)	1 (1 - 2)
12	35, 99th percentile value	141 (52 - 229)	35 (13 - 57)	8 (3 - 12)	1 (1 - 2)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**			
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Policy Relevant Background =3.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =15 µg/m3**	**Hypothetical Threshold =20 µg/m3**
12	30, 99th percentile value	141 (52 - 229)	35 (13 - 57)	8 (3 - 12)	1 (1 - 2)
12	25, 99th percentile value	118 (43 - 191)	20 (7 - 33)	3 (1 - 4)	0 (0 - 1)

*This sensitivity analysis was performed using Schwartz (2003b). See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.30. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
St. Louis, MO, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	596 (206 - 1047)	311 (107 - 548)	23 (8 - 40)
15	40, 98th percentile value	596 (206 - 1047)	311 (107 - 548)	23 (8 - 40)
15	35, 98th percentile value	592 (204 - 1039)	306 (105 - 539)	17 (6 - 30)
15	30, 98th percentile value	414 (144 - 726)	107 (37 - 188)	0 (0 - 0)
15	25, 98th percentile value	239 (83 - 417)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	596 (206 - 1047)	311 (107 - 548)	23 (8 - 40)
15	40, 99th percentile value	596 (206 - 1047)	311 (107 - 548)	23 (8 - 40)
15	35, 99th percentile value	486 (168 - 853)	188 (65 - 330)	0 (0 - 0)
15	30, 99th percentile value	327 (113 - 571)	8 (3 - 15)	0 (0 - 0)
15	25, 99th percentile value	168 (58 - 293)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	498 (172 - 874)	201 (69 - 354)	0 (0 - 0)
14	35, 98th percentile value	498 (172 - 874)	201 (69 - 354)	0 (0 - 0)
14	30, 98th percentile value	414 (144 - 726)	107 (37 - 188)	0 (0 - 0)
14	25, 98th percentile value	239 (83 - 417)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	498 (172 - 874)	201 (69 - 354)	0 (0 - 0)
14	35, 99th percentile value	486 (168 - 853)	188 (65 - 330)	0 (0 - 0)
14	30, 99th percentile value	327 (113 - 571)	8 (3 - 15)	0 (0 - 0)
14	25, 99th percentile value	168 (58 - 293)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	401 (139 - 702)	92 (32 - 162)	0 (0 - 0)
13	35, 98th percentile value	401 (139 - 702)	92 (32 - 162)	0 (0 - 0)
13	30, 98th percentile value	401 (139 - 702)	92 (32 - 162)	0 (0 - 0)
13	25, 98th percentile value	239 (83 - 417)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	401 (139 - 702)	92 (32 - 162)	0 (0 - 0)
13	35, 99th percentile value	401 (139 - 702)	92 (32 - 162)	0 (0 - 0)
13	30, 99th percentile value	327 (113 - 571)	8 (3 - 15)	0 (0 - 0)
13	25, 99th percentile value	168 (58 - 293)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	304 (106 - 532)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	304 (106 - 532)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	304 (106 - 532)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	239 (83 - 417)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	304 (106 - 532)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	35, 99th percentile value	304 (106 - 532)	0 (0 - 0)	0 (0 - 0)
12	30, 99th percentile value	304 (106 - 532)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	168 (58 - 293)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.31. Sensitivity Analysis: Estimated Annual Cardiopulmonary Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
St. Louis, MO, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	426 (150 - 715)	223 (78 - 376)	16 (6 - 27)
15	40, 98th percentile value	426 (150 - 715)	223 (78 - 376)	16 (6 - 27)
15	35, 98th percentile value	423 (148 - 709)	219 (77 - 369)	12 (4 - 21)
15	30, 98th percentile value	296 (104 - 494)	76 (27 - 128)	0 (0 - 0)
15	25, 98th percentile value	170 (60 - 283)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	426 (150 - 715)	223 (78 - 376)	16 (6 - 27)
15	40, 99th percentile value	426 (150 - 715)	223 (78 - 376)	16 (6 - 27)
15	35, 99th percentile value	347 (122 - 581)	134 (47 - 226)	0 (0 - 0)
15	30, 99th percentile value	233 (82 - 388)	6 (2 - 10)	0 (0 - 0)
15	25, 99th percentile value	120 (42 - 198)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	356 (125 - 596)	144 (50 - 242)	0 (0 - 0)
14	35, 98th percentile value	356 (125 - 596)	144 (50 - 242)	0 (0 - 0)
14	30, 98th percentile value	296 (104 - 494)	76 (27 - 128)	0 (0 - 0)
14	25, 98th percentile value	170 (60 - 283)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	40, 99th percentile value	356 (125 - 596)	144 (50 - 242)	0 (0 - 0)
14	35, 99th percentile value	347 (122 - 581)	134 (47 - 226)	0 (0 - 0)
14	30, 99th percentile value	233 (82 - 388)	6 (2 - 10)	0 (0 - 0)
14	25, 99th percentile value	120 (42 - 198)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	286 (101 - 478)	66 (23 - 110)	0 (0 - 0)
13	35, 98th percentile value	286 (101 - 478)	66 (23 - 110)	0 (0 - 0)
13	30, 98th percentile value	286 (101 - 478)	66 (23 - 110)	0 (0 - 0)
13	25, 98th percentile value	170 (60 - 283)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	286 (101 - 478)	66 (23 - 110)	0 (0 - 0)
13	35, 99th percentile value	286 (101 - 478)	66 (23 - 110)	0 (0 - 0)
13	30, 99th percentile value	233 (82 - 388)	6 (2 - 10)	0 (0 - 0)
13	25, 99th percentile value	120 (42 - 198)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	217 (77 - 361)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	217 (77 - 361)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	217 (77 - 361)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	170 (60 - 283)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	217 (77 - 361)	0 (0 - 0)	0 (0 - 0)
12	35, 99th percentile value	217 (77 - 361)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	30, 99th percentile value	217 (77 - 361)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	120 (42 - 198)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.32. Sensitivity Analysis: Estimated Annual Lung Cancer Mortality Associated with Long-Term Exposure to $PM_{2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*
St. Louis, MO, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value	88 (27 - 134)	46 (14 - 71)	3 (1 - 5)
15	40, 98th percentile value	88 (27 - 134)	46 (14 - 71)	3 (1 - 5)
15	35, 98th percentile value	87 (27 - 133)	45 (14 - 70)	3 (1 - 4)
15	30, 98th percentile value	61 (19 - 92)	16 (5 - 24)	0 (0 - 0)
15	25, 98th percentile value	35 (11 - 53)	0 (0 - 0)	0 (0 - 0)
15	65, 99th percentile value	88 (27 - 134)	46 (14 - 71)	3 (1 - 5)
15	40, 99th percentile value	88 (27 - 134)	46 (14 - 71)	3 (1 - 5)
15	35, 99th percentile value	71 (22 - 109)	28 (9 - 42)	0 (0 - 0)
15	30, 99th percentile value	48 (15 - 72)	1 (0 - 2)	0 (0 - 0)
15	25, 99th percentile value	24 (8 - 37)	0 (0 - 0)	0 (0 - 0)
14	40, 98th percentile value	73 (23 - 112)	30 (9 - 46)	0 (0 - 0)
14	35, 98th percentile value	73 (23 - 112)	30 (9 - 46)	0 (0 - 0)
14	30, 98th percentile value	61 (19 - 92)	16 (5 - 24)	0 (0 - 0)
14	25, 98th percentile value	35 (11 - 53)	0 (0 - 0)	0 (0 - 0)
14	40, 99th percentile value	73 (23 - 112)	30 (9 - 46)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
14	35, 99th percentile value	71 (22 - 109)	28 (9 - 42)	0 (0 - 0)
14	30, 99th percentile value	48 (15 - 72)	1 (0 - 2)	0 (0 - 0)
14	25, 99th percentile value	24 (8 - 37)	0 (0 - 0)	0 (0 - 0)
13	40, 98th percentile value	59 (18 - 89)	14 (4 - 21)	0 (0 - 0)
13	35, 98th percentile value	59 (18 - 89)	14 (4 - 21)	0 (0 - 0)
13	30, 98th percentile value	59 (18 - 89)	14 (4 - 21)	0 (0 - 0)
13	25, 98th percentile value	35 (11 - 53)	0 (0 - 0)	0 (0 - 0)
13	40, 99th percentile value	59 (18 - 89)	14 (4 - 21)	0 (0 - 0)
13	35, 99th percentile value	59 (18 - 89)	14 (4 - 21)	0 (0 - 0)
13	30, 99th percentile value	48 (15 - 72)	1 (0 - 2)	0 (0 - 0)
13	25, 99th percentile value	24 (8 - 37)	0 (0 - 0)	0 (0 - 0)
12	40, 98th percentile value	44 (14 - 67)	0 (0 - 0)	0 (0 - 0)
12	35, 98th percentile value	44 (14 - 67)	0 (0 - 0)	0 (0 - 0)
12	30, 98th percentile value	44 (14 - 67)	0 (0 - 0)	0 (0 - 0)
12	25, 98th percentile value	35 (11 - 53)	0 (0 - 0)	0 (0 - 0)
12	40, 99th percentile value	44 (14 - 67)	0 (0 - 0)	0 (0 - 0)
12	35, 99th percentile value	44 (14 - 67)	0 (0 - 0)	0 (0 - 0)

Alternative Standards		PM-Related Incidence Associated with PM-2.5**		
Annual (ug/m3)	**Daily (ug/m3)**	**BASE CASE: Lowest Measured Level in Study =7.5 µg/m3**	**Hypothetical Threshold =10 µg/m3**	**Hypothetical Threshold =12 µg/m3**
12	30, 99th percentile value	44 (14 - 67)	0 (0 - 0)	0 (0 - 0)
12	25, 99th percentile value	24 (8 - 37)	0 (0 - 0)	0 (0 - 0)

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.33. Sensitivity Analysis: Estimated Annual Hospital Admissions for Asthma (Age < 65) Associated with Short-Term Exposure to $PM_{10-2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

Seattle, WA, 2003

(As Is = 11.4 ug/m3 Annual Average; 26.2 ug/m3 98th Percentile Daily Value

"As Is" $PM_{10-2.5}$ Concentrations and Alternative Standards	PM-Related Incidence Associated with $PM_{10-2.5}$**			
	BASE CASE: Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
"As is" $PM_{10-2.5}$ concentrations	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
80 ug/m3 daily 98th percentile value	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
65 ug/m3 daily 98th percentile value	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
50 ug/m3 daily 98th percentile value	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
30 ug/m3 daily 98th percentile value	26 (0 - 63)	11 (0 - 26)	4 (0 - 10)	1 (0 - 3)
25 ug/m3 daily 98th percentile value	21 (0 - 51)	7 (0 - 16)	2 (0 - 5)	0 (0 - 1)
100 ug/m3 daily 99th percentile value	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
80 ug/m3 daily 99th percentile value	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
60 ug/m3 daily 99th percentile value	27 (0 - 65)	12 (0 - 28)	5 (0 - 11)	2 (0 - 4)
35 ug/m3 daily 99th percentile value	24 (0 - 58)	9 (0 - 22)	3 (0 - 8)	1 (0 - 2)
30 ug/m3 daily 99th percentile value	20 (0 - 48)	6 (0 - 14)	2 (0 - 4)	0 (0 - 1)

*This sensitivity analysis was performed using Sheppard (2003). See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM10-2.5 concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

Exhibit H.34. Sensitivity Analysis: Estimated Annual Days of Cough Among Children Associated with Short-Term Exposure to $PM_{10-2.5}$ When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models*

St. Louis, MO, 2003

(As Is = 12.0 ug/m3 Annual Average; 24.1 ug/m3 98th Percentile Daily Value

"As Is" $PM_{10-2.5}$ Concentrations and Alternative Standards	PM-Related Incidence Associated with $PM_{10-2.5}$**			
	BASE CASE: Policy Relevant Background =4.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
"As is" $PM_{10-2.5}$ concentrations	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
80 ug/m3 daily 98th percentile value	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
65 ug/m3 daily 98th percentile value	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
50 ug/m3 daily 98th percentile value	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
30 ug/m3 daily 98th percentile value	23800 (9800 - 35600)	9100 (3800 - 13300)	4200 (1800 - 6000)	2200 (1000 - 2900)
25 ug/m3 daily 98th percentile value	18600 (7800 - 27400)	5300 (2300 - 7300)	2000 (900 - 2500)	1300 (600 - 1600)
100 ug/m3 daily 99th percentile value	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
80 ug/m3 daily 99th percentile value	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
60 ug/m3 daily 99th percentile value	27000 (11000 - 40900)	12100 (4900 - 18100)	5800 (2500 - 8600)	2900 (1300 - 4000)
35 ug/m3 daily 99th percentile value	18600 (7700 - 27300)	5200 (2300 - 7300)	1900 (900 - 2500)	1200 (600 - 1600)
30 ug/m3 daily 99th percentile value	15200 (6400 - 22200)	3300 (1500 - 4400)	1100 (600 - 1400)	700 (400 - 900)

*This sensitivity analysis was performed using Schwartz and Neas (2000) -- 6 cities. See text for an explanation of the slope adjustment method.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest 100.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the $PM_{10-2.5}$ coefficient.

Exhibit H.35. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models -- Rollbacks to Meet Annual Standards Using Design Values Based on Maximum vs. Average of Monitor-Specific Averages* Pittsburgh, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Maximum of Monitor-Specific Averages**				PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Average of Monitor-Specific Averages**			
		Percent Reduction in Incidence from Current Standards				Percent Reduction in Incidence from Current Standards			
Annual (ug/m3)	Daily (ug/m3)	Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3	Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value***	50 (-108 - 200) 0.0%	22 (-48 - 87) 0.0%	10 (-23 - 41) 0.0%	5 (-11 - 18) 0.0%	59 (-128 - 238) 0.0%	31 (-66 - 122) 0.0%	17 (-37 - 67) 0.0%	9 (-19 - 35) 0.0%
15	65, 99th percentile value	50 (-108 - 200) 0.0%	22 (-48 - 87) 0.0%	10 (-23 - 41) 0.0%	5 (-11 - 18) 0.0%	59 (-128 - 238) 0.0%	31 (-66 - 122) 0.0%	17 (-37 - 67) 0.0%	9 (-19 - 35) 0.0%
14	40, 98th percentile value	46 (-99 - 182) 8.0%	18 (-40 - 72) 18.2%	8 (-17 - 31) 20.0%	3 (-8 - 13) 40.0%	47 (-102 - 189) 20.3%	19 (-43 - 77) 38.7%	9 (-19 - 34) 47.1%	4 (-9 - 15) 55.6%
13	40, 98th percentile value	41 (-90 - 165) 18.0%	15 (-32 - 58) 31.8%	6 (-13 - 22) 40.0%	2 (-5 - 9) 60.0%	47 (-102 - 189) 20.3%	19 (-43 - 77) 38.7%	9 (-19 - 34) 47.1%	4 (-9 - 15) 55.6%
13	40, 99th percentile value	41 (-90 - 165) 18.0%	15 (-32 - 58) 31.8%	6 (-13 - 22) 40.0%	2 (-5 - 9) 60.0%	42 (-92 - 168) 28.8%	15 (-34 - 61) 51.6%	6 (-13 - 24) 64.7%	3 (-6 - 10) 66.7%
12	40, 98th percentile value	37 (-80 - 147) 26.0%	11 (-25 - 44) 50.0%	4 (-8 - 15) 60.0%	1 (-3 - 6) 80.0%	44 (-95 - 175) 25.4%	17 (-36 - 66) 45.2%	7 (-15 - 27) 58.8%	3 (-7 - 11) 66.7%
12	35, 98th percentile value	37 (-80 - 147) 26.0%	11 (-25 - 44) 50.0%	4 (-8 - 15) 60.0%	1 (-3 - 6) 80.0%	41 (-88 - 162) 30.5%	14 (-31 - 56) 54.8%	5 (-12 - 21) 70.6%	2 (-5 - 8) 77.8%
12	40, 99th percentile value	37 (-80 - 147) 26.0%	11 (-25 - 44) 50.0%	4 (-8 - 15) 60.0%	1 (-3 - 6) 80.0%	42 (-92 - 168) 28.8%	15 (-34 - 61) 51.6%	6 (-13 - 24) 64.7%	3 (-6 - 10) 66.7%

*This sensitivity analysis was performed using Chock et al. (2000), age 75+ model. See text for an explanation of the slope adjustment method. Only those standard combinations for which the change in design value used for the annual standard makes a difference in estimated mortality are shown.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number. Percents are rounded to the nearest tenth.

***Current standards.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.36. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models -- Rollbacks to Meet Annual Standards Using Design Values Based on Maximum vs. Average of Monitor-Specific Averages* Pittsburgh, PA, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Maximum of Monitor-Specific Averages**			PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Average of Monitor-Specific Averages**		
		Percent Reduction in Incidence from Current Standards			Percent Reduction in Incidence from Current Standards		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value***	403 (141 - 699) 0.0%	215 (75 - 373) 0.0%	25 (9 - 43) 0.0%	546 (190 - 950) 0.0%	375 (130 - 654) 0.0%	202 (70 - 354) 0.0%
15	65, 99th percentile value	403 (141 - 699) 0.0%	215 (75 - 373) 0.0%	25 (9 - 43) 0.0%	546 (190 - 950) 0.0%	375 (130 - 654) 0.0%	202 (70 - 354) 0.0%
14	40, 98th percentile value	338 (118 - 585) 16.1%	141 (49 - 245) 34.4%	0 (0 - 0) 100.0%	361 (126 - 626) 33.9%	168 (58 - 291) 55.2%	0 (0 - 0) 100.0%
13	40, 98th percentile value	273 (96 - 471) 32.3%	68 (24 - 118) 68.4%	0 (0 - 0) 100.0%	361 (126 - 626) 33.9%	168 (58 - 291) 55.2%	0 (0 - 0) 100.0%
13	40, 99th percentile value	273 (96 - 471) 32.3%	68 (24 - 118) 68.4%	0 (0 - 0) 100.0%	287 (100 - 495) 47.4%	84 (29 - 145) 77.6%	0 (0 - 0) 100.0%
12	40, 98th percentile value	208 (73 - 358) 48.4%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	312 (109 - 539) 42.9%	112 (39 - 194) 70.1%	0 (0 - 0) 100.0%
12	35, 98th percentile value	208 (73 - 358) 48.4%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	264 (93 - 456) 51.6%	59 (21 - 102) 84.3%	0 (0 - 0) 100.0%
12	40, 99th percentile value	208 (73 - 358) 48.4%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	287 (100 - 495) 47.4%	84 (29 - 145) 77.6%	0 (0 - 0) 100.0%

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method. Only those standard combinations for which the change in design value used for the annual standard makes a difference in estimated mortality are shown.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number. Percents are rounded to the nearest tenth.

***Current standards.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.37. Sensitivity Analysis: Estimated Annual Mortality Associated with Short-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models -- Rollbacks to Meet Annual Standards Using Design Values Based on Maximum vs. Average of Monitor-Specific Averages*
St. Louis, MO, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Maximum of Monitor-Specific Averages**				PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Average of Monitor-Specific Averages**			
		Percent Reduction in Incidence from Current Standards				Percent Reduction in Incidence from Current Standards			
Annual (ug/m3)	Daily (ug/m3)	Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3	Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
15	65, 98th percentile value***	191 (70 - 311) 0.0%	75 (28 - 122) 0.0%	29 (11 - 46) 0.0%	9 (3 - 14) 0.0%	201 (74 - 327) 0.0%	84 (31 - 137) 0.0%	34 (13 - 56) 0.0%	11 (4 - 19) 0.0%
15	40, 98th percentile value	191 (70 - 311) 0.0%	75 (28 - 122) 0.0%	29 (11 - 46) 0.0%	9 (3 - 14) 0.0%	201 (74 - 327) 0.0%	84 (31 - 137) 0.0%	34 (13 - 56) 0.0%	11 (4 - 19) 0.0%
15	65, 99th percentile value	191 (70 - 311) 0.0%	75 (28 - 122) 0.0%	29 (11 - 46) 0.0%	9 (3 - 14) 0.0%	201 (74 - 327) 0.0%	84 (31 - 137) 0.0%	34 (13 - 56) 0.0%	11 (4 - 19) 0.0%
15	40, 99th percentile value	191 (70 - 311) 0.0%	75 (28 - 122) 0.0%	29 (11 - 46) 0.0%	9 (3 - 14) 0.0%	200 (74 - 325) 0.5%	83 (31 - 135) 1.2%	34 (12 - 55) 0.0%	11 (4 - 18) 0.0%
14	40, 98th percentile value	175 (64 - 284) 8.4%	61 (22 - 99) 18.7%	20 (7 - 33) 31.0%	5 (2 - 8) 44.4%	184 (68 - 299) 8.5%	69 (25 - 112) 17.9%	25 (9 - 40) 26.5%	7 (3 - 11) 36.4%
14	35, 98th percentile value	175 (64 - 284) 8.4%	61 (22 - 99) 18.7%	20 (7 - 33) 31.0%	5 (2 - 8) 44.4%	184 (68 - 299) 8.5%	69 (25 - 112) 17.9%	25 (9 - 40) 26.5%	7 (3 - 11) 36.4%
14	40, 99th percentile value	175 (64 - 284) 8.4%	61 (22 - 99) 18.7%	20 (7 - 33) 31.0%	5 (2 - 8) 44.4%	184 (68 - 299) 8.5%	69 (25 - 112) 17.9%	25 (9 - 40) 26.5%	7 (3 - 11) 36.4%
13	40, 98th percentile value	158 (58 - 256) 17.3%	47 (17 - 77) 37.3%	13 (5 - 21) 55.2%	3 (1 - 4) 66.7%	166 (61 - 270) 17.4%	54 (20 - 88) 35.7%	17 (6 - 27) 50.0%	4 (1 - 6) 63.6%
13	35, 98th percentile value	158 (58 - 256) 17.3%	47 (17 - 77) 37.3%	13 (5 - 21) 55.2%	3 (1 - 4) 66.7%	166 (61 - 270) 17.4%	54 (20 - 88) 35.7%	17 (6 - 27) 50.0%	4 (1 - 6) 63.6%

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Maximum of Monitor-Specific Averages**				PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Average of Monitor-Specific Averages**			
		Percent Reduction in Incidence from Current Standards				Percent Reduction in Incidence from Current Standards			
Annual (ug/m3)	Daily (ug/m3)	Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3	Policy Relevant Background =3.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =15 µg/m3	Hypothetical Threshold =20 µg/m3
13	30, 98th percentile value	158 (58 - 256) 17.3%	47 (17 - 77) 37.3%	13 (5 - 21) 55.2%	3 (1 - 4) 66.7%	160 (59 - 260) 20.4%	49 (18 - 80) 41.7%	14 (5 - 23) 58.8%	3 (1 - 4) 72.7%
13	40, 99th percentile value	158 (58 - 256) 17.3%	47 (17 - 77) 37.3%	13 (5 - 21) 55.2%	3 (1 - 4) 66.7%	166 (61 - 270) 17.4%	54 (20 - 88) 35.7%	17 (6 - 27) 50.0%	4 (1 - 6) 63.6%
13	35, 99th percentile value	158 (58 - 256) 17.3%	47 (17 - 77) 37.3%	13 (5 - 21) 55.2%	3 (1 - 4) 66.7%	166 (61 - 270) 17.4%	54 (20 - 88) 35.7%	17 (6 - 27) 50.0%	4 (1 - 6) 63.6%
12	40, 98th percentile value	141 (52 - 229) 26.2%	35 (13 - 57) 53.3%	8 (3 - 12) 72.4%	1 (1 - 2) 88.9%	149 (55 - 241) 25.9%	41 (15 - 66) 51.2%	10 (4 - 16) 70.6%	2 (1 - 3) 81.8%
12	35, 98th percentile value	141 (52 - 229) 26.2%	35 (13 - 57) 53.3%	8 (3 - 12) 72.4%	1 (1 - 2) 88.9%	149 (55 - 241) 25.9%	41 (15 - 66) 51.2%	10 (4 - 16) 70.6%	2 (1 - 3) 81.8%
12	30, 98th percentile value	141 (52 - 229) 26.2%	35 (13 - 57) 53.3%	8 (3 - 12) 72.4%	1 (1 - 2) 88.9%	149 (55 - 241) 25.9%	41 (15 - 66) 51.2%	10 (4 - 16) 70.6%	2 (1 - 3) 81.8%
12	40, 99th percentile value	141 (52 - 229) 26.2%	35 (13 - 57) 53.3%	8 (3 - 12) 72.4%	1 (1 - 2) 88.9%	149 (55 - 241) 25.9%	41 (15 - 66) 51.2%	10 (4 - 16) 70.6%	2 (1 - 3) 81.8%
12	35, 99th percentile value	141 (52 - 229) 26.2%	35 (13 - 57) 53.3%	8 (3 - 12) 72.4%	1 (1 - 2) 88.9%	149 (55 - 241) 25.9%	41 (15 - 66) 51.2%	10 (4 - 16) 70.6%	2 (1 - 3) 81.8%
12	30, 99th percentile value	141 (52 - 229) 26.2%	35 (13 - 57) 53.3%	8 (3 - 12) 72.4%	1 (1 - 2) 88.9%	145 (53 - 235) 27.9%	38 (14 - 62) 54.8%	9 (3 - 14) 73.5%	2 (1 - 3) 81.8%

*This sensitivity analysis was performed using Chock et al. (2000), age 75+ model. See text for an explanation of the slope adjustment method. Only those standard combinations for which the change in design value used for the annual standard makes a difference in estimated mortality are shown.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number. Percents are rounded to the nearest tenth.

***Current standards.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Exhibit H.38. Sensitivity Analysis: Estimated Annual Mortality Associated with Long-Term Exposure to PM2.5 When Alternative Standards Are Just Met, in the Base Case and Using Alternative Hypothetical Threshold Models -- Rollbacks to Meet Annual Standards Using Design Values Based on Maximum vs. Average of Monitor-Specific Averages*
St. Louis, MO, 2003

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Maximum of Monitor-Specific Averages**			PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Average of Monitor-Specific Averages**		
		Percent Reduction in Incidence from Current Standards			Percent Reduction in Incidence from Current Standards		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
15	65, 98th percentile value***	596 (206 - 1047) 0.0%	311 (107 - 548) 0.0%	23 (8 - 40) 0.0%	655 (226 - 1153) 0.0%	377 (130 - 667) 0.0%	97 (33 - 171) 0.0%
15	40, 98th percentile value	596 (206 - 1047) 0.0%	311 (107 - 548) 0.0%	23 (8 - 40) 0.0%	655 (226 - 1153) 0.0%	377 (130 - 667) 0.0%	97 (33 - 171) 0.0%
15	65, 99th percentile value	596 (206 - 1047) 0.0%	311 (107 - 548) 0.0%	23 (8 - 40) 0.0%	655 (226 - 1153) 0.0%	377 (130 - 667) 0.0%	97 (33 - 171) 0.0%
15	40, 99th percentile value	596 (206 - 1047) 0.0%	311 (107 - 548) 0.0%	23 (8 - 40) 0.0%	647 (223 - 1138) 1.2%	368 (127 - 651) 2.4%	87 (30 - 153) 10.3%
14	40, 98th percentile value	498 (172 - 874) 16.4%	201 (69 - 354) 35.4%	0 (0 - 0) 100.0%	552 (191 - 970) 15.7%	262 (90 - 461) 30.5%	0 (0 - 0) 100.0%
14	35, 98th percentile value	498 (172 - 874) 16.4%	201 (69 - 354) 35.4%	0 (0 - 0) 100.0%	552 (191 - 970) 15.7%	262 (90 - 461) 30.5%	0 (0 - 0) 100.0%
14	40, 99th percentile value	498 (172 - 874) 16.4%	201 (69 - 354) 35.4%	0 (0 - 0) 100.0%	552 (191 - 970) 15.7%	262 (90 - 461) 30.5%	0 (0 - 0) 100.0%
13	40, 98th percentile value	401 (139 - 702) 32.7%	92 (32 - 162) 70.4%	0 (0 - 0) 100.0%	450 (156 - 788) 31.3%	147 (51 - 258) 61.0%	0 (0 - 0) 100.0%
13	35, 98th percentile value	401 (139 - 702) 32.7%	92 (32 - 162) 70.4%	0 (0 - 0) 100.0%	450 (156 - 788) 31.3%	147 (51 - 258) 61.0%	0 (0 - 0) 100.0%

Alternative Standards		PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Maximum of Monitor-Specific Averages**			PM-Related Incidence Associated with PM-2.5 Using Annual Standard Design Values Based on the Average of Monitor-Specific Averages**		
		Percent Reduction in Incidence from Current Standards			Percent Reduction in Incidence from Current Standards		
Annual (ug/m3)	Daily (ug/m3)	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3	BASE CASE: Lowest Measured Level in Study =7.5 µg/m3	Hypothetical Threshold =10 µg/m3	Hypothetical Threshold =12 µg/m3
13	30, 98th percentile value	401 (139 - 702) 32.7%	92 (32 - 162) 70.4%	0 (0 - 0) 100.0%	414 (144 - 726) 36.8%	107 (37 - 188) 71.6%	0 (0 - 0) 100.0%
13	40, 99th percentile value	401 (139 - 702) 32.7%	92 (32 - 162) 70.4%	0 (0 - 0) 100.0%	450 (156 - 788) 31.3%	147 (51 - 258) 61.0%	0 (0 - 0) 100.0%
13	35, 99th percentile value	401 (139 - 702) 32.7%	92 (32 - 162) 70.4%	0 (0 - 0) 100.0%	450 (156 - 788) 31.3%	147 (51 - 258) 61.0%	0 (0 - 0) 100.0%
12	40, 98th percentile value	304 (106 - 532) 49.0%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	348 (121 - 608) 46.9%	32 (11 - 56) 91.5%	0 (0 - 0) 100.0%
12	35, 98th percentile value	304 (106 - 532) 49.0%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	348 (121 - 608) 46.9%	32 (11 - 56) 91.5%	0 (0 - 0) 100.0%
12	30, 98th percentile value	304 (106 - 532) 49.0%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	348 (121 - 608) 46.9%	32 (11 - 56) 91.5%	0 (0 - 0) 100.0%
12	40, 99th percentile value	304 (106 - 532) 49.0%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	348 (121 - 608) 46.9%	32 (11 - 56) 91.5%	0 (0 - 0) 100.0%
12	35, 99th percentile value	304 (106 - 532) 49.0%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	348 (121 - 608) 46.9%	32 (11 - 56) 91.5%	0 (0 - 0) 100.0%
12	30, 99th percentile value	304 (106 - 532) 49.0%	0 (0 - 0) 100.0%	0 (0 - 0) 100.0%	327 (113 - 571) 50.1%	8 (3 - 15) 97.9%	0 (0 - 0) 100.0%

*This sensitivity analysis was performed using Pope et al. (2002) -- ACS extended. See text for an explanation of the slope adjustment method. Only those standard combinations for which the change in design value used for the annual standard makes a difference in estimated mortality are shown.

**In the base case, incidence was quantified across the range of PM concentrations observed in the study, when possible, but not below policy relevant background level. Under alternative threshold models, incidence was quantified down to the specified threshold. Incidences are rounded to the nearest whole number. Percents are rounded to the nearest tenth.

***Current standards.

Note: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM2.5 coefficient.

Appendix I. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations

I.1. Relevant Population Sizes

Exhibit I.1. Relevant Population Sizes for PM_{10} Risk Assessment Locations

City	Population[a]						
	Total	**Ages 7-14**	**Ages ≥30**	**Ages <65**	**Ages ≥ 65**	**Ages <75**	**Ages ≥75**
Boston[1]	2,806,000	283,000 (10%)	---	---	---	---	---
Detroit[2]	2,061,000	---	---		249,000 (12%)	---	---
Los Angeles[3]	9,519,000	---	5,092,000 (53%)	---	927,000 (10%)	---	---
Philadelphia[4]	1,518,000	---	---	---	---	---	---
Phoenix[5]	3,072,000	---	---	---	359,000 (12%)	---	---
Pittsburg[6]	1,282,000	---	---	---	---	1,166,000 (91%)	116,000 (9%)
San Jose[7]	1,683,000	---	---	---	---	---	---
Seattle[8]	1,737,000	---	---	1,555,000 (90%)	---	---	---
St. Louis[9]	2,518,000	307,000 (12%)	---	---	---	---	---

[a] Total population and age-specific population estimates taken from the CDC Wonder website are based on 2000 U.S. Census data. See http://factfinder.census.gov/. Populations are rounded to the nearest thousand. The urban areas given in this exhibit are those considered in the studies used in the $PM_{2.5}$ risk assessment. The percentages in parentheses indicate the percentage of the total population in the specific age category.

[1] Middlesex, Norfolk, and Suffolk Counties. [2] Wayne County. [3] Los Angeles County. [4] Philadelphia County.

[5] Maricopa County. [6] Allegheny County. [7] Santa Clara County. [8] King County.

[9] St. Louis, Franklin, Jefferson, St. Charles, Clinton (IL), Madison (IL), Monroe (IL), and St. Clair (IL) Counties and St. Louis City.

I.2. Baseline Incidence Rates

Exhibit I.2. Baseline Mortality Rates for 2001 for PM_{10} Risk Assessment Locations*

Health Effect	Boston[1]	Detroit[2]	Los Angeles[3]	Philadelphia[4]	Phoenix[5]	Pittsburgh[6]	San Jose[7]	St. Louis[8]	Seattle[9]	National Average
Mortality[a]:										
A. Mortality Rates Used in Risk Analysis for Short-Term Exposure Studies[b] (deaths per 100,000 general population/year)										
Non-accidental (all ages): ICD-9 codes < 800	776	916	581	---	---	---	494	869	---	791
Non-accidental (75+): ICD-9 codes < 800	---	---	---	---	---	761	---	---	---	469
Non-accidental (<75): ICD-9 codes < 800	---	---	---	---	---	399	---	---	---	322
Cardiovascular (all ages): ICD-9 codes: 390-459	---	416	---	---	---	---	206	---	---	328
Cardiovascular (all ages): ICD-9 codes: 390-448	---	---	---	418	---	---	---	---	---	324
Cardiovascular (65+): ICD-9 codes: 390-448	---	---	---	---	211	---	---	---	---	273
Cardiovascular (all ages): ICD-9 codes: 390-429	---	---	207	---	---	---	---	---	---	252

Health Effect	Boston[1]	Detroit[2]	Los Angeles[3]	Philadelphia[4]	Phoenix[5]	Pittsburgh[6]	San Jose[7]	St. Louis[8]	Seattle[9]	National Average
Respiratory (all ages): ICD-9 codes: 11, 35, 472-519, 710.0, 710.2, 710.4	---	---	---	---	---	---	51	---	---	80
Respiratory (all ages): ICD-9 codes: 460-519	---	72	---	---	---	---	---	---	---	79

*The epidemiological studies used in the risk assessment reported causes of mortality using the ninth revision of the International Classification of Diseases (ICD-9) codes. However, the tenth revision has since come out, and baseline mortality incidence rates for 2001 shown in this exhibit use ICD-10 codes. The groupings of ICD-9 codes used in the epidemiological studies and the corresponding ICD-10 codes used to calculate year 2001 baseline incidence rates is given in Exhibit 5.4.

[a] Mortality figures were obtained from CDC Wonder for 2001. See http://wonder.cdc.gov/.

[b] Mortality rates are presented only for the locations in which the C-R functions were estimated. All incidence rates are rounded to the nearest unit. Mortality rates for St. Louis may be slightly underestimated because some of the mortality counts in the smaller counties were reported as missing in CDC Wonder.

[1] Middlesex, Norfolk, and Suffolk Counties. [2] Wayne County. [3] Los Angeles County. [4] Philadelphia County.

[5] Maricopa County. [6] Allegheny County. [7] Santa Clara County.

[8] St. Louis, Franklin, Jefferson, St. Charles, Clinton (IL), Madison (IL), Monroe (IL), and St. Clair (IL) Counties and St. Louis City.

[9] King County.

Exhibit I.3. Baseline Hospitalization Rates for PM_{10} Risk Assessment Locations [a]

Health Effect	Detroit[1]	Los Angeles[2]	Seattle[3]
Hospital Admissions (per 100,000 general population/year)			
Pneumonia admissions (65 and over): ICD codes 480-487	252	---	---
Pneumonia admissions (65 and over): ICD codes 480-486	250	---	---
COPD and asthma admissions (all ages): ICD codes 490-496	---	152	---
COPD and asthma admissions (65 and over): ICD codes 490-496	192	---	---
COPD without asthma admissions (65 and over): ICD codes 490-492, 494-496	163	---	---
Asthma admissions (30 and over): ICD code 493	---	70	---
Asthma admissions (<65): ICD code 493	---	---	92
Cardiovascular admissions (65 and over): ICD codes: 390-429	---	728	---
Ischemic heart disease (65 and over): ICD codes 410-414	487	---	---
Dysrhythmias (65 and over): ICD code 427	161	---	---
Congestive heart failure (65 and over): ICD code 428	341	---	---

[a] Hospitalization rates are presented only for the locations in which the C-R functions were estimated. For each location, the number of discharges was divided by the location's population from the 2000 U.S. Census estimates to obtain rates. All incidence rates are rounded to the nearest unit.

[1] Wayne County. Year 2000 hospitalization data were obtained from the Michigan Health and Hospital Association.

[2] Los Angeles County. Year 1999 hospitalization data were obtained from California's Office of Statewide Health Planning and Development – Health Care Information Resource Center.

[3] King County. Year 2000 hospitalization data were obtained from the State of Washington Department of Health, Center for Health Statistics, Office of Hospital and Patient Data Systems.

I.3. The PM_{10} data

PM_{10} data for Boston, Detroit, Los Angeles, Philadelphia, Phoenix, Pittsburgh, San Jose, Seattle, and St. Louis were obtained for the years 1999 through 2002 from EPA's Aerometric Information Retrieval System (AIRS). For all urban areas except Boston and San Jose, year 2002 data were used. For Boston and San Jose, there were no monitors in any year after 1999 that met the inclusion criterion, so year 1999 data were used.

PM_{10} data for all cities were obtained from monitors measuring concentrations at standard temperature and pressure, because significantly more AIRS PM_{10} data are reported under standard conditions than local conditions. The numbers of days of observations by monitor and at the composite monitor, by quarter and for the year, along with annual averages and maximum concentrations, are given in Exhibits I.4 through I.12 for each of the locations in the PM_{10} risk assessment.

Exhibit I.4. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Boston, 1999*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 250250024811021	11	14	15	12	52	24.3	50
Composite[1]	11	14	15	12	52	24.3	50

*All concentrations are in $\mu g/m^3$; includes Middlesex, Norfolk and Suffolk Counties.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.5. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Detroit, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 261630001811021	15	15	15	14	59	20.2	49
Composite[1]	15	15	15	14	59	20.2	49

*All concentrations are in $\mu g/m^3$; includes Wayne County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.6. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Los Angeles, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 060370002811022	14	15	16	12	57	45.8	79
AIRS 060371002811022	14	14	16	14	58	37.7	71
AIRS 060374002811022	14	15	15	14	58	36.0	62
AIRS 060375001811021	15	15	16	15	61	37.2	97
AIRS 060376012811021	15	15	16	14	60	33.3	56
AIRS 060379033811021	14	15	14	15	58	29.7	48
Composite[1]	18	19	20	18	75	36.6	55

*All concentrations are in $\mu g/m^3$; includes Los Angeles County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.7. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Philadelphia, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 421010004811021	12	15	14	15	56	22.3	51
AIRS 421010037811021	15	13	15	11	54	26.5	83
AIRS 421010149811021	11	15	16	14	56	24.6	71
AIRS 421010449811021	11	11	15	14	51	25.1	64
Composite[1]	15	15	16	15	61	25.4	72

*All concentrations are in $\mu g/m^3$; includes Philadelphia County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.8. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Phoenix, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 040130019811021	15	15	16	15	61	52.5	98
AIRS 040131003811021	15	15	16	15	61	37.9	86
AIRS 040131004811021	15	15	16	14	60	36.9	72
AIRS 040132001811021	15	15	16	14	60	40.3	85
AIRS 040133002811022	15	15	16	15	61	43.1	76
AIRS 040133003811021	15	15	16	15	61	36.7	62
AIRS 040133006811021	15	15	13	13	56	44.6	90
AIRS 040133007811022	14	15	16	15	60	80.5	174
AIRS 040133010811021	15	15	16	15	61	54.6	102
AIRS 040134003811021	15	15	16	15	61	59.5	123
AIRS 040134004811021	15	15	16	15	61	38.5	77
AIRS 040134006811021	13	15	16	14	58	62.5	134
AIRS 040134007811021	14	14	16	15	59	31.9	67
AIRS 040139812811021	15	15	16	15	61	69.9	158
AIRS 040139993811021	15	15	15	14	59	28.8	78
Composite[1]	15	15	16	15	61	47.9	83.9

*All concentrations are in $\mu g/m^3$; includes Maricopa County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.9. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Pittsburgh, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 420030067811021	13	15	16	13	57	19.3	54
AIRS 420030092811021	13	14	16	15	58	23.2	61
AIRS 420030095811021	13	13	16	13	55	18.5	59
Composite[1]	13	15	16	15	59	20.5	58

*All concentrations are in $\mu g/m^3$; includes Allegheny County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.10. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. San Jose, 1999*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 060850004811024	13	15	12	15	55	24.6	77
Composite[1]	13	15	12	15	55	24.6	77

*All concentrations are in $\mu g/m^3$; includes Santa Clara County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.11. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. Seattle, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 530332004811022	15	15	16	15	61	18.0	44
Composite[1]	15	15	16	15	61	18.0	44

*All concentrations are in $\mu g/m^3$; includes King County.

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.12. Number of Days on which PM_{10} Concentration Data are Available, by Monitor and by Quarter, and PM_{10} Concentrations. St. Louis, 2002*

Monitor	Q1	Q2	Q3	Q4	Year Total	Annual Avg.	98th Percentile
AIRS 171630010811021	15	13	15	15	58	29.8	93
AIRS 291895001811022	15	15	16	15	61	16.7	36
Composite[1]	15	15	18	15	63	22.8	69

*All concentrations are in $\mu g/m^3$; includes St. Louis (MO), Franklin (MO), Jefferson (MO), St. Charles (MO), Clinton (IL), Madison (IL), Monroe (IL), and St. Clair (IL) Counties and St. Louis City (MO).

1. The number of days at the composite monitor is the number of days on which at least one of the monitors reported.

Exhibit I.13. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations Boston, MA, 1999

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM-10 Above Lowest Measured Level in the Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Non-accidental	all	0 day		420 (247 - 590)	1.9% (1.1% - 2.7%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Non-accidental	all	0 day		247 (142 - 351)	1.1% (0.7% - 1.6%)
	Dominici et al. (2003) [reanalysis of Samet et al. (2000)] -- regional	Non-accidental	all	1 day		145 (13 - 276)	0.7% (0.1% - 1.3%)
Respiratory Symptoms* **	**Single Pollutant Models**						
	Schwartz et al. (1994) -- 6 cities	Lower respiratory symptoms	7 - 14	1 day		11600 (16400 - 49600)	22.2% (31.6% - 95.4%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit I.14. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
Detroit, MI, 2002

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Dominici et al. (2003) [reanalysis of Samet et al. (2000)]	Non-accidental	all	1 day		54 (9 - 99)	0.3% (0.1% - 0.5%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Non-accidental	all	1 day		106 (-65 - 274)	0.6% (-0.3% - 1.5%)
	Dominici et al. (2003) [reanalysis of Samet et al. (2000)] -- regional	Non-accidental	all	1 day		45 (9 - 80)	0.2% (0.1% - 0.4%)
	Single Pollutant Models (Cause-Specific Mortality)						
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Circulatory	all	1 day		77 (-40 - 188)	0.9% (-0.5% - 2.2%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Respiratory	all	0 day		18 (-29 - 62)	1.2% (-2.0% - 4.2%)
Hospital Admissions	**Single Pollutant Models**						
	Schwartz and Morris (1995)	Congestive heart failure	65+	mean of lag 0 & 1		84 (32 - 134)	1.2% (0.5% - 1.9%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Congestive heart failure	65+	0 day		105 (-4 - 209)	1.5% (-0.1% - 3.0%)
	Zanobetti and Schwartz (2003) [reanalysis of Samet et al. (2000)] -- distr. lag model	COPD	65+	unconst.		127 (68 - 185)	3.8% (2.0% - 5.5%)
	Zanobetti and Schwartz (2003) [reanalysis of Samet et al. (2000)] -- 14 cities	COPD	65+	unconst.		101 (49 - 151)	3.0% (1.5% - 4.5%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	COPD+	65+	3 day		42 (-57 - 135)	1.1% (-1.4% - 3.4%)
	Schwartz and Morris (1995)	Dysrhythmias	65+	1 day		24 (-5 - 54)	0.7% (-0.2% - 1.6%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Dysrhythmias	65+	1 day		16 (-67 - 94)	0.5% (-2.0% - 2.9%)
	Schwartz and Morris (1995)	Ischemic heart disease	65+	0 day		68 (19 - 120)	0.7% (0.2% - 1.2%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Ischemic heart disease	65+	2 day		131 (-5 - 265)	1.3% (-0.1% - 2.6%)

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
	Zanobetti and Schwartz (2003) [reanalysis of Samet et al. (2000)] -- distr. lag model	Pneumonia	65+	unconst.		59 (-2 - 120)	1.2% (0.0% - 2.3%)
	Ito (2003) [reanalysis of Lippmann et al. (2000)]	Pneumonia	65+	1 day		143 (45 - 235)	2.8% (0.9% - 4.6%)
	Zanobetti and Schwartz (2003) [reanalysis of Samet et al. (2000)] -- 14 cities	Pneumonia	65+	unconst.		100 (60 - 141)	1.9% (1.2% - 2.7%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit I.15. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
Los Angeles, CA, 2002

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Lowest Measured Level in Study or Policy Relevant Background**	
							Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**							
	Kinney et al. (1995)	Non-accidental	all	log-linear	0 day		581 (0 - 1233)	1.1% (0.0% - 2.2%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	0 day		82 (-590 - 745)	0.2% (-1.1% - 1.4%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Non-accidental	all	log-linear, GAM (stringent), 30 df	1 day		163 (-433 - 752)	0.3% (-0.8% - 1.4%)
	Dominici et al. (2003) [reanalysis of Samet et al.	Non-accidental	all	log-linear, GLM, Bayes adjusted	1 day		459 (52 - 861)	0.8% (0.1% - 1.6%)
	Single Pollutant Models (Cause-Specific Mortality)							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	0 day		192 (-133 - 511)	1.0% (-0.7% - 2.6%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000a)]	Cardiovascular	all	log-linear, GAM (stringent), 30 df	1 day		163 (-171 - 490)	0.8% (-0.9% - 2.5%)
	Multi-Pollutant Models (Total Mortality)							
	Kinney et al. (1995)	Non-accidental	all	log-linear	0 day	O3	581 (0 - 1233)	1.1% (0.0% - 2.2%)
	Kinney et al. (1995)	Non-accidental	all	log-linear	0 day	CO	467 (-243 - 1020)	0.8% (-0.4% - 1.8%)
	Dominici et al.(2003) [reanalysis of Samet et	Non-accidental	all	log-linear, GLM, Bayes adjusted	1 day	O3	454 (203 - 738)	0.8% (0.4% - 1.3%)
	Dominici et al.(2003) [reanalysis of Samet et	Non-accidental	all	log-linear, GLM, Bayes adjusted	1 day	O3, NO2	354 (-17 - 738)	0.6% (0.0% - 1.3%)
	Dominici et al.(2003) [reanalysis of Samet et	Non-accidental	all	log-linear, GLM, Bayes adjusted	1 day	O3, SO2	354 (34 - 704)	0.6% (0.1% - 1.3%)
	Dominici et al.(2003) [reanalysis of Samet et	Non-accidental	all	log-linear, GLM, Bayes adjusted	1 day	O3, CO	404 (85 - 721)	0.7% (0.2% - 1.3%)

Health Effects*	Study	Type	Ages	Model	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Lowest Measured Level in Study or Policy Relevant Background**	
							Incidence	Percent of Total Incidence
Hospital Admission	**Single Pollutant Models**							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	0 day		1358 (492 - 2212)	2.0% (0.7% - 3.2%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 30 df	1 day		1037 (154 - 1906)	1.5% (0.2% - 2.8%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	0 day		458 (191 - 719)	3.2% (1.3% - 5.0%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	1 day		466 (201 - 726)	3.2% (1.4% - 5.0%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 30 df	2 day		630 (358 - 897)	4.4% (2.5% - 6.2%)
	Linn et al. (2000) -- Calif. South Coast Air Basin***	Asthma	30+	log-linear	0 day		61 (-100 - 217)	0.9% (-1.5% - 3.3%)
	Multi-Pollutant Models							
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000b)]	Cardiovascular	65+	log-linear, GAM (stringent), 100 df	0 day	CO	-535 (-1578 - 489)	-0.8% (-2.3% - 0.7%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	0 day	NO2	-13 (-378 - 342)	-0.1% (-2.6% - 2.4%)
	Moolgavkar (2003) [reanalysis of Moolgavkar (2000c)]	COPD+	all	log-linear, GAM (stringent), 100 df	1 day	NO2	162 (-160 - 476)	1.1% (-1.1% - 3.3%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

***The California South Coast Air Basin represents the area included in Los Angeles, Riverside, San Bernadino and Orange Counties, excluding the mountain and desert regions of the first three counties.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city or multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit I.16. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations Philadelphia, PA, 2002

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Cause-Specific Mortality)**						
	Lipfert et al. (2000) -- 7 counties	Cardiovascular	all	1 day		538 (248 - 828)	8.5% (3.9% - 13.1%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient. The Lipfert et al. (2000) study does not provide the statistical uncertainties surrounding the PM10 non-accidental mortality coefficients and the cardiovascular mortality multi-pollutant coefficient. Therefore the 95% confidence intervals for the corresponding health effects estimates can not be calculated.

Note 2: Multi-city or multi-county short-term exposure C-R functions were applied only to counties included among those used to estimate the function.

Exhibit I.17. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
Phoenix, AZ, 2002

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	Single Pollutant Models (Cause-Specific Mortality)						
	Mar et al. (2003) [reanalysis of Mar et al (2000)]	Cardiovascular	65-100	0 day		478 (107 - 862)	7.4% (1.7% - 13.4%)
	Mar et al. (2003) [reanalysis of Mar et al (2000)]	Cardiovascular	65-100	1 day		373 (0 - 776)	5.8% (0.0% - 12.0%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit I.18. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
Pittsburgh, PA, 2002

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Chock et al. (2000)	Non-accidental	<75	0 day		39 (3 - 75)	0.8% (0.1% - 1.5%)
	Chock et al. (2000)	Non-accidental	75+	0 day		48 (-23 - 118)	0.5% (-0.2% - 1.2%)
	Multi-Pollutant Models (Total Mortality)						
	Chock et al. (2000)	Non-accidental	<75	0 day	NO2	54 (9 - 99)	1.1% (0.2% - 1.9%)
	Chock et al. (2000)	Non-accidental	75+	0 day	CO	88 (3 - 171)	0.9% (0.0% - 1.8%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit I.19. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
San Jose, CA, 1999

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Dominici et al. (2003) [reanalysis of Samet et al. (2000)]	Non-accidental	all	1 day		30 (1 - 59)	0.4% (0.0% - 0.7%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	0 day		204 (76 - 329)	2.5% (0.9% - 4.0%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Non-accidental	all	1 day		-31 (-160 - 94)	-0.4% (-1.9% - 1.1%)
	Dominici et al. (2003) [reanalysis of Samet et al. (2000)] -- regional	Non-accidental	all	1 day		25 (-6 - 55)	0.3% (-0.1% - 0.7%)
	Single Pollutant Models (Cause-Specific Mortality)						
	Fairley (2003) [reanalysis of Fairley (1999)]	Respiratory	all	0 day		28 (-11 - 65)	3.3% (-1.3% - 7.5%)
	Fairley (2003) [reanalysis of Fairley (1999)]	Cardiovascular	all	0 day		92 (7 - 173)	2.7% (0.2% - 5.0%)
	Multi-Pollutant Models (Total Mortality)						
	Dominici et al.(2003) [reanalysis of Samet et al.(2000)] -- national	Non-accidental	all	1 day	O3	37 (17 - 60)	0.5% (0.2% - 0.7%)
	Dominici et al.(2003) [reanalysis of Samet et al.(2000)] -- national	Non-accidental	all	1 day	O3, NO2	29 (-1 - 60)	0.4% (0.0% - 0.7%)
	Dominici et al.(2003) [reanalysis of Samet et al.(2000)] -- national	Non-accidental	all	1 day	O3, SO2	29 (3 - 58)	0.4% (0.0% - 0.7%)
	Dominici et al.(2003) [reanalysis of Samet et al.(2000)] -- national	Non-accidental	all	1 day	O3, CO	33 (7 - 59)	0.4% (0.1% - 0.7%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.

Exhibit I.20. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
Seattle, WA, 2002

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Hospital Admissions	**Single Pollutant Models**						
	Sheppard (2003) [reanalysis of Sheppard et al. (1999)]***	Asthma	<65	1 day		39 (10 - 66)	2.4% (0.6% - 4.1%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number; percents are rounded to the nearest tenth.

***Sheppard (2003) [reanalysis of Sheppard et al. (1999)] used daily PM2.5 values obtained from nephelometer measurements rather than from air quality monitors.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Exhibit I.21. Estimated Annual Health Risks Associated with "As Is" PM_{10} Concentrations
St. Louis, MO, 2002

Health Effects*	Study	Type	Ages	Lag	Other Pollutants in Model	Health Effects Associated with PM10 Above Lowest Measured Level in Study or Policy Relevant Background**	
						Incidence	Percent of Total Incidence
Short-Term Exposure Mortality	**Single Pollutant Models (Total Mortality)**						
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)]	Non-accidental	all	0 day		130 (0 - 259)	0.6% (0.0% - 1.2%)
	Klemm and Mason (2003) [reanalysis of Klemm et al. (2000)] -- 6 cities	Non-accidental	all	0 day		227 (130 - 322)	1.0% (0.6% - 1.5%)
	Dominici et al. (2003) [reanalysis of Samet et al. (2000)] -- regional	Non-accidental	all	1 day		63 (13 - 112)	0.3% (0.1% - 0.5%)
Respiratory Symptoms* **	**Single Pollutant Models**						
	Schwartz et al. (1994) -- 6 cities	Lower respiratory symptoms	7 - 14	1 day		4000 (1900 - 5700)	7.1% (3.3% - 10.2%)

*Health effects are associated with short-term exposure to PM10 unless otherwise specified.

** Health effects incidence was quantified across the range of PM concentrations observed in each study, when possible, but not below policy relevant background level. Policy relevant background PM10 is taken to be 8 ug/m3 in the East and 6 ug/m3 in the West. Incidences are rounded to the nearest whole number, except respiratory symptoms incidences which are rounded to the nearest 100; percents are rounded to the nearest tenth.

***The C-R functions for lower respiratory symptoms and cough were calculated for the summer period April 1 through August 31.

Note 1: Numbers in parentheses are 95% confidence intervals based on statistical uncertainty surrounding the PM10 coefficient.

Note 2: Multi-city short-term exposure C-R functions were applied only to urban areas included among the cities used to estimate the function.