CALPUFF ANALYSIS IN SUPPORT OF THE JUNE 2005 CHANGES TO THE REGIONAL HAZE RULE

June 15, 2005

The following is in support of the June 2005 revisions to the Regional Haze Rule (RHR) and the Guidelines for Best Available Retrofit Technology (BART) Determinations under the regional haze rule. The report documents a portion of the work involving the exercise of the CALPUFF dispersion model for assessing visibility impairment associated with proto-typical BART eligible coal-fired EGUs and industrial boilers.

Background

To reduce haze, and to meet the requirements of the Clean Air Act, EPA in April 1999 issued a regional haze rule aimed at protecting visibility in 156 federal areas. The rule seeks to reduce the visibility impairment caused by many sources over a wide area. EPA's previous visibility regulation, issued in 1980, addressed only local visibility impairment from local sources. Soon after the regional haze rule was finalized, several parties filed petitions challenging the rule with the U.S. Court of Appeals for the D.C. Circuit. Because regional haze is a problem caused by multiple sources over a wide area, EPA's rule required that states (in determining BART requirements) assess visibility impairment on a cumulative basis using a regional air quality model; i.e., as opposed to assessing visibility impairment on a source-by-source basis. In May 2002, the court ruled that EPA's approach to BART was not acceptable; specifically, the court maintained that the approach infringed on States' discretion by not providing an option for States to make BART determinations on an individual, source-by-source basis. Consequently, the court vacated portions of the regional haze rule related to BART and remanded to EPA for appropriate actions. Further discussion of the procedural history of this rule can be found in the preamble accompanying the final rule.

Use of CALPUFF for Regional Haze

One of the first challenges encountered in responding to the court's remand involved the identification of appropriate analytical tools; currently, CALPUFF is the only available dispersion model with capability for estimating secondarily formed particulates (a critical ingredient in the regional haze problem). The challenge we encountered is that CALPUFF has not been fully tested for secondary formation and thus is not fully approved for applications in PSD permitting and NAAQS attainment demonstrations (i.e., it is approved for primary particulates, but not for secondarily-formed particulates). One justification for using CALPUFF for BART is that, unlike PSD and NAAQS, the BART modeling results do not, by themselves, determine the regulatory consequences. Additionally, we believe that CALPUFF is based on sufficiently sound technical grounds to support assessments of relative impacts among BART-eligible sources for the purposes of guiding more refined analyses and to help inform regulatory decisions that are based on a cumulative weight of evidence, such as the statutorily-defined factors for consideration in assessing BART for regional haze. Further description of CALPUFF is provided below.

The BART Process

The BART process consists of the following:

1. Identify, in accordance with CAA Section 169A(b)(2), whether a source is "BART-eligible" based on its source category, when it was put in service, and its emissions of one or more "visibility-impairing" air pollutants including, gaseous precursors to visibility-impairing particulate matter.

2. Determine whether a BART-eligible source is "subject to BART" (for any visibility-impairing pollutant), based on an estimate of the source's impact on visibility.

3. Determine BART for the source by evaluating control options and selecting the "best" alternative, taking into consideration:

   - The costs of compliance,
   - The energy and non air-quality environmental impacts of compliance,
   - Any existing pollution control technology in use at the source,
   - The remaining useful life of the source, and
   - The degree of improvement in visibility that may reasonably be anticipated to result from the use of BART.

Our support to the BART process is focused on step 2, determining whether a BART-eligible source is subject to BART based on an estimate of its impact on visibility. Our approach to this task involved : (1) selection of sources to analyze, (2) creation of modeling domains to provide separate analyses for eastern and western locations, and (3) use of a range of emission rates to bracket analyses of most interest/use to decision making for the BART rule. In the process of selecting sources for analyses we constructed proto-typical sources to represent two important categories in the universe of BART-eligible sources: coal-fired boilers used to power electrical generating units (EGUs) and coal-fired industrial boilers. This process resulted in a total of 23 scenarios for analysis. Source characteristics and emission rates for the 23 scenarios are given in Table 1. The source characteristics are median values based on representative samples of BART eligible units. The emission rates were selected to address various questions related to the implementation of the BART requirement. It should be noted that although the emission rates are given in tons per year, this does not impart or imply any special meaning to the values; e.g., there is no presumption that the values represent actual or allowable emissions.

Table 1 Emission rates and source parameters used in CALPUFF modeling for BART Eligible coal-fired boilers

Run #	Source ID	Hgt (m)	Elev (m)	Diam (m)	Vel (m/s)	Temp (K)	Emission rates (tpy) SO2	NOx	PM25	Domain
1	EGU_E#1	100	200	8.0	27.0	400	10000	3500	50	Eastern
2	EGU_W#2	100	200	8.0	27.0	400	10000	6250	50	Western
3	EGU_E#3	100	200	8.0	27.0	400	5000	3500	50	Eastern
4	EGU_W#4	100	200	8.0	27.0	400	5000	6250	50	Western
5	EGU_E#5	100	200	8.0	27.0	400	1000	3500	50	Eastern
6	EGU_W#6	100	200	8.0	27.0	400	1000	6250	50	Western
7	EGU_E#7	100	200	8.0	27.0	400	1000	350	50	Eastern
8	EGU_W#8	100	200	8.0	27.0	400	1000	625	50	Western
9	EGU_E#9	100	200	8.0	27.0	400	30000	10000	50	Eastern
10	EGU_E#10	100	200	8.0	27.0	400	3000	10000	50	Eastern
11	EGU_E#11	100	200	8.0	27.0	400	3000	1000	50	Eastern
12	IB_E#12	55	200	2.6	11.4	414	7000	1400	20	Eastern
13	IB_W#13	55	200	2.6	11.4	414	7000	1400	20	Western
14	IB_E#14	55	200	2.6	11.4	414	900	1400	20	Eastern
15	IB_W#15	55	200	2.6	11.4	414	900	1400	20	Western
16	IB_E#16	55	200	2.6	11.4	414	900	300	20	Eastern
17	IB_W#17	55	200	2.6	11.4	414	900	300	20	Western
18	IB_E#18	55	200	2.6	11.4	414	0	1000	20	Eastern
19	IB_E#19	55	200	2.6	11.4	414	0	500	20	Eastern
20	IB_W#20	55	200	2.6	11.4	414	0	1000	20	Western
21	IB_W#21	55	200	2.6	11.4	414	0	500	20	Western
22	IB_E#22	55	200	3.1	11.4	478	7000	1400	20	Eastern
23	IB_W#23	55	200	3.1	11.4	478	7000	1400	20	Western

Key to Source ID

EGU	Electrical Generating Unit
IB	Industrial Boiler
_E	indicates the Eastern domain
_W	indicates the Western domain
#nn	indicates the run number

CALPUFF

CALPUFF is an advanced meteorological and air quality modeling system recommended by the U.S. EPA as the preferred tool for evaluating impacts associated with the long range transport of primary pollutants. It was promulgated for regulatory use in specific circumstances in the Guideline on Air Quality Models, Appendix W to 40 CFR Part 51[1]. CALPUFF is also recommended by the Inter Agency Workgroup on Air Quality Modeling (IWAQM) for use in evaluating impacts on visibility in the 156 Federal Class I areas[2]. The modeling system consists of three main components: CALMET (a diagnostic 3-dimensional meteorological model), CALPUFF (an air quality dispersion model), and CALPOST (a postprocessing package).

With few exceptions we have used the default CALPUFF settings as recommended in the IWAQM Phase 2 report. Our setups (selections of model options and switch settings) for the three CALPUFF modules (CALMET, CALPUFF, and CALPOST) are documented in the example command file input images provided in appendix A. Complete documentation on our use of CALPUFF for BART is included on a DVD which is being provided to the docket for the June 2005 changes to the regional haze rule. In the following we highlight portions of this material.

As mentioned previously, we created two modeling domains (east and west) for use in evaluating the potential effects of our proto-typical BART eligible sources The two domains are identical in terms of the overall size (dimensions) and grid spacing. Each domain is a 600 x 600 km square sectioned into 75 x 75 horizontal grid cells and 10 vertical layers; the horizontal grid spacing is 8 km., vertical levels are located at 20,50,75, 100, 250, 500, 750, 1000, 2000, and 3000 m.

The location of the domain determines which meteorological stations will be used in CALMET to build the three-dimensional wind fields used in CALPUFF. The Eastern domain is centered over West Virginia and uses meteorological data for 5 upper-air stations and 22 surface stations (see Table A-2). The Western domain is centered over Denver and uses meteorological data for 3 upper-air stations and 12 surface stations (see Table A-1). Meteorological data for the five year period 1986-1990 were used for both domains.

The CALPUFF modeling domain is a subset of the CALMET domain. For both domains we employ a 5 grid cell (40 km) buffer to guard against edge effects at the boundaries; this results in a 520 km x 520 km CALPUFF domain. The proto-typical source to be evaluated is placed at the center of the domain. Receptors for use in modeling were placed in concentric rings located

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[1] Revision to the Guideline on Air Quality Models: Adoption of a Preferred Long Range Transport Model and Other Revisions; Final Rule, FR, Vol. 68, No. 72, April 15, 2003.

[2] Interagency Workgroup on Air Quality Modeling (IWAQM) Phase 2 Summary Report and Recommendations for Modeling Long Range Transport Impacts. EPA-454/R-98-019, 1998.

every 25 km to a maximum range of 250 km; receptors were located every 10 degrees along each ring. Other than the meteorology there are no other domain-specific factors in our CALPUFF modeling. Both domains were modeled in a flat-terrain mode using a common source/receptor base elevation of 200 m. In addition, there is no presumption regarding the location of Class I areas in our CALPUFF analyses. The unstated presumption, in the use of our results for BART, is that all receptors are located in Class I areas.

Background Ozone - The IWAQM recommended default for ozone is 80 ppb. The results presented here are based on CALPUFF estimates using a background concentration of 50 ppb. The lower value better characterizes the more recent data for the National Park Service monitoring sites.

Background Ammonia - The IWAQM recommended default for forested locations, 0.5 ppb, was used for the eastern domain. The IWAQM recommended value for arid locations, 1.0 ppb, was used for the western domain.

Metric for Tracking Progress Under the RHR

According to the Regional Haze Rule, baseline visibility conditions, progress goals, and changes in natural visibility conditions must be expressed in terms of deciview (dv) units. The deciview is a unit of measurement of haze, implemented in a haze index (HI) that is derived from calculated light extinction, and that is designed so that uniform changes in haziness correspond approximately to uniform incremental changes in perception, across the entire range of conditions, from pristine to highly impaired. The HI is expressed by the following formula:

$$HI = 10\ln(b_{ext}/10)$$

Here, a reference extinction coefficient of 10 (Mm^{-1}) in the denominator of the log corresponds to a 'pristine' environment and a haze index (deciview) of zero. Because visibility impairment is a relative quantity, the estimated (i.e., modeled) extinction for a particular source is not sufficient by itself to quantify the perceived effects on visibility of that source. This is because a given source impact (extinction) that may go unnoticed when viewed against a hazy background may be acutely apparent when viewed against a pristine background. A fractional measure, made up of the modeled extinction coefficient (b_{ext-m}) and a background extinction coefficient (b_{ext-0}), is needed to assess changes in visibility. Two such measures are computed and reported in CALPOST, the fractional (percent) change in extinction and the change in the haze index (delta-deciview):

$$\Delta dv = 10\ln\left(1 + b_{ext\_m}/b_{ext\_0}\right)$$

EPA tracks progress under the regional haze program using a metric for natural visibility conditions (i.e., the goal of the regional haze program). This term is significant in and of itself to the extent that it has its own guidance document[3]. The following is from EPA's guidance for estimating natural visibility conditions under the regional haze rule.

"The term natural visibility conditions represents the ultimate goal of the regional haze program, consistent with the national visibility goal set forth in section 169A of the Clean Air Act (CAA). The national visibility goal is to remedy existing and prevent future human-caused impairment of visibility in mandatory Federal Class I areas. Regional haze strategies are to make reasonable progress towards this goal....estimates of natural visibility conditions should reflect contemporary conditions and land use patterns. That is, estimates should attempt to calculate the degree of visibility impairment that exists today, given current vegetative landscapes, when human emissions contributions are removed.....The 1991 peer-reviewed report of the National Acid Precipitation Assessment Program (NAPAP)[4] provides annual average estimates of natural concentrations for these six main components of PM for the eastern and western regions of the country. By applying assumptions for average extinction efficiencies for each PM component and for the effect of humidity, the NAPAP report also included estimates of natural visibility conditions on an annual average basis. With minor adjustments, these estimates provide the starting point for calculating natural visibility conditions in the mandatory Federal Class I areas

The approach to estimating natural conditions presented in the NAPAP report defines two separate regions of the United States: (1) the East, which consists of all the States east of the Mississippi River, and up to one tier of States west of the Mississippi; and (2) the West ,including the desert/mountain regions of the Mountain and Pacific time zones. Geographically, these two subregions show strong differences in haze sources, vegetation, relative humidity, and regional haze levels. ....Table 2-1 presents the default estimated natural concentrations of the particulate species for the East and the West along with estimates of the dry extinction efficiencies for each species. These concentration estimates are used with the respective estimates of the dry extinction efficiencies to establish the light extinction attributed to natural sources in the East and West."

Natural Visibility Conditions Used with CALPUFF Domains

With the information provided in EPA's guidance for estimating natural visibility, and f(rh) values specific for the East and West (also provided in the natural visibility guidance document) we have the necessary information for calculating annual average natural visibility conditions for the eastern and western CALPUFF modeling domains. The annual average natural extinction

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[3] Guidance for Estimating Natural Visibility Conditions Under the Regional Haze Rule, EPA-454/B-03-005, September 2003.

[4] National Acid Precipitation Assessment Program, 1991. Acid Deposition: State of the Science and Technology Report 24. Visibility: Existing and Historical Conditions - Causes and Effects.

values for the eastern and western domains are 21.2 and 15.7 (1/Mm), respectively; these values correspond to haze index values of 7 .5 and 4.5 deciviews, respectively.

Results

Visibility results for the 23 scenarios are given in Appendix B. For each scenario there is a table giving the number of days (in the indicated year) that a given delta-dv threshold (0.1, 0.5, and 1.0) was exceeded at three distances (50, 100, and 200 km). A second table gives the ten highest delta-dv values for each year (1986-1990) for the same three distances (50, 100, and 200 km). In the top ten tables, a 99th percentile is approximately equivalent to a value midway between the values for ranks 3 and 4. Similarly, a 98th percentile is approximately equivalent to the value associated with a rank of 7.

Caution to Readers

Readers of this document are cautioned that it is not intended to provide guidance or recommendations on how to run CALPUFF for BART. By their very nature, illustrative modeling analyses using proto-typical sources (as described herein) necessitate the use of assumptions that may not be appropriate in a given regulatory application. For example, a State will be modeling a real source and will know the direction and distance to the nearest Class I area; one would not expect a State to treat the entire modeling domain as a Class I area as was done in the illustrative analyses described here. Although our procedures included the use of default model options and switch settings, one should not view this as either precluding other procedures or providing guarantees that using these procedures will result in actions that are fully approvable.

Appendix A

Information used in setting up CALPUFF runs for BART including example input files for CALMET, CALPUFF, and CALPOST

Table A-1
CALMET settings specific to the Western domain

Grid origin coordinates: (SW corner of cell 1,1)

XMAP0 = -300.000000 (km)
YMAP0 = -300.000000 (km)
N.Lat0 = 37.2454529 (deg)
E.Lon0 = -108.380447 (deg)
W.Lon0 = 108.380447 (deg)

Denver Upper-Air Stations

Name	ID	X (km)	Y (km)	Latitude (Deg)	Longitude (Deg)	Time Zone	Grid Coordinates* X (km)	Grid Coordinates* Y (km)
U1	23062	11.4	-25.8	39.767	104.867	7.0	38.924	34.269
U2	23066	-305.3	-91.9	39.117	108.533	7.0	-0.662	26.010
U3	24021	-305.4	319.2	42.817	108.733	7.0	-0.671	77.397

Denver Surface Stations

Name	ID	X (km)	Y (km)	Latitude (Deg)	Longitude (Deg)	Time Zone	Grid Coordinates* X (km)	Grid Coordinates* Y (km)
S1	23061	-76.7	-282.6	37.450	105.867	7.0	27.912	2.174
S2	23063	-164.4	-37.1	39.650	106.917	7.0	16.952	32.867
S3	23066	-305.3	-92.0	39.117	108.533	7.0	-0.666	26.005
S4	93037	24.6	-131.3	38.817	104.717	7.0	40.575	21.093
S5	93058	42.3	-190.4	38.283	104.517	7.0	42.785	13.704
S6	94018	-21.3	1.9	40.017	105.250	7.0	34.834	37.735
S7	23065	284.1	-65.0	39.367	101.700	7.0	73.019	29.374
S8	24028	116.2	208.1	41.867	103.600	7.0	52.027	63.514
S9	24018	15.4	127.6	41.150	104.817	7.0	39.423	53.455
S10	24021	-305.4	319.1	42.817	108.733	7.0	-0.675	77.392
S11	24027	-338.8	185.3	41.600	109.067	7.0	-4.852	60.665
S12	24089	-119.8	324.8	42.917	106.467	7.0	22.522	78.105

* Origin = (0,0)

Table A-2
CALMET settings specific to the Eastern domain

Grid origin coordinates: (SW corner of cell 1,1)
XMAP0 = -300.000000 (km)
YMAP0 = -300.000000 (km)
N.Lat0 = 36.2467041 (deg)
E.Lon0 = -84.3368683 (deg)
W.Lon0 = 84.3368683 (deg)

West Virginia Upper-Air Stations

Name	ID	X (km)	Y (km)	Latitude (Deg)	Longitude (Deg)	Time Zone	Grid Coordinates* X (km)	Y (km)
U1	13723	94.6	-323.1	36.083	79.950	5.0	49.329	-2.891
U2	13840	-260.9	95.0	39.817	84.050	5.0	4.882	49.378
U3	94823	66.4	166.7	40.500	80.217	5.0	45.794	58.342
U4	93734	305.8	4.1	38.983	77.467	5.0	75.730	38.006
U5	3860	-135.4	-69.1	38.367	82.550	5.0	20.579	28.866

West Virginia Surface Stations

Name	ID	X (km)	Y (km)	Latitude (Deg)	Longitude (Deg)	Time Zone	Grid Coordinates* X (km)	Y (km)
S1	14827	-353.2	230.1	41.000	85.200	5.0	-6.652	66.265
S2	93814	-317.0	13.8	39.067	84.667	5.0	-2.129	39.223
S3	93820	-315.8	-101.0	38.033	84.600	5.0	-1.975	24.876
S4	13722	200.3	-345.3	35.867	78.783	5.0	62.543	-5.657
S5	13723	94.6	-323.1	36.083	79.950	5.0	49.329	-2.887
S6	14820	-71.1	266.7	41.400	81.850	5.0	28.613	70.840
S7	14821	-160.7	112.6	40.000	82.883	5.0	17.409	51.577
S8	14852	27.9	251.6	41.267	80.667	5.0	40.992	68.954
S9	14895	-36.5	212.8	40.917	81.433	5.0	32.938	64.100
S10	93815	-274.9	104.7	39.900	84.217	5.0	3.141	50.590
S11	94830	-233.5	292.2	41.600	83.800	5.0	8.316	74.025
S12	4751	196.8	313.4	41.800	78.633	5.0	62.100	76.674
S13	14751	353.0	143.1	40.217	76.850	5.0	81.623	55.381
S14	14778	330.9	258.8	41.267	77.050	5.0	78.866	69.845
S15	94823	66.4	166.7	40.500	80.217	5.0	45.798	58.342
S16	13877	-125.5	-278.3	36.483	82.400	5.0	21.815	2.717
S17	13891	-269.8	-348.8	35.817	83.983	5.0	3.776	-6.103
S18	13740	324.0	-159.9	37.500	77.333	5.0	78.005	17.515
S19	13741	91.6	-186.2	37.317	79.967	5.0	48.947	14.221
S20	93738	307.5	0.4	38.950	77.450	5.0	75.932	37.556
S21	3860	-135.4	-69.1	38.367	82.550	5.0	20.579	28.866
S22	13866	-52.4	-70.1	38.367	81.600	5.0	30.950	28.739

* Origin = (0,0)

Table A-3 Example CALMET setup for Jan-Feb 1990 for the Eastern Domain

```
                                        CALMET   Version: 5.53       Level: 030709

***************************************************************************************************************************

  Clock time: 17:42:40
        Date: 10-15-2004

  Run Title:
     BART analysis for Eastern domain using 1986-90 meteorology
     Domain is centered over West Virginia
     ******

                    CALMET MODEL CONTROL FILE
                    --------------------------

INPUT GROUP: 0 -- Input and Output File Names


Subgroup (a)
------------
Default Name  Type          File Name
------------  ----          ---------
GEO.DAT       input    ! GEODAT = T:\CALVIEW\WVA\GEO\GEO.DAT     !
SURF.DAT      input    ! SRFDAT = T:\CALVIEW\WVA\MET\SURF.DAT    !
PRECIP.DAT    input    ! PRCDAT = T:\CALVIEW\WVA\MET\PRECIP.DAT  !

CALMET.LST    output   ! METLST = T:\WVA\CALMET\1990\JAN-FEB.LST !
CALMET.DAT    output   ! METDAT = T:\WVA\CALMET\1990\JAN-FEB.MET !


Number of upper air stations         ! NUSTA  = 5 !
Number of overwater met station      ! NOWSTA = 0 !

!END!

Upper air files (one per station)
---------------------------------
Default Name  Type       File Name
------------  ----       ---------
UP1.DAT     input   1  ! UPDAT = T:\CALVIEW\WVA\MET\UP_13723.DAT  !  !END!
UP2.DAT     input   2  ! UPDAT = T:\CALVIEW\WVA\MET\UP_13840.DAT  !  !END!
UP3.DAT     input   3  ! UPDAT = T:\CALVIEW\WVA\MET\UP_94823.DAT  !  !END!
UP4.DAT     input   4  ! UPDAT = T:\CALVIEW\WVA\MET\UP_93734.DAT  !  !END!
UP5.DAT     input   5  ! UPDAT = T:\CALVIEW\WVA\MET\UP_3860.DAT   !  !END!


!END!


 INPUT GROUP: 1 -- General run control parameters
 --------------

      Starting date:   Year (IBYR) -- No default       ! IBYR = 1990 !
                      Month (IBMO) -- No default       ! IBMO = 1 !
                        Day (IBDY) -- No default       ! IBDY = 1 !
                       Hour (IBHR) -- No default       ! IBHR = 1 !

      Base time zone        (IBTZ) -- No default       ! IBTZ = 5 !
         PST = 08, MST = 07
         CST = 06, EST = 05

      Length of run (hours) (IRLG) -- No default       ! IRLG = 1416 !
```

Table A-3 (continued)

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INPUT GROUP: 2 -- Map Projection and Grid control parameters
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     Projection for all (X,Y):
     -------------------------

     Map projection

     ! PMAP = LCC !   Lambert Conformal Conic


     False Easting and Northing (km) at the projection origin

     (FEAST)                    Default=0.0     ! FEAST = 0 !
     (FNORTH)                   Default=0.0     ! FNORTH = 0 !


     Latitude and Longitude (decimal degrees) of projection origin

     (RLAT0)                    No Default      ! RLAT0 = 39.00N !
     (RLON0)                    No Default      ! RLON0 = 81.00W !


     Matching parallel(s) of latitude (decimal degrees) for projection

     (XLAT1)                    No Default      ! XLAT1 = 36.90N !
     (XLAT2)                    No Default      ! XLAT2 = 41.10N !



     Datum-region
     ------------

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-G     ! DATUM = WGS-G !


     Horizontal grid definition:
     ---------------------------

     Rectangular grid defined for projection PMAP,
     with X the Easting and Y the Northing coordinate

            No. X grid cells (NX)      No default     ! NX = 75 !
            No. Y grid cells (NY)      No default     ! NY = 75 !

     Grid spacing (km)                 No default     ! DGRIDKM = 8 !


     Reference grid coordinate of
     SOUTHWEST corner of grid cell (1,1)

        X coordinate (km)         No default     ! XORIGKM = -300 !
        Y coordinate (km)         No default     ! YORIGKM = -300 !


     Vertical grid definition:
     -------------------------

        No. of vertical layers (NZ)    No default     ! NZ = 10 !

        Cell face heights (m)

        ! ZFACE = 0.00,20.00,50.00,75.00,100.00,250.00,500.00,750.00,1000.00,2000.00,3000.00 !

!END!
```

Table A-3 (continued)

```
INPUT GROUP: 3 -- Output Options
--------------

!END!


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INPUT GROUP: 4 -- Meteorological data options
--------------

    OBSERVATION MODE                  ! NOOBS = 0 !

          0 = Use surface, overwater, and upper air stations
          1 = Use surface and overwater stations (no upper air observations)
              Use MM5 for upper air data
          2 = No surface, overwater, or upper air observations
              Use MM5 for surface, overwater, and upper air data

    NUMBER OF SURFACE & PRECIP. METEOROLOGICAL STATIONS

       Number of surface stations            ! NSSTA = 22 !
       Number of precipitation stations      ! NPSTA =  0 !

    CLOUD DATA OPTIONS
       Gridded cloud fields:                 ! ICLOUD = 0 !

       ICLOUD = 0 - Gridded clouds not used (Default)
       ICLOUD = 1 - Gridded CLOUD.DAT generated as OUTPUT
       ICLOUD = 2 - Gridded CLOUD.DAT read as INPUT
       ICLOUD = 3 - Gridded cloud cover from Prognostic Rel. Humidity


!END!


-------------------------------------------------------------------------------

INPUT GROUP: 5 -- Wind Field Options and Parameters
--------------


    RADIUS OF INFLUENCE PARAMETERS

       Maximum radius of influence over land in surface layer (km)      ! RMAX1 = 10 !
       Maximum radius of influence over land above surface layer (km)   ! RMAX2 = 20 !
       Maximum radius of influence over water (km)                      ! RMAX3 = 50 !


    OTHER WIND FIELD INPUT PARAMETERS

       Minimum radius of influence used in
       the wind field interpolation (RMIN)   Default: 0.1    ! RMIN = 0.1 !
                                             Units: km
       Radius of influence of terrain
       features (TERRAD)                     No default      ! TERRAD = 100 !
                                             Units: km
       Relative weighting of the first
       guess field and observations in the
       SURFACE layer (R1)                    No default      ! R1 = 5 !
       (R1 is the distance from an           Units: km
       observational station at which the
       observation and first guess field are
       equally weighted)
```

Table A-3 (continued)

```
       Relative weighting of the first
       guess field and observations in the
       layers ALOFT (R2)                     No default      ! R2 = 5 !
       (R2 is applied in the upper layers    Units: km
       in the same manner as R1 is used in
       the surface layer).

       Relative weighting parameter of the
       prognostic wind field data (RPROG)    No default      ! RPROG = 0 !
       (Used only if IPROG = 1)              Units: km
       ------------------------


          Surface met. station to use for
          the surface temperature (ISURFT)   No default     ! ISURFT = 15 !
          (Must be a value from 1 to NSSTA)
          (Used only if IDIOPT1 = 0)
          --------------------------


          Upper air station to use for
          the domain-scale lapse rate (IUPT) No default     ! IUPT = 3 !
          (Must be a value from 1 to NUSTA)
          (Used only if IDIOPT2 = 0)
          --------------------------

!END!


--------------------------------------------------------------------------------

INPUT GROUP: 6 -- Mixing Height, Temperature and Precipitation Parameters
--------------

!END!
```

Table A-4
Example CALPUFF input file for scenario # 2 for 1990

```
 Domain:          Western
 Time Zone:       7
 Year:            1990
 SOURCE:          EGU_W#2

 INPUT GROUP: 0


 ! PUFLST =C:\DENVER\CALPUFF\1990\EGU_w#2.LOG  !
 ! CONDAT =C:\DENVER\CALPUFF\1990\EGU_W#2.CON  !
 ! VISDAT =C:\DENVER\CALPUFF\1990\EGU_W#2.VIS  !


 ! NMETDAT =  6   !                            !END!

 ! METDAT = T:\DENVER\CALMET\1990\JAN-FEB.DAT  !   !END!
 ! METDAT = T:\DENVER\CALMET\1990\MAR-APR.DAT  !   !END!
 ! METDAT = T:\DENVER\CALMET\1990\MAY-JUN.DAT  !   !END!
 ! METDAT = T:\DENVER\CALMET\1990\JUL-AUG.DAT  !   !END!
 ! METDAT = T:\DENVER\CALMET\1990\SEP-OCT.DAT  !   !END!
 ! METDAT = T:\DENVER\CALMET\1990\NOV-DEC.DAT  !   !END!


 INPUT GROUP: 1 -- General run control parameters

 ! XBTZ =  7  !

 ! METRUN =   0    !  Run time period as follows:
 ! IBYR =  1990  !
 ! IBMO =     1    !
 ! IBDY =     1    !
 ! IBHR =     1    !
 ! IRLG =  8736    !


 ! NSPEC =    6  !
 ! NSE =      3  !
 ! ITEST =    2  !

 Meteorological Data Format (METFM)
 ! METFM =  1   !

 !END!
FILE:  PUFF_MID_DENVER.INP

INPUT GROUP: 2 -- Technical options
--------------

      ! MSPLIT =  0  !       Disable puff splitting
      ! MWET   =  1  !       Enable wet removal
      ! MDRY   =  1  !       Enable dry deposition

!END!

--------------------------------------------------------------------------------
INPUT GROUP: 3a, 3b -- Species list
-------------------

  The following species are modeled:

      ! CSPEC =          SO2 !         !END!
      ! CSPEC =          SO4 !         !END!
      ! CSPEC =          NOX !         !END!
      ! CSPEC =         HNO3 !         !END!
```

Table A-4 (continued)

```
        Species   Modeled ?  Emitted ?  Deposited ?   Group #

      !    SO2  =      1,          1,        1,          0   !
      !    SO4  =      1,          0,        2,          0   !
      !    NOX  =      1,          1,        1,          0   !
      !   HNO3  =      1,          0,        1,          0   !
      !    NO3  =      1,          0,        2,          0   !
      !   PM25  =      1,          1,        2,          0   !

!END!


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

      ! PMAP   =  LCC     !

      Latitude and Longitude (decimal degrees) of projection origin
      ! RLAT0  =     40N  !
      ! RLON0  =    105W  !

      Matching parallel(s) of latitude (decimal degrees) for projection
      ! XLAT1  =  37.9N  !
      ! XLAT2  =  42.1N  !


METEOROLOGICAL Grid:

      ! NX =  75   !         Number of X grid cells
      ! NY =  75   !         Number of. Y grid cells
      ! NZ =  10   !         Number of vertical layers

      ! DGRIDKM =   8 !      Grid spacing (km)

      ! ZFACE = 0., 20, 50, 75, 100, 250, 500, 750, 1000, 2000, 3000   !  Cell face heights (m)


      Reference Coordinates of grid cell(1, 1):

      ! XORIGKM =   -300.  !
      ! YORIGKM =   -300.  !



COMPUTATIONAL Grid:

      ! IBCOMP =   5   !
      ! JBCOMP =   5   !

      ! IECOMP =  71   !
      ! JECOMP =  71   !


SAMPLING Grid (GRIDDED RECEPTORS):

      ! LSAMP  =   F  !      Disable gridded receptors

!END!


INPUT GROUP: 5 -- Output Options
--------------

      !  ICON =  1   !          Concentrations
      !  IDRY =  0   !          Dry Fluxes
      !  IWET =  0   !          Wet Fluxes
```

Table A-4 (continued)

```
     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS
FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   SAVED ON
DISK?
   -------       ------------------------   ------------------------   ------------------------
---------------
!          SO2 =     0,           1,           0,           0,           0,           0,           0   !
!          SO4 =     0,           1,           0,           0,           0,           0,           0   !
!          NOX =     0,           1,           0,           0,           0,           0,           0   !
!         HNO3 =     0,           1,           0,           0,           0,           0,           0   !
!          NO3 =     0,           1,           0,           0,           0,           0,           0   !
!         PM25 =     0,           1,           0,           0,           0,           0,           0   !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

      !  MHILL = 1  !        Hill and receptor data created by CTDM processors

      !  XCTDMKM  = 0.0 !
      !  YCTDMKM  = 0.0 !

! END !


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE     HENRY'S LAW
COEFFICIENT
       NAME        (cm**2/s)                                           (s/cm)
(dimensionless)
      -------     -----------      ----------      ----------    --------------------
-----------------------

!          SO2 =     0.1509,         1000.,            8.,               0.,                0.04 !
!          NOX =     0.1656,            1.,            8.,               5.,                 3.5 !
!         HNO3 =     0.1628,            1.,           18.,               0.,          0.00000008 !

!END!


-------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                  DEVIATION
                        (microns)                 (microns)
      -------      -------------------        ------------------
!          SO4 =          0.48,                      2.   !
!          NO3 =          0.48,                      2.   !
!         PM25 =          0.48,                      2.   !

!END!
```

Table A-4 (continued)

```
INPUT GROUP: 10 -- Wet Deposition Parameters
---------------
                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !

!END!

-------------------------------------------------------------------------------
INPUT GROUP: 11 -- Chemistry Parameters
---------------
      !  MOZ  = 0            !  Use monthly background values provided for ozone
      !  BCKO3   = 12*50     !  Monthly average ozone   (ppb)

      !  BCKNH3  = 12* 1.00  !  Monthly average ammonia (ppb)
      !  BCKH2O2 = 12* 1.00  !  Monthly average H2O2    (ppb)

      ! RNITE1 = 0.2         !  Nightime SO2 loss rate (%/hr)
      ! RNITE2 = 2.0         !  Nightime NOX loss rate (%/hr)
      ! RNITE3 = 2.0         !  Nightime HNO3 loss rate (%/hr)

      ! MH2O2  = 0.0         !  H2O2 data input option



!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

      Location and surface parameters for single-point Met data files

      ! ELEVIN =  200.0 !    Elevation (msl)
      ! XLATIN =  39.00 !    Latitude (deg)
      ! XLONIN =  81.00 !    Longitude (deg)

!END!

-------------------------------------------------------------------------------
INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

      !  NPT1 =  1  !       Number of point sources
      !  IPTU =  4  !       Emission units (4 =  tons/yr)
      !  NPT2 =  0  !       Number of pt sources with variable emissions

!END!

-------------------------------------------------------------------------------
 Input Group 13 (Point source data)

 ! SRCNAM = EGU_W#2 !                                    emission rates (tpy)
        X    Y   hgt   elev  diam  vel   temp  dw    SO2         NOx              PMF
 ! X = 0.0, 0.0, 100,  200,  8.0,  27.0, 400,   0,  10000, 0.0, 6250.0, 0.0, 0.0, 50.0  !

 ! FMFAC  = 1.0 !
```

Table A-5
Example CALPUFF input file for scenario # 1 for 1990

```
 Domain:          Eastern
 Time Zone:       5
 Year:            1990
 SOURCE:          EGU_E#1

 INPUT GROUP: 0


 ! PUFLST =C:\WVA\CALPUFF\1990\EGU_E#1.LOG  !
 ! CONDAT =C:\WVA\CALPUFF\1990\EGU_E#1.CON  !
 ! VISDAT =C:\WVA\CALPUFF\1990\EGU_E#1.VIS  !


 ! NMETDAT =  6   !                            !END!

 ! METDAT = T:\WVA\CALMET\1990\JAN-FEB.DAT  !    !END!
 ! METDAT = T:\WVA\CALMET\1990\MAR-APR.DAT  !    !END!
 ! METDAT = T:\WVA\CALMET\1990\MAY-JUN.DAT  !    !END!
 ! METDAT = T:\WVA\CALMET\1990\JUL-AUG.DAT  !    !END!
 ! METDAT = T:\WVA\CALMET\1990\SEP-OCT.DAT  !    !END!
 ! METDAT = T:\WVA\CALMET\1990\NOV-DEC.DAT  !    !END!


 INPUT GROUP: 1 -- General run control parameters

 ! XBTZ =  5  !

 ! METRUN =   0    !  Run time period as follows:
 ! IBYR =  1990  !
 ! IBMO =     1    !
 ! IBDY =     1    !
 ! IBHR =     1    !
 ! IRLG =  8736    !


 ! NSPEC =    6  !
 ! NSE =      3  !
 ! ITEST =    2  !

 Meteorological Data Format (METFM)
 ! METFM =  1   !

 !END!
FILE:  PUFF_MID_WVA.INP

INPUT GROUP: 2 -- Technical options
--------------

      ! MSPLIT =  0  !       Disable puff splitting
      ! MWET   =  1  !       Enable wet removal
      ! MDRY   =  1  !       Enable dry deposition

!END!

--------------------------------------------------------------------------------
INPUT GROUP: 3a, 3b -- Species list
-------------------

  The following species are modeled:

      ! CSPEC =          SO2 !         !END!
      ! CSPEC =          SO4 !         !END!
      ! CSPEC =          NOX !         !END!
      ! CSPEC =         HNO3 !         !END!
```

Table A-5 (continued)

```
        Species   Modeled ?  Emitted ?  Deposited ?   Group #

      !    SO2  =      1,          1,        1,          0   !
      !    SO4  =      1,          0,        2,          0   !
      !    NOX  =      1,          1,        1,          0   !
      !   HNO3  =      1,          0,        1,          0   !
      !    NO3  =      1,          0,        2,          0   !
      !   PM25  =      1,          1,        2,          0   !

!END!


INPUT GROUP: 4 -- Map Projection and Grid control parameters
--------------

      ! PMAP   =  LCC     !

      Latitude and Longitude (decimal degrees) of projection origin
      ! RLAT0  =     39N  !
      ! RLON0  =     81W  !

      Matching parallel(s) of latitude (decimal degrees) for projection
      ! XLAT1  =  36.9N  !
      ! XLAT2  =  41.1N  !


METEOROLOGICAL Grid:

      ! NX =  75   !         Number of X grid cells
      ! NY =  75   !         Number of Y grid cells
      ! NZ =  10   !         Number of vertical layers

      ! DGRIDKM =   8 !      Grid spacing (km)

      ! ZFACE = 0., 20, 50, 75, 100, 250, 500, 750, 1000, 2000, 3000   !  Cell face heights (m)


      Reference Coordinates of grid cell(1, 1):

      ! XORIGKM =   -300.  !
      ! YORIGKM =   -300.  !



COMPUTATIONAL Grid:

      ! IBCOMP =   5   !
      ! JBCOMP =   5   !

      ! IECOMP =  71   !
      ! JECOMP =  71   !


SAMPLING Grid (GRIDDED RECEPTORS):

      ! LSAMP  =   F  !      Disable gridded receptors

!END!


INPUT GROUP: 5 -- Output Options
--------------

      !  ICON =  1   !          Concentrations
      !  IDRY =  0   !          Dry Fluxes
      !  IWET =  0   !          Wet Fluxes
```

Table A-5 (continued)

```
     SPECIES (or GROUP for combined species) LIST FOR OUTPUT OPTIONS

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS
FLUX --
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   SAVED ON
DISK?
   -------       ------------------------   ------------------------   ------------------------
---------------
!         SO2 =     0,           1,           0,           0,           0,           0,           0   !
!         SO4 =     0,           1,           0,           0,           0,           0,           0   !
!         NOX =     0,           1,           0,           0,           0,           0,           0   !
!        HNO3 =     0,           1,           0,           0,           0,           0,           0   !
!         NO3 =     0,           1,           0,           0,           0,           0,           0   !
!        PM25 =     0,           1,           0,           0,           0,           0,           0   !

!END!


--------------------------------------------------------------------------------


INPUT GROUP: 6a, 6b, & 6c -- Subgrid scale complex terrain inputs
-------------------------

      !  MHILL = 1  !        Hill and receptor data created by CTDM processors

      !  XCTDMKM  = 0.0 !
      !  YCTDMKM  = 0.0 !

! END !


INPUT GROUP: 7 -- Chemical parameters for dry deposition of gases
--------------

      SPECIES     DIFFUSIVITY      ALPHA STAR      REACTIVITY    MESOPHYLL RESISTANCE     HENRY'S LAW
COEFFICIENT
       NAME        (cm**2/s)                                              (s/cm)
(dimensionless)
      -------     -----------      ----------      ----------    --------------------
-----------------------

!         SO2 =     0.1509,         1000.,            8.,              0.,               0.04 !
!         NOX =     0.1656,            1.,            8.,              5.,                3.5 !
!        HNO3 =     0.1628,            1.,           18.,              0.,         0.00000008 !

!END!


--------------------------------------------------------------------------------


INPUT GROUP: 8 -- Size parameters for dry deposition of particles
--------------

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                   DEVIATION
                        (microns)                  (microns)
      -------      -------------------        ------------------
!         SO4 =          0.48,                      2.   !
!         NO3 =          0.48,                      2.   !
!        PM25 =          0.48,                      2.   !

!END!
```

Table A-5 (continued)

```
INPUT GROUP: 10 -- Wet Deposition Parameters
---------------
                      Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
       ---------      --------------       --------------
!          SO2 =         3.0E-05,             0.0E00 !
!          SO4 =         1.0E-04,            3.0E-05 !
!         HNO3 =         6.0E-05,             0.0E00 !
!          NO3 =         1.0E-04,            3.0E-05 !

!END!

-------------------------------------------------------------------------------
INPUT GROUP: 11 -- Chemistry Parameters
---------------
      !  MOZ  = 0            !  Use monthly background values provided for ozone
      !  BCKO3   = 12*50     !  Monthly average ozone   (ppb)

      !  BCKNH3  = 12* 0.50  !  Monthly average ammonia (ppb)
      !  BCKH2O2 = 12* 1.00  !  Monthly average H2O2    (ppb)

      ! RNITE1 = 0.2         !  Nightime SO2 loss rate (%/hr)
      ! RNITE2 = 2.0         !  Nightime NOX loss rate (%/hr)
      ! RNITE3 = 2.0         !  Nightime HNO3 loss rate (%/hr)

      ! MH2O2  = 0.0         !  H2O2 data input option



!END!


-------------------------------------------------------------------------------


INPUT GROUP: 12 -- Misc. Dispersion and Computational Parameters
---------------

      Location and surface parameters for single-point Met data files

      ! ELEVIN =  200.0 !    Elevation (msl)
      ! XLATIN =  39.00 !    Latitude (deg)
      ! XLONIN =  81.00 !    Longitude (deg)

!END!

-------------------------------------------------------------------------------
INPUT GROUPS: 13a, 13b, 13c, 13d -- Point source parameters
--------------------------------

      !  NPT1 =  1  !       Number of point sources
      !  IPTU =  4  !       Emission units (4 =  tons/yr)
      !  NPT2 =  0  !       Number of pt sources with variable emissions

!END!

-------------------------------------------------------------------------------
 Input Group 13 (Point source data)


 ! SRCNAM = EGU_E#1  !                                     emission rates (tpy)
        X    Y   hgt   elev  diam  vel   temp  dw    SO2         NOx              PMF
 ! X = 0.0, 0.0, 100,  200,  8.0,  27.0, 400,   0,  10000, 0.0, 3500.0, 0.0, 0.0, 50.0  !

 ! FMFAC  = 1.0 !
```

Table A-6

Receptors used in CALPUFF modeling for the Western and Eastern domains.

INPUT GROUP 17 -- Receptors

```
     !  NREC =  360  !    Number of non-gridded receptors
!END!
```

The following receptors are laid out in a polar grid centered on 0.00 km East, 0.00 km North; i.e., the center of the computational domain. There are 10 rings located every 25 km to a maximum range of 250 km. Radials are located every 10 degrees beginning at 10 degrees and ending at 360 degrees.

Rec. #	Dir.	Range (km)				X (km)	Y (km)	Elev. (m)		
1	10	25	!	X	=	4.341,	24.620,	200	!	!END!
2	20	25	!	X	=	8.551,	23.492,	200	!	!END!
3	30	25	!	X	=	12.500,	21.651,	200	!	!END!
4	40	25	!	X	=	16.070,	19.151,	200	!	!END!
5	50	25	!	X	=	19.151,	16.070,	200	!	!END!
6	60	25	!	X	=	21.651,	12.500,	200	!	!END!
7	70	25	!	X	=	23.492,	8.551,	200	!	!END!
8	80	25	!	X	=	24.620,	4.341,	200	!	!END!
9	90	25	!	X	=	25.000,	0.000,	200	!	!END!
10	100	25	!	X	=	24.620,	-4.341,	200	!	!END!
11	110	25	!	X	=	23.492,	-8.551,	200	!	!END!
12	120	25	!	X	=	21.651,	-12.500,	200	!	!END!
13	130	25	!	X	=	19.151,	-16.070,	200	!	!END!
14	140	25	!	X	=	16.070,	-19.151,	200	!	!END!
15	150	25	!	X	=	12.500,	-21.651,	200	!	!END!
16	160	25	!	X	=	8.551,	-23.492,	200	!	!END!
17	170	25	!	X	=	4.341,	-24.620,	200	!	!END!
18	180	25	!	X	=	0.000,	-25.000,	200	!	!END!
19	190	25	!	X	=	-4.341,	-24.620,	200	!	!END!
20	200	25	!	X	=	-8.551,	-23.492,	200	!	!END!
21	210	25	!	X	=	-12.500,	-21.651,	200	!	!END!
22	220	25	!	X	=	-16.070,	-19.151,	200	!	!END!
23	230	25	!	X	=	-19.151,	-16.070,	200	!	!END!
24	240	25	!	X	=	-21.651,	-12.500,	200	!	!END!
25	250	25	!	X	=	-23.492,	-8.551,	200	!	!END!
26	260	25	!	X	=	-24.620,	-4.341,	200	!	!END!
27	270	25	!	X	=	-25.000,	0.000,	200	!	!END!
28	280	25	!	X	=	-24.620,	4.341,	200	!	!END!
29	290	25	!	X	=	-23.492,	8.551,	200	!	!END!
30	300	25	!	X	=	-21.651,	12.500,	200	!	!END!
31	310	25	!	X	=	-19.151,	16.070,	200	!	!END!
32	320	25	!	X	=	-16.070,	19.151,	200	!	!END!
33	330	25	!	X	=	-12.500,	21.651,	200	!	!END!
34	340	25	!	X	=	-8.550,	23.492,	200	!	!END!
35	350	25	!	X	=	-4.341,	24.620,	200	!	!END!
36	360	25	!	X	=	0.000,	25.000,	200	!	!END!
37	10	50	!	X	=	8.682,	49.240,	200	!	!END!
38	20	50	!	X	=	17.101,	46.985,	200	!	!END!
39	30	50	!	X	=	25.000,	43.301,	200	!	!END!
40	40	50	!	X	=	32.139,	38.302,	200	!	!END!
41	50	50	!	X	=	38.302,	32.139,	200	!	!END!
42	60	50	!	X	=	43.301,	25.000,	200	!	!END!
43	70	50	!	X	=	46.985,	17.101,	200	!	!END!
44	80	50	!	X	=	49.240,	8.682,	200	!	!END!
45	90	50	!	X	=	50.000,	0.000,	200	!	!END!
46	100	50	!	X	=	49.240,	-8.682,	200	!	!END!
47	110	50	!	X	=	46.985,	-17.101,	200	!	!END!
48	120	50	!	X	=	43.301,	-25.000,	200	!	!END!
49	130	50	!	X	=	38.302,	-32.139,	200	!	!END!
50	140	50	!	X	=	32.139,	-38.302,	200	!	!END!
51	150	50	!	X	=	25.000,	-43.301,	200	!	!END!
52	160	50	!	X	=	17.101,	-46.985,	200	!	!END!
53	170	50	!	X	=	8.682,	-49.240,	200	!	!END!
54	180	50	!	X	=	0.000,	-50.000,	200	!	!END!

Table A-6 (continued)

55	190	50	!	X	=	-8.682,	-49.240,	200	!	!END!
56	200	50	!	X	=	-17.101,	-46.985,	200	!	!END!
57	210	50	!	X	=	-25.000,	-43.301,	200	!	!END!
58	220	50	!	X	=	-32.139,	-38.302,	200	!	!END!
59	230	50	!	X	=	-38.302,	-32.139,	200	!	!END!
60	240	50	!	X	=	-43.301,	-25.000,	200	!	!END!
61	250	50	!	X	=	-46.985,	-17.101,	200	!	!END!
62	260	50	!	X	=	-49.240,	-8.682,	200	!	!END!
63	270	50	!	X	=	-50.000,	0.000,	200	!	!END!
64	280	50	!	X	=	-49.240,	8.682,	200	!	!END!
65	290	50	!	X	=	-46.985,	17.101,	200	!	!END!
66	300	50	!	X	=	-43.301,	25.000,	200	!	!END!
67	310	50	!	X	=	-38.302,	32.139,	200	!	!END!
68	320	50	!	X	=	-32.139,	38.302,	200	!	!END!
69	330	50	!	X	=	-25.000,	43.301,	200	!	!END!
70	340	50	!	X	=	-17.101,	46.985,	200	!	!END!
71	350	50	!	X	=	-8.682,	49.240,	200	!	!END!
72	360	50	!	X	=	0.000,	50.000,	200	!	!END!
73	10	75	!	X	=	13.024,	73.861,	200	!	!END!
74	20	75	!	X	=	25.652,	70.477,	200	!	!END!
75	30	75	!	X	=	37.500,	64.952,	200	!	!END!
76	40	75	!	X	=	48.209,	57.453,	200	!	!END!
77	50	75	!	X	=	57.453,	48.209,	200	!	!END!
78	60	75	!	X	=	64.952,	37.500,	200	!	!END!
79	70	75	!	X	=	70.477,	25.652,	200	!	!END!
80	80	75	!	X	=	73.861,	13.024,	200	!	!END!
81	90	75	!	X	=	75.000,	0.000,	200	!	!END!
82	100	75	!	X	=	73.861,	-13.024,	200	!	!END!
83	110	75	!	X	=	70.477,	-25.652,	200	!	!END!
84	120	75	!	X	=	64.952,	-37.500,	200	!	!END!
85	130	75	!	X	=	57.453,	-48.209,	200	!	!END!
86	140	75	!	X	=	48.209,	-57.453,	200	!	!END!
87	150	75	!	X	=	37.500,	-64.952,	200	!	!END!
88	160	75	!	X	=	25.652,	-70.477,	200	!	!END!
89	170	75	!	X	=	13.024,	-73.861,	200	!	!END!
90	180	75	!	X	=	0.000,	-75.000,	200	!	!END!
91	190	75	!	X	=	-13.024,	-73.861,	200	!	!END!
92	200	75	!	X	=	-25.652,	-70.477,	200	!	!END!
93	210	75	!	X	=	-37.500,	-64.952,	200	!	!END!
94	220	75	!	X	=	-48.209,	-57.453,	200	!	!END!
95	230	75	!	X	=	-57.453,	-48.209,	200	!	!END!
96	240	75	!	X	=	-64.952,	-37.500,	200	!	!END!
97	250	75	!	X	=	-70.477,	-25.652,	200	!	!END!
98	260	75	!	X	=	-73.861,	-13.024,	200	!	!END!
99	270	75	!	X	=	-75.000,	0.000,	200	!	!END!
100	280	75	!	X	=	-73.861,	13.024,	200	!	!END!
101	290	75	!	X	=	-70.477,	25.652,	200	!	!END!
102	300	75	!	X	=	-64.952,	37.500,	200	!	!END!
103	310	75	!	X	=	-57.453,	48.209,	200	!	!END!
104	320	75	!	X	=	-48.209,	57.453,	200	!	!END!
105	330	75	!	X	=	-37.500,	64.952,	200	!	!END!
106	340	75	!	X	=	-25.651,	70.477,	200	!	!END!
107	350	75	!	X	=	-13.024,	73.861,	200	!	!END!
108	360	75	!	X	=	0.000,	75.000,	200	!	!END!
109	10	100	!	X	=	17.365,	98.481,	200	!	!END!
110	20	100	!	X	=	34.202,	93.969,	200	!	!END!
111	30	100	!	X	=	50.000,	86.603,	200	!	!END!
112	40	100	!	X	=	64.279,	76.604,	200	!	!END!
113	50	100	!	X	=	76.604,	64.279,	200	!	!END!
114	60	100	!	X	=	86.603,	50.000,	200	!	!END!
115	70	100	!	X	=	93.969,	34.202,	200	!	!END!
116	80	100	!	X	=	98.481,	17.365,	200	!	!END!
117	90	100	!	X	=	100.000,	0.000,	200	!	!END!
118	100	100	!	X	=	98.481,	-17.365,	200	!	!END!
119	110	100	!	X	=	93.969,	-34.202,	200	!	!END!
120	120	100	!	X	=	86.603,	-50.000,	200	!	!END!
121	130	100	!	X	=	76.604,	-64.279,	200	!	!END!
122	140	100	!	X	=	64.279,	-76.604,	200	!	!END!
123	150	100	!	X	=	50.000,	-86.603,	200	!	!END!
124	160	100	!	X	=	34.202,	-93.969,	200	!	!END!

Table A-6 (continued)

125	170	100	!	X	=	17.365,	-98.481,	200	!	!END!
126	180	100	!	X	=	0.000,	-100.000,	200	!	!END!
127	190	100	!	X	=	-17.365,	-98.481,	200	!	!END!
128	200	100	!	X	=	-34.202,	-93.969,	200	!	!END!
129	210	100	!	X	=	-50.000,	-86.603,	200	!	!END!
130	220	100	!	X	=	-64.279,	-76.604,	200	!	!END!
131	230	100	!	X	=	-76.604,	-64.279,	200	!	!END!
132	240	100	!	X	=	-86.603,	-50.000,	200	!	!END!
133	250	100	!	X	=	-93.969,	-34.202,	200	!	!END!
134	260	100	!	X	=	-98.481,	-17.365,	200	!	!END!
135	270	100	!	X	=	-100.000,	0.000,	200	!	!END!
136	280	100	!	X	=	-98.481,	17.365,	200	!	!END!
137	290	100	!	X	=	-93.969,	34.202,	200	!	!END!
138	300	100	!	X	=	-86.603,	50.000,	200	!	!END!
139	310	100	!	X	=	-76.604,	64.279,	200	!	!END!
140	320	100	!	X	=	-64.279,	76.604,	200	!	!END!
141	330	100	!	X	=	-50.000,	86.603,	200	!	!END!
142	340	100	!	X	=	-34.202,	93.969,	200	!	!END!
143	350	100	!	X	=	-17.365,	98.481,	200	!	!END!
144	360	100	!	X	=	0.000,	100.000,	200	!	!END!
145	10	125	!	X	=	21.706,	123.101,	200	!	!END!
146	20	125	!	X	=	42.753,	117.462,	200	!	!END!
147	30	125	!	X	=	62.500,	108.253,	200	!	!END!
148	40	125	!	X	=	80.348,	95.756,	200	!	!END!
149	50	125	!	X	=	95.756,	80.348,	200	!	!END!
150	60	125	!	X	=	108.253,	62.500,	200	!	!END!
151	70	125	!	X	=	117.462,	42.753,	200	!	!END!
152	80	125	!	X	=	123.101,	21.706,	200	!	!END!
153	90	125	!	X	=	125.000,	0.000,	200	!	!END!
154	100	125	!	X	=	123.101,	-21.706,	200	!	!END!
155	110	125	!	X	=	117.462,	-42.753,	200	!	!END!
156	120	125	!	X	=	108.253,	-62.500,	200	!	!END!
157	130	125	!	X	=	95.756,	-80.348,	200	!	!END!
158	140	125	!	X	=	80.348,	-95.756,	200	!	!END!
159	150	125	!	X	=	62.500,	-108.253,	200	!	!END!
160	160	125	!	X	=	42.753,	-117.462,	200	!	!END!
161	170	125	!	X	=	21.706,	-123.101,	200	!	!END!
162	180	125	!	X	=	0.000,	-125.000,	200	!	!END!
163	190	125	!	X	=	-21.706,	-123.101,	200	!	!END!
164	200	125	!	X	=	-42.753,	-117.462,	200	!	!END!
165	210	125	!	X	=	-62.500,	-108.253,	200	!	!END!
166	220	125	!	X	=	-80.348,	-95.756,	200	!	!END!
167	230	125	!	X	=	-95.756,	-80.348,	200	!	!END!
168	240	125	!	X	=	-108.253,	-62.500,	200	!	!END!
169	250	125	!	X	=	-117.462,	-42.753,	200	!	!END!
170	260	125	!	X	=	-123.101,	-21.706,	200	!	!END!
171	270	125	!	X	=	-125.000,	0.000,	200	!	!END!
172	280	125	!	X	=	-123.101,	21.706,	200	!	!END!
173	290	125	!	X	=	-117.462,	42.753,	200	!	!END!
174	300	125	!	X	=	-108.253,	62.500,	200	!	!END!
175	310	125	!	X	=	-95.756,	80.348,	200	!	!END!
176	320	125	!	X	=	-80.348,	95.756,	200	!	!END!
177	330	125	!	X	=	-62.500,	108.253,	200	!	!END!
178	340	125	!	X	=	-42.752,	117.462,	200	!	!END!
179	350	125	!	X	=	-21.706,	123.101,	200	!	!END!
180	360	125	!	X	=	0.000,	125.000,	200	!	!END!
181	10	150	!	X	=	26.047,	147.721,	200	!	!END!
182	20	150	!	X	=	51.303,	140.954,	200	!	!END!
183	30	150	!	X	=	75.000,	129.904,	200	!	!END!
184	40	150	!	X	=	96.418,	114.907,	200	!	!END!
185	50	150	!	X	=	114.907,	96.418,	200	!	!END!
186	60	150	!	X	=	129.904,	75.000,	200	!	!END!
187	70	150	!	X	=	140.954,	51.303,	200	!	!END!
188	80	150	!	X	=	147.721,	26.047,	200	!	!END!
189	90	150	!	X	=	150.000,	0.000,	200	!	!END!
190	100	150	!	X	=	147.721,	-26.047,	200	!	!END!
191	110	150	!	X	=	140.954,	-51.303,	200	!	!END!
192	120	150	!	X	=	129.904,	-75.000,	200	!	!END!
193	130	150	!	X	=	114.907,	-96.418,	200	!	!END!
194	140	150	!	X	=	96.418,	-114.907,	200	!	!END!

Table A-6 (continued)

195	150	150	!	X	=	75.000,	-129.904,	200	!	!END!
196	160	150	!	X	=	51.303,	-140.954,	200	!	!END!
197	170	150	!	X	=	26.047,	-147.721,	200	!	!END!
198	180	150	!	X	=	0.000,	-150.000,	200	!	!END!
199	190	150	!	X	=	-26.047,	-147.721,	200	!	!END!
200	200	150	!	X	=	-51.303,	-140.954,	200	!	!END!
201	210	150	!	X	=	-75.000,	-129.904,	200	!	!END!
202	220	150	!	X	=	-96.418,	-114.907,	200	!	!END!
203	230	150	!	X	=	-114.907,	-96.418,	200	!	!END!
204	240	150	!	X	=	-129.904,	-75.000,	200	!	!END!
205	250	150	!	X	=	-140.954,	-51.303,	200	!	!END!
206	260	150	!	X	=	-147.721,	-26.047,	200	!	!END!
207	270	150	!	X	=	-150.000,	0.000,	200	!	!END!
208	280	150	!	X	=	-147.721,	26.047,	200	!	!END!
209	290	150	!	X	=	-140.954,	51.303,	200	!	!END!
210	300	150	!	X	=	-129.904,	75.000,	200	!	!END!
211	310	150	!	X	=	-114.907,	96.418,	200	!	!END!
212	320	150	!	X	=	-96.418,	114.907,	200	!	!END!
213	330	150	!	X	=	-75.000,	129.904,	200	!	!END!
214	340	150	!	X	=	-51.303,	140.954,	200	!	!END!
215	350	150	!	X	=	-26.047,	147.721,	200	!	!END!
216	360	150	!	X	=	0.000,	150.000,	200	!	!END!
217	10	175	!	X	=	30.388,	172.341,	200	!	!END!
218	20	175	!	X	=	59.854,	164.446,	200	!	!END!
219	30	175	!	X	=	87.500,	151.554,	200	!	!END!
220	40	175	!	X	=	112.488,	134.058,	200	!	!END!
221	50	175	!	X	=	134.058,	112.488,	200	!	!END!
222	60	175	!	X	=	151.554,	87.500,	200	!	!END!
223	70	175	!	X	=	164.446,	59.854,	200	!	!END!
224	80	175	!	X	=	172.341,	30.388,	200	!	!END!
225	90	175	!	X	=	175.000,	0.000,	200	!	!END!
226	100	175	!	X	=	172.341,	-30.388,	200	!	!END!
227	110	175	!	X	=	164.446,	-59.854,	200	!	!END!
228	120	175	!	X	=	151.554,	-87.500,	200	!	!END!
229	130	175	!	X	=	134.058,	-112.488,	200	!	!END!
230	140	175	!	X	=	112.488,	-134.058,	200	!	!END!
231	150	175	!	X	=	87.500,	-151.554,	200	!	!END!
232	160	175	!	X	=	59.854,	-164.446,	200	!	!END!
233	170	175	!	X	=	30.388,	-172.341,	200	!	!END!
234	180	175	!	X	=	0.000,	-175.000,	200	!	!END!
235	190	175	!	X	=	-30.388,	-172.341,	200	!	!END!
236	200	175	!	X	=	-59.854,	-164.446,	200	!	!END!
237	210	175	!	X	=	-87.500,	-151.554,	200	!	!END!
238	220	175	!	X	=	-112.488,	-134.058,	200	!	!END!
239	230	175	!	X	=	-134.058,	-112.488,	200	!	!END!
240	240	175	!	X	=	-151.554,	-87.500,	200	!	!END!
241	250	175	!	X	=	-164.446,	-59.854,	200	!	!END!
242	260	175	!	X	=	-172.341,	-30.388,	200	!	!END!
243	270	175	!	X	=	-175.000,	0.000,	200	!	!END!
244	280	175	!	X	=	-172.341,	30.388,	200	!	!END!
245	290	175	!	X	=	-164.446,	59.854,	200	!	!END!
246	300	175	!	X	=	-151.554,	87.500,	200	!	!END!
247	310	175	!	X	=	-134.058,	112.488,	200	!	!END!
248	320	175	!	X	=	-112.488,	134.058,	200	!	!END!
249	330	175	!	X	=	-87.500,	151.554,	200	!	!END!
250	340	175	!	X	=	-59.853,	164.446,	200	!	!END!
251	350	175	!	X	=	-30.388,	172.341,	200	!	!END!
252	360	175	!	X	=	0.000,	175.000,	200	!	!END!
253	10	200	!	X	=	34.730,	196.962,	200	!	!END!
254	20	200	!	X	=	68.404,	187.939,	200	!	!END!
255	30	200	!	X	=	100.000,	173.205,	200	!	!END!
256	40	200	!	X	=	128.558,	153.209,	200	!	!END!
257	50	200	!	X	=	153.209,	128.558,	200	!	!END!
258	60	200	!	X	=	173.205,	100.000,	200	!	!END!
259	70	200	!	X	=	187.939,	68.404,	200	!	!END!
260	80	200	!	X	=	196.962,	34.730,	200	!	!END!
261	90	200	!	X	=	200.000,	0.000,	200	!	!END!
262	100	200	!	X	=	196.962,	-34.730,	200	!	!END!
263	110	200	!	X	=	187.939,	-68.404,	200	!	!END!
264	120	200	!	X	=	173.205,	-100.000,	200	!	!END!

Table A-6 (continued)

265	130	200	!	X	=	153.209,	-128.558,	200	!	!END!
266	140	200	!	X	=	128.558,	-153.209,	200	!	!END!
267	150	200	!	X	=	100.000,	-173.205,	200	!	!END!
268	160	200	!	X	=	68.404,	-187.939,	200	!	!END!
269	170	200	!	X	=	34.730,	-196.962,	200	!	!END!
270	180	200	!	X	=	0.000,	-200.000,	200	!	!END!
271	190	200	!	X	=	-34.730,	-196.962,	200	!	!END!
272	200	200	!	X	=	-68.404,	-187.939,	200	!	!END!
273	210	200	!	X	=	-100.000,	-173.205,	200	!	!END!
274	220	200	!	X	=	-128.558,	-153.209,	200	!	!END!
275	230	200	!	X	=	-153.209,	-128.558,	200	!	!END!
276	240	200	!	X	=	-173.205,	-100.000,	200	!	!END!
277	250	200	!	X	=	-187.939,	-68.404,	200	!	!END!
278	260	200	!	X	=	-196.962,	-34.730,	200	!	!END!
279	270	200	!	X	=	-200.000,	0.000,	200	!	!END!
280	280	200	!	X	=	-196.962,	34.730,	200	!	!END!
281	290	200	!	X	=	-187.939,	68.404,	200	!	!END!
282	300	200	!	X	=	-173.205,	100.000,	200	!	!END!
283	310	200	!	X	=	-153.209,	128.558,	200	!	!END!
284	320	200	!	X	=	-128.557,	153.209,	200	!	!END!
285	330	200	!	X	=	-100.000,	173.205,	200	!	!END!
286	340	200	!	X	=	-68.404,	187.939,	200	!	!END!
287	350	200	!	X	=	-34.730,	196.962,	200	!	!END!
288	360	200	!	X	=	0.000,	200.000,	200	!	!END!
289	10	225	!	X	=	39.071,	221.582,	200	!	!END!
290	20	225	!	X	=	76.955,	211.431,	200	!	!END!
291	30	225	!	X	=	112.500,	194.856,	200	!	!END!
292	40	225	!	X	=	144.627,	172.360,	200	!	!END!
293	50	225	!	X	=	172.360,	144.627,	200	!	!END!
294	60	225	!	X	=	194.856,	112.500,	200	!	!END!
295	70	225	!	X	=	211.431,	76.955,	200	!	!END!
296	80	225	!	X	=	221.582,	39.071,	200	!	!END!
297	90	225	!	X	=	225.000,	0.000,	200	!	!END!
298	100	225	!	X	=	221.582,	-39.071,	200	!	!END!
299	110	225	!	X	=	211.431,	-76.955,	200	!	!END!
300	120	225	!	X	=	194.856,	-112.500,	200	!	!END!
301	130	225	!	X	=	172.360,	-144.627,	200	!	!END!
302	140	225	!	X	=	144.627,	-172.360,	200	!	!END!
303	150	225	!	X	=	112.500,	-194.856,	200	!	!END!
304	160	225	!	X	=	76.955,	-211.431,	200	!	!END!
305	170	225	!	X	=	39.071,	-221.582,	200	!	!END!
306	180	225	!	X	=	0.000,	-225.000,	200	!	!END!
307	190	225	!	X	=	-39.071,	-221.582,	200	!	!END!
308	200	225	!	X	=	-76.955,	-211.431,	200	!	!END!
309	210	225	!	X	=	-112.500,	-194.856,	200	!	!END!
310	220	225	!	X	=	-144.627,	-172.360,	200	!	!END!
311	230	225	!	X	=	-172.360,	-144.627,	200	!	!END!
312	240	225	!	X	=	-194.856,	-112.500,	200	!	!END!
313	250	225	!	X	=	-211.431,	-76.955,	200	!	!END!
314	260	225	!	X	=	-221.582,	-39.071,	200	!	!END!
315	270	225	!	X	=	-225.000,	0.000,	200	!	!END!
316	280	225	!	X	=	-221.582,	39.071,	200	!	!END!
317	290	225	!	X	=	-211.431,	76.955,	200	!	!END!
318	300	225	!	X	=	-194.856,	112.500,	200	!	!END!
319	310	225	!	X	=	-172.360,	144.627,	200	!	!END!
320	320	225	!	X	=	-144.627,	172.360,	200	!	!END!
321	330	225	!	X	=	-112.500,	194.856,	200	!	!END!
322	340	225	!	X	=	-76.954,	211.431,	200	!	!END!
323	350	225	!	X	=	-39.071,	221.582,	200	!	!END!
324	360	225	!	X	=	0.000,	225.000,	200	!	!END!
325	10	250	!	X	=	43.412,	246.202,	200	!	!END!
326	20	250	!	X	=	85.505,	234.923,	200	!	!END!
327	30	250	!	X	=	125.000,	216.506,	200	!	!END!
328	40	250	!	X	=	160.697,	191.511,	200	!	!END!
329	50	250	!	X	=	191.511,	160.697,	200	!	!END!
330	60	250	!	X	=	216.506,	125.000,	200	!	!END!
331	70	250	!	X	=	234.923,	85.505,	200	!	!END!
332	80	250	!	X	=	246.202,	43.412,	200	!	!END!
333	90	250	!	X	=	250.000,	0.000,	200	!	!END!
334	100	250	!	X	=	246.202,	-43.412,	200	!	!END!

Table A-6 (continued)

```
   335    110     250    !  X  =      234.923,     -85.505,      200   !   !END!
   336    120     250    !  X  =      216.506,    -125.000,      200   !   !END!
   337    130     250    !  X  =      191.511,    -160.697,      200   !   !END!
   338    140     250    !  X  =      160.697,    -191.511,      200   !   !END!
   339    150     250    !  X  =      125.000,    -216.506,      200   !   !END!
   340    160     250    !  X  =       85.505,    -234.923,      200   !   !END!
   341    170     250    !  X  =       43.412,    -246.202,      200   !   !END!
   342    180     250    !  X  =        0.000,    -250.000,      200   !   !END!
   343    190     250    !  X  =      -43.412,    -246.202,      200   !   !END!
   344    200     250    !  X  =      -85.505,    -234.923,      200   !   !END!
   345    210     250    !  X  =     -125.000,    -216.506,      200   !   !END!
   346    220     250    !  X  =     -160.697,    -191.511,      200   !   !END!
   347    230     250    !  X  =     -191.511,    -160.697,      200   !   !END!
   348    240     250    !  X  =     -216.506,    -125.000,      200   !   !END!
   349    250     250    !  X  =     -234.923,     -85.505,      200   !   !END!
   350    260     250    !  X  =     -246.202,     -43.412,      200   !   !END!
   351    270     250    !  X  =     -250.000,       0.000,      200   !   !END!
   352    280     250    !  X  =     -246.202,      43.412,      200   !   !END!
   353    290     250    !  X  =     -234.923,      85.505,      200   !   !END!
   354    300     250    !  X  =     -216.506,     125.000,      200   !   !END!
   355    310     250    !  X  =     -191.511,     160.697,      200   !   !END!
   356    320     250    !  X  =     -160.697,     191.511,      200   !   !END!
   357    330     250    !  X  =     -125.000,     216.506,      200   !   !END!
   358    340     250    !  X  =      -85.505,     234.923,      200   !   !END!
   359    350     250    !  X  =      -43.412,     246.202,      200   !   !END!
   360    360     250    !  X  =        0.000,     250.000,      200   !   !END!

!END!
```

Table A-7
Example CALPOST input file for scenario # 2 for receptors at 200 km for 1990

```
INPUT GROUP: 0
! MODDAT = C:\DENVER\CALPUFF\1990\EGU_W#2.CON         !
! VISDAT = C:\DENVER\CALPUFF\1990\EGU_W#2.VIS         !
! PSTLST = C:\BART\DENVER\1990\EGU_W#2_R200.D01       !
!END!

INPUT GROUP: 1
! METRUN =    1   !
! ISYR  =  1990   !
! ASPEC =  VISIB  !
!     LG =  F  !
!     LD =  T  !
! NDRECP =     252*0,  36*1  !    Select the 36 receptors for the 200 km ring
!END!

INPUT GROUP: 2  Visibility parameters

     ! LVSO4   =  T  !     Include modeled sulfate in extinction ?
     ! LVNO3   =  T  !     Include modeled nitrate in extinction ?
     ! LVOC    =  F  !     Include modeled organic carbon in extinction ?
     ! LVPMC   =  F  !     Include modeled coarse particulates in extinction ?
     ! LVPMF   =  T  !     Include modeled fine particulates in extinction ?
     ! LVEC    =  F  !     Include modeled elemental carbon in extinction ?

     ! LVBK    =  F    !     Do not include background in extinction when ranking
     ! SPECPMC =  PMC  !     Species name for coarse particulates
     ! SPECPMF =  PM25 !     Species name for fine particulates


     Extinction efficiencies (m^2/g) are assigned as follows:

     ! EEPMC   =  0.6  !     Modeled coarse particulates
     ! EEPMF   =  1.0  !     Modeled fine particulates
     ! EEPMCBK =  0.6  !     Background coarse particulates
     ! EESO4   =  3.0  !     Ammonium sulfate
     ! EENO3   =  3.0  !     Ammonium Nitrate
     ! EEOC    =  4.0  !     Organic carbon
     ! EESOIL  =  1.0  !     Soil dust
     ! EEEC    = 10.0  !     Elemental carbom (soot)

     ! MVISBK  =    6  !     Method used to obtain background extinction

                    1 = Supply single light extinction and hygroscopic fraction
                        IWAQM (1993) RH adjustment applied to hygroscopic background
                        and modeled sulfate and nitrate.

                    2 = Compute extinction from speciated PM measurements (A)
                        (A) Hourly f(rh) applied to observed and modeled sulfate
                        and nitrate.  F(rh) is cappped at RHNAX.

                    6 = Compute extinction from speciated PM measurements - FLAG RH
                        adjustment factor applied to observed and modeled sulfate and
                        nitrate.
```

Table A-7 (continued)

The following are used with MVISBK option 6 for the Western domain
The background concentration values are from Table 2.B-2 in the FLAG report.

```
! RHFAC  = 12*2.0  !    Annual average relative humidity adjustment factor f(rh)
                        for hygroscopic species

! BKSO4  = 12*0.1  !    Background ammonium sulfate concentration

! BKNO3  = 12*0.1  !    Background ammonium nitrate concentration
! BKPMC  = 12*3.0  !    Background coarse particulate concentration
! BKOC   = 12*0.5  !    Background organic carbon concentration
! BKSOIL = 12*0.5  !    Background soil dust concentration
! BKEC   = 12*0.02 !    Background elemental carbon concentration


! BEXTRAY = 10.0   !    Extinction due to Rayleigh scattering (1/Mm)

!END!
```

```
INPUT GROUP: 3  Output options

     !  LPLT     =  F   !   Disable plot-file output
     !  LGRD     =  F   !   Disable 'GRID' format for plot files

     !  IPRTU    =  3   !   Set concentration units to micro-gm per cubic meter

     !  L1HR     =  F   !
     !  L3HR     =  F   !
     !  L24HR    =  T   !   Enable output for 24-hour averages
     !  LRUNL    =  T   !   Enable output for length-of-run averages

     !  LT50     =  F    !   Disable top-50 table
     !  LTOPN    =  T    !   Enable "Top N" table
     !  NTOP     =  2    !
     !  ITOP     =  1, 2 !

     !  LEXCD    =  T   !   Enable exceedance tables
     !  THRESH24 =  0.1 !   Set exceedance threshold for 24-hour averages

     !END!
```

Table A-8
Example CALPOST input file for scenario # 1 for receptors at 200 km for 1990

```
INPUT GROUP: 0
! MODDAT = C:\WVA\CALPUFF\1990\EGU_E#1.CON         !
! VISDAT = C:\WVA\CALPUFF\1990\EGU_E#1.VIS         !
! PSTLST = C:\BART\WVA\1990\EGU_E#1_R200.D01    !
!END!

INPUT GROUP: 1
! METRUN =    1   !
! ISYR  =  1990   !
! ASPEC =  VISIB  !
!     LG =  F  !
!     LD =  T  !
! NDRECP =     252*0,  36*1  !    Select the 36 receptors for the 200 km ring
!END!

INPUT GROUP: 2  Visibility parameters

     ! LVSO4   =  T  !     Include modeled sulfate in extinction ?
     ! LVNO3   =  T  !     Include modeled nitrate in extinction ?
     ! LVOC    =  F  !     Include modeled organic carbon in extinction ?
     ! LVPMC   =  F  !     Include modeled coarse particulates in extinction ?
     ! LVPMF   =  T  !     Include modeled fine particulates in extinction ?
     ! LVEC    =  F  !     Include modeled elemental carbon in extinction ?

     ! LVBK    =  F    !     Do not include background in extinction when ranking
     ! SPECPMC =  PMC  !     Species name for coarse particulates
     ! SPECPMF =  PM25 !     Species name for fine particulates


     Extinction efficiencies (m^2/g) are assigned as follows:

     ! EEPMC   =  0.6  !     Modeled coarse particulates
     ! EEPMF   =  1.0  !     Modeled fine particulates
     ! EEPMCBK =  0.6  !     Background coarse particulates
     ! EESO4   =  3.0  !     Ammonium sulfate
     ! EENO3   =  3.0  !     Ammonium Nitrate
     ! EEOC    =  4.0  !     Organic carbon
     ! EESOIL  =  1.0  !     Soil dust
     ! EEEC    = 10.0  !     Elemental carbom (soot)

     ! MVISBK  =    6  !     Method used to obtain background extinction

                         1 = Supply single light extinction and hygroscopic fraction
                             IWAQM (1993) RH adjustment applied to hygroscopic background
                             and modeled sulfate and nitrate.

                         2 = Compute extinction from speciated PM measurements (A)
                             (A) Hourly f(rh) applied to observed and modeled sulfate
                             and nitrate.  F(rh) is cappped at RHNAX.

                         6 = Compute extinction from speciated PM measurements - FLAG RH
                             adjustment factor applied to observed and modeled sulfate and
                             nitrate.
```

Table A-8 (continued)

The following are used with MVISBK option 6 for the Eastern domain
The background concentration values are from Table 2.B-2 in the FLAG report.

```
! RHFAC  = 12*3.0  !    Annual average relative humidity adjustment factor f(rh)
                        for hygroscopic species

! BKSO4  = 12*0.2  !    Background ammonium sulfate concentration

! BKNO3  = 12*0.1  !    Background ammonium nitrate concentration
! BKPMC  = 12*3.0  !    Background coarse particulate concentration
! BKOC   = 12*1.5  !    Background organic carbon concentration
! BKSOIL = 12*0.5  !    Background soil dust concentration
! BKEC   = 12*0.02 !    Background elemental carbon concentration


! BEXTRAY = 10.0   !    Extinction due to Rayleigh scattering (1/Mm)

!END!


INPUT GROUP: 3  Output options

!  LPLT     =  F   !   Disable plot-file output
!  LGRD     =  F   !   Disable 'GRID' format for plot files

!  IPRTU    =  3   !   Set concentration units to micro-gm per cubic meter

!  L1HR     =  F   !
!  L3HR     =  F   !
!  L24HR    =  T   !   Enable output for 24-hour averages
!  LRUNL    =  T   !   Enable output for length-of-run averages

!  LT50     =  F    !   Disable top-50 table
!  LTOPN    =  T    !   Enable "Top N" table
!  NTOP     =  2    !
!  ITOP     =  1, 2 !

!  LEXCD    =  T   !   Enable exceedance tables
!  THRESH24 =  0.1 !   Set exceedance threshold for 24-hour averages

!END!
```

Appendix B

Visibility Impairment Associated with Coal-fired EGUs and Industrial Boilers

(CALPUFF Estimates for 23 Scenarios)

Table B-1 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 1
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 10000, 3500, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	116	104	121	118	119	**115.6**
0.1	100	92	102	93	97	106	**98.0**
0.1	200	68	80	64	66	84	**72.4**
0.5	50	31	33	3	45	33	**29.0**
0.5	100	21	23	19	28	26	**23.4**
0.5	200	11	14	10	19	11	**13.0**
1.0	50	9	11	13	15	14	**12.4**
1.0	100	5	8	8	10	11	**8.4**
1.0	200	2	3	4	8	4	**4.2**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	3.80	2.18	1.75	1.71	1.51	1.41	1.28	1.25	1.09	0.99
50	1987	3.75	2.51	2.23	1.55	1.52	1.42	1.31	1.24	1.18	1.16
50	1988	3.25	2.55	2.46	1.87	1.54	1.46	1.33	1.24	1.21	1.15
50	1989	4.71	2.39	2.37	2.06	2.04	1.67	1.61	1.51	1.47	1.38
50	1990	3.82	3.35	1.98	1.71	1.61	1.43	1.34	1.25	1.18	1.15
50	**5-yr. Avg.**	**3.87**	**2.60**	**2.16**	**1.78**	**1.64**	**1.48**	**1.38**	**1.30**	**1.23**	**1.17**
100	1986	3.80	1.65	1.56	1.23	1.16	1.00	0.90	0.86	0.81	0.80
100	1987	2.43	2.37	1.66	1.52	1.44	1.38	1.17	1.01	0.93	0.91
100	1988	3.08	1.82	1.51	1.33	1.16	1.11	1.10	1.04	0.81	0.80
100	1989	2.26	1.95	1.74	1.66	1.49	1.37	1.33	1.31	1.26	1.10
100	1990	3.67	2.27	1.76	1.67	1.55	1.46	1.40	1.25	1.22	1.20
100	**5-yr. Avg.**	**3.05**	**2.01**	**1.65**	**1.48**	**1.36**	**1.26**	**1.18**	**1.09**	**1.01**	**0.96**
200	1986	1.70	1.24	1.08	0.86	0.85	0.83	0.67	0.63	0.63	0.57
200	1987	1.69	1.19	1.08	0.99	0.96	0.95	0.77	0.71	0.65	0.58
200	1988	2.08	1.33	1.24	1.02	0.75	0.65	0.62	0.58	0.57	0.54
200	1989	2.39	1.81	1.75	1.62	1.38	1.31	1.07	1.03	0.99	0.96
200	1990	2.95	1.39	1.27	1.02	0.95	0.89	0.81	0.71	0.71	0.56
200	**5-yr. Avg.**	**2.16**	**1.39**	**1.28**	**1.10**	**0.98**	**0.93**	**0.79**	**0.73**	**0.71**	**0.64**

Table B-2 Visibility impairment associated with a coal-fired EGU located in the Western domain - Run/Scenario # 2
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 10000, 6250, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	246	251	237	221	240	**239.0**
0.1	100	213	224	222	201	213	**214.6**
0.1	200	140	124	118	122	143	**129.4**
0.5	50	93	108	80	80	99	**92.0**
0.5	100	81	87	72	70	94	**80.8**
0.5	200	29	24	20	27	26	**25.2**
1.0	50	37	38	30	35	33	**34.6**
1.0	100	33	22	25	21	21	**24.4**
1.0	200	6	4	4	15	6	**7.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	4.06	3.50	3.32	2.63	2.41	2.26	2.23	2.10	2.07	1.91
50	1987	4.74	3.75	3.26	2.72	2.47	2.41	2.19	2.14	1.88	1.85
50	1988	4.29	3.40	2.92	2.82	2.79	2.67	2.51	2.48	2.42	1.98
50	1989	5.76	5.49	5.07	4.59	4.47	4.45	3.90	3.70	3.67	3.30
50	1990	6.09	4.76	3.84	3.39	3.03	2.91	2.51	2.48	2.42	2.30
50	**5-yr. Avg.**	**4.99**	**4.18**	**3.68**	**3.23**	**3.04**	**2.94**	**2.67**	**2.58**	**2.49**	**2.27**
100	1986	3.18	2.56	2.42	2.35	2.01	1.87	1.86	1.78	1.62	1.60
100	1987	2.59	2.10	1.98	1.90	1.83	1.63	1.51	1.43	1.41	1.40
100	1988	3.81	2.37	2.03	2.00	1.73	1.69	1.60	1.47	1.44	1.42
100	1989	4.16	3.16	3.11	2.73	2.60	2.05	1.99	1.77	1.68	1.53
100	1990	4.18	2.82	2.28	2.25	2.12	2.00	1.78	1.43	1.38	1.26
100	**5-yr. Avg.**	**3.58**	**2.60**	**2.36**	**2.25**	**2.06**	**1.85**	**1.75**	**1.57**	**1.51**	**1.44**
200	1986	2.89	1.74	1.67	1.37	1.32	1.16	0.94	0.87	0.86	0.84
200	1987	2.30	1.41	1.28	1.01	0.90	0.88	0.85	0.77	0.74	0.73
200	1988	2.43	1.74	1.29	1.01	0.90	0.88	0.80	0.71	0.69	0.69
200	1989	2.89	2.75	1.95	1.58	1.37	1.37	1.35	1.32	1.31	1.24
200	1990	3.33	2.83	1.79	1.56	1.34	1.05	1.00	0.88	0.88	0.87
200	**5-yr. Avg.**	**2.77**	**2.09**	**1.59**	**1.30**	**1.17**	**1.07**	**0.99**	**0.91**	**0.90**	**0.87**

Table B-3 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 3
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 5000, 3500, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	93	82	107	99	93	**94.8**
0.1	100	69	79	67	82	71	**73.6**
0.1	200	47	54	42	49	56	**49.6**
0.5	50	14	17	15	23	20	**17.8**
0.5	100	9	9	10	13	14	**11.0**
0.5	200	6	6	4	12	9	**7.4**
1.0	50	4	4	4	7	4	**4.6**
1.0	100	2	3	2	4	4	**3.0**
1.0	200	1	0	1	1	1	**0.8**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	2.47	1.57	1.26	1.02	0.98	0.93	0.82	0.81	0.70	0.68
50	1987	2.48	1.60	1.39	1.06	0.92	0.81	0.79	0.75	0.68	0.65
50	1988	1.81	1.64	1.48	1.33	0.93	0.90	0.86	0.70	0.68	0.68
50	1989	3.75	1.99	1.47	1.34	1.26	1.11	1.04	0.97	0.92	0.92
50	1990	2.39	2.09	1.24	1.09	0.94	0.90	0.80	0.72	0.71	0.67
50	**5-yr. Avg.**	**2.58**	**1.77**	**1.37**	**1.17**	**1.01**	**0.93**	**0.86**	**0.79**	**0.74**	**0.72**
100	1986	2.52	1.16	0.98	0.76	0.68	0.59	0.56	0.53	0.51	0.46
100	1987	1.64	1.43	1.01	0.88	0.80	0.79	0.63	0.57	0.53	0.50
100	1988	2.11	1.13	0.98	0.78	0.76	0.70	0.59	0.59	0.52	0.51
100	1989	1.37	1.19	1.16	1.08	0.97	0.93	0.85	0.80	0.77	0.70
100	1990	2.13	1.39	1.09	1.03	0.92	0.91	0.84	0.78	0.77	0.74
100	**5-yr. Avg.**	**1.95**	**1.26**	**1.04**	**0.90**	**0.83**	**0.78**	**0.70**	**0.65**	**0.62**	**0.58**
200	1986	1.07	0.88	0.68	0.58	0.58	0.55	0.48	0.46	0.37	0.34
200	1987	0.99	0.70	0.64	0.56	0.56	0.55	0.44	0.42	0.35	0.35
200	1988	1.35	0.85	0.81	0.55	0.49	0.37	0.36	0.32	0.32	0.30
200	1989	1.44	0.99	0.98	0.95	0.76	0.75	0.72	0.59	0.54	0.52
200	1990	1.68	0.82	0.67	0.61	0.51	0.49	0.45	0.44	0.38	0.33
200	**5-yr. Avg.**	**1.31**	**0.85**	**0.76**	**0.65**	**0.58**	**0.54**	**0.49**	**0.45**	**0.39**	**0.37**

Table B-4 Visibility impairment associated with a coal-fired EGU located in the Western domain - Run/Scenario # 4
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 5000, 6250, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	217	228	214	193	217	**213.8**
0.1	100	191	199	193	179	191	**190.6**
0.1	200	114	98	88	98	108	**101.2**
0.5	50	71	70	55	50	63	**61.8**
0.5	100	61	51	48	49	69	**55.6**
0.5	200	20	11	10	19	14	**14.8**
1.0	50	27	28	21	28	23	**25.4**
1.0	100	22	13	14	13	10	**14.4**
1.0	200	5	3	3	5	4	**4.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	3.41	3.01	2.82	2.24	1.96	1.95	1.83	1.70	1.69	1.68
50	1987	4.14	3.03	2.60	2.30	2.11	2.04	1.84	1.67	1.63	1.48
50	1988	3.69	2.92	2.36	2.26	2.21	2.15	2.04	1.95	1.80	1.64
50	1989	4.60	0.51	4.00	3.63	3.59	3.53	3.19	2.98	2.92	2.56
50	1990	4.95	3.71	3.25	2.68	2.20	2.07	2.03	2.00	1.88	1.77
50	**5-yr. Avg.**	**4.16**	**2.64**	**3.00**	**2.62**	**2.41**	**2.35**	**2.19**	**2.06**	**1.98**	**1.82**
100	1986	2.61	2.26	2.11	2.06	1.80	1.60	1.53	1.45	1.38	1.35
100	1987	2.28	1.80	1.61	1.53	1.33	1.31	1.24	1.19	1.17	1.14
100	1988	3.10	1.93	1.63	1.60	1.36	1.29	1.24	1.18	1.13	1.11
100	1989	3.15	2.34	2.33	2.09	1.96	1.56	1.41	1.28	1.21	1.20
100	1990	3.21	2.20	1.70	1.67	1.64	1.61	1.48	1.15	1.09	1.02
100	**5-yr. Avg.**	**2.87**	**2.11**	**1.88**	**1.79**	**1.62**	**1.47**	**1.38**	**1.25**	**1.20**	**1.16**
200	1986	2.30	1.42	1.36	1.14	1.13	0.96	0.77	0.70	0.70	0.68
200	1987	1.82	1.19	1.04	0.83	0.73	0.61	0.58	0.58	0.58	0.53
200	1988	1.93	1.43	1.04	0.81	0.74	0.72	0.65	0.58	0.54	0.53
200	1989	2.11	2.03	1.55	1.10	1.08	0.99	0.95	0.95	0.92	0.92
200	1990	2.79	2.30	1.46	1.25	0.98	0.81	0.75	0.68	0.64	0.64
200	**5-yr. Avg.**	**2.19**	**1.67**	**1.29**	**1.03**	**0.93**	**0.82**	**0.74**	**0.70**	**0.68**	**0.66**

Table B-5 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 5
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 1000, 3500, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	64	48	67	74	66	**63.8**
0.1	100	35	34	35	47	37	**37.6**
0.1	200	21	22	17	24	23	**21.4**
0.5	50	4	7	6	9	5	**6.2**
0.5	100	3	4	3	4	4	**3.6**
0.5	200	2	1	1	2	1	**1.4**
1.0	50	2	1	1	2	1	**1.4**
1.0	100	1	1	1	0	0	**0.6**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	1.67	1.05	0.77	0.54	0.47	0.46	0.41	0.39	0.39	0.33
50	1987	1.73	0.98	0.83	0.68	0.62	0.59	0.55	0.49	0.39	0.36
50	1988	1.06	0.87	0.75	0.62	0.58	0.56	0.39	0.38	0.37	0.37
50	1989	2.91	1.66	0.86	0.81	0.66	0.65	0.57	0.57	0.54	0.49
50	1990	1.29	0.98	0.63	0.54	0.51	0.47	0.46	0.44	0.43	0.43
50	**5-yr. Avg.**	**1.73**	**1.11**	**0.77**	**0.64**	**0.57**	**0.55**	**0.48**	**0.46**	**0.43**	**0.40**
100	1986	1.36	0.72	0.51	0.42	0.37	0.36	0.32	0.30	0.30	0.26
100	1987	1.06	0.82	0.55	0.53	0.41	0.35	0.34	0.32	0.30	0.27
100	1988	1.26	0.56	0.53	0.39	0.37	0.35	0.32	0.31	0.26	0.26
100	1989	0.90	0.72	0.55	0.53	0.49	0.42	0.38	0.38	0.37	0.37
100	1990	0.84	0.64	0.62	0.50	0.48	0.45	0.40	0.39	0.33	0.29
100	**5-yr. Avg.**	**1.08**	**0.69**	**0.55**	**0.47**	**0.42**	**0.39**	**0.35**	**0.34**	**0.31**	**0.29**
200	1986	0.70	0.55	0.40	0.36	0.33	0.33	0.33	0.28	0.21	0.18
200	1987	0.57	0.49	0.44	0.34	0.25	0.24	0.23	0.22	0.21	0.21
200	1988	0.72	0.45	0.44	0.39	0.27	0.21	0.19	0.18	0.17	0.16
200	1989	0.70	0.54	0.41	0.35	0.32	0.28	0.28	0.25	0.25	0.23
200	1990	0.63	0.42	0.31	0.25	0.23	0.18	0.17	0.16	0.16	0.16
200	**5-yr. Avg.**	**0.66**	**0.49**	**0.40**	**0.34**	**0.28**	**0.25**	**0.24**	**0.22**	**0.20**	**0.19**

Table B-6 Visibility impairment associated with a coal-fired EGU located in the Western domain - Run/Scenario # 6

(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 1000, 6250, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	165	184	165	162	175	**170.2**
0.1	100	158	150	155	150	155	**153.6**
0.1	200	79	60	65	70	73	**69.4**
0.5	50	55	52	41	39	42	**45.8**
0.5	100	45	42	39	32	44	**40.4**
0.5	200	12	5	7	10	9	**8.6**
1.0	50	18	17	17	19	16	**17.4**
1.0	100	16	8	8	9	7	**9.6**
1.0	200	3	2	2	3	3	**2.6**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	2.92	2.60	2.39	1.99	1.74	1.73	1.56	1.50	1.49	1.37
50	1987	3.63	2.41	2.07	1.84	1.76	1.69	1.62	1.50	1.32	1.28
50	1988	3.19	2.47	2.00	1.82	1.79	1.72	1.70	1.51	1.47	1.27
50	1989	3.57	3.45	3.05	2.87	2.83	2.74	2.57	2.40	2.24	1.93
50	1990	3.93	2.79	2.74	2.08	1.76	1.66	1.56	1.48	1.42	1.33
50	**5-yr. Avg.**	**3.45**	**2.74**	**2.45**	**2.12**	**1.97**	**1.91**	**1.80**	**1.68**	**1.59**	**1.44**
100	1986	2.16	2.03	1.85	1.82	1.62	1.33	1.30	1.19	1.15	1.13
100	1987	2.05	1.55	1.37	1.19	1.16	1.15	1.11	1.01	0.99	0.98
100	1988	2.49	1.68	1.39	1.28	1.13	1.09	1.03	1.02	0.96	0.95
100	1989	2.26	1.66	1.63	1.56	1.39	1.15	1.06	1.06	1.02	0.96
100	1990	2.36	1.76	1.46	1.25	1.23	1.15	1.07	0.97	0.91	0.87
100	**5-yr. Avg.**	**2.26**	**1.74**	**1.54**	**1.42**	**1.31**	**1.18**	**1.11**	**1.05**	**1.00**	**0.98**
200	1986	1.81	1.15	1.11	0.97	0.95	0.80	0.63	0.60	0.58	0.57
200	1987	1.42	1.04	0.84	0.68	0.63	0.49	0.47	0.46	0.43	0.41
200	1988	1.50	1.17	0.84	0.65	0.57	0.54	0.50	0.48	0.42	0.42
200	1989	1.60	1.34	1.22	0.97	0.72	0.70	0.68	0.62	0.59	0.58
200	1990	2.33	1.86	1.16	1.00	0.76	0.69	0.58	0.56	0.52	0.49
200	**5-yr. Avg.**	**1.73**	**1.31**	**1.03**	**0.85**	**0.73**	**0.64**	**0.57**	**0.54**	**0.51**	**0.49**

Table B-7 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 7
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 1000, 350, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	10	12	13	19	17	**14.2**
0.1	100	6	8	8	10	12	**8.8**
0.1	200	3	4	4	10	4	**5.0**
0.5	50	0	0	0	1	0	**0.2**
0.5	100	0	0	0	0	0	**0.0**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	0	0	0	0	0	**0.0**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	0.45	0.24	0.20	0.19	0.17	0.15	0.14	0.13	0.12	0.10
50	1987	0.44	0.28	0.25	0.17	0.16	0.15	0.14	0.13	0.13	0.12
50	1988	0.38	0.29	0.28	0.20	0.17	0.16	0.15	0.13	0.13	0.12
50	1989	0.57	0.27	0.27	0.24	0.23	0.18	0.18	0.16	0.16	0.15
50	1990	0.46	0.40	0.22	0.19	0.17	0.15	0.14	0.13	0.13	0.12
50	**5-yr. Avg.**	**0.46**	**0.30**	**0.24**	**0.20**	**0.18**	**0.16**	**0.15**	**0.14**	**0.13**	**0.12**
100	1986	0.45	0.18	0.17	0.13	0.12	0.11	0.10	0.09	0.08	0.08
100	1987	0.27	0.27	0.18	0.16	0.15	0.15	0.12	0.11	0.10	0.10
100	1988	0.35	0.20	0.16	0.14	0.12	0.12	0.11	0.11	0.09	0.08
100	1989	0.25	0.22	0.19	0.18	0.16	0.15	0.14	0.14	0.13	0.12
100	1990	0.44	0.25	0.19	0.18	0.17	0.16	0.15	0.13	0.13	0.13
100	**5-yr. Avg.**	**0.35**	**0.22**	**0.18**	**0.16**	**0.14**	**0.14**	**0.12**	**0.12**	**0.11**	**0.10**
200	1986	0.18	0.13	0.11	0.09	0.09	0.09	0.07	0.06	0.06	0.06
200	1987	0.18	0.13	0.11	0.10	0.10	0.10	0.08	0.07	0.07	0.06
200	1988	0.23	0.14	0.13	0.11	0.08	0.07	0.06	0.06	0.06	0.06
200	1989	0.27	0.20	0.19	0.17	0.15	0.14	0.11	0.11	0.10	0.10
200	1990	0.34	0.15	0.14	0.11	0.10	0.09	0.08	0.07	0.07	0.06
200	**5-yr. Avg.**	**0.24**	**0.15**	**0.14**	**0.12**	**0.10**	**0.10**	**0.08**	**0.08**	**0.07**	**0.07**

Table B-8 Visibility impairment associated with a coal-fired EGU located in the Western domain - Run/Scenario # 1
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 1000, 625, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	40	46	34	35	38	**38.6**
0.1	100	35	26	27	24	26	**27.6**
0.1	200	6	4	4	15	6	**7.0**
0.5	50	0	1	1	6	2	**2.0**
0.5	100	0	0	0	0	0	**0.0**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	0	0	0	0	0	**0.0**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	0.46	0.40	0.37	0.29	0.27	0.25	0.25	0.23	0.23	0.21
50	1987	0.56	0.45	0.37	0.31	0.29	0.26	0.25	0.23	0.22	0.21
50	1988	0.52	0.40	0.32	0.32	0.31	0.29	0.29	0.27	0.27	0.22
50	1989	0.72	0.69	0.63	0.55	0.54	0.54	0.45	0.45	0.42	0.38
50	1990	0.80	0.58	0.47	0.42	0.34	0.34	0.28	0.27	0.26	0.25
50	**5-yr. Avg.**	**0.62**	**0.50**	**0.43**	**0.38**	**0.35**	**0.34**	**0.30**	**0.29**	**0.28**	**0.25**
100	1986	0.36	0.28	0.26	0.26	0.22	0.20	0.20	0.19	0.17	0.17
100	1987	0.29	0.23	0.22	0.20	0.19	0.17	0.16	0.15	0.15	0.15
100	1988	0.45	0.25	0.22	0.22	0.18	0.18	0.17	0.16	0.15	0.15
100	1989	0.49	0.36	0.35	0.30	0.29	0.22	0.21	0.19	0.17	0.16
100	1990	0.49	0.31	0.25	0.24	0.23	0.22	0.19	0.15	0.14	0.14
100	**5-yr. Avg.**	**0.41**	**0.29**	**0.26**	**0.24**	**0.22**	**0.20**	**0.18**	**0.17**	**0.16**	**0.15**
200	1986	0.32	0.18	0.18	0.14	0.14	0.12	0.09	0.09	0.09	0.09
200	1987	0.25	0.15	0.13	0.10	0.09	0.09	0.09	0.08	0.08	0.07
200	1988	0.27	0.18	0.13	0.10	0.09	0.09	0.08	0.07	0.07	0.07
200	1989	0.32	0.31	0.21	0.17	0.14	0.14	0.14	0.14	0.14	0.13
200	1990	0.38	0.32	0.19	0.16	0.14	0.11	0.10	0.09	0.09	0.09
200	**5-yr. Avg.**	**0.31**	**0.23**	**0.17**	**0.14**	**0.12**	**0.11**	**0.10**	**0.09**	**0.09**	**0.09**

Table B-9 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 9
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 30000, 10000, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	161	153	164	163	164	**161.0**
0.1	100	146	153	146	153	171	**153.8**
0.1	200	124	139	133	128	136	**132.0**
0.5	50	90	81	95	93	87	**89.2**
0.5	100	66	71	64	81	65	**69.4**
0.5	200	48	54	39	49	56	**49.2**
1.0	50	45	42	56	64	45	**50.4**
1.0	100	32	32	29	45	41	**35.8**
1.0	200	20	20	20	34	20	**22.8**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	8.57	5.04	4.52	4.16	3.73	3.71	3.36	3.32	2.68	2.60
50	1987	8.57	5.55	5.16	4.04	3.98	3.66	3.36	3.33	3.14	3.08
50	1988	7.66	6.26	5.67	4.71	4.04	3.81	3.54	3.32	3.25	3.12
50	1989	9.89	5.93	5.79	5.15	4.83	4.34	4.20	3.96	3.65	3.38
50	1990	8.60	7.71	5.05	4.31	3.87	3.79	3.58	3.35	3.19	3.11
50	**5-yr. Avg.**	**8.66**	**6.10**	**5.24**	**4.47**	**4.09**	**3.86**	**3.61**	**3.46**	**3.18**	**3.06**
100	1986	8.66	4.26	4.08	3.31	3.05	2.70	2.46	2.35	2.24	2.22
100	1987	5.98	5.83	4.33	3.99	3.80	3.66	3.15	2.75	2.57	2.50
100	1988	7.29	4.70	3.91	3.54	3.12	3.02	2.96	2.85	2.27	2.19
100	1989	5.60	4.94	4.46	4.30	3.91	3.58	3.55	3.49	3.38	2.98
100	1990	8.42	5.69	4.57	4.29	4.02	3.72	3.70	3.26	3.25	3.23
100	**5-yr. Avg.**	**7.19**	**5.08**	**4.27**	**3.88**	**3.58**	**3.34**	**3.16**	**2.94**	**2.74**	**2.62**
200	1986	4.40	3.31	2.92	2.39	2.36	2.26	1.88	1.78	1.77	1.59
200	1987	4.39	3.21	2.96	2.71	2.64	2.61	2.16	1.99	1.82	1.65
200	1988	5.24	3.55	3.32	2.80	2.10	1.83	1.75	1.65	1.62	1.54
200	1989	5.92	4.67	4.54	4.23	3.67	3.51	2.91	2.82	2.72	2.63
200	1990	7.07	3.70	3.41	2.79	2.61	2.46	2.26	1.99	1.98	1.58
200	**5-yr. Avg.**	**5.40**	**3.69**	**3.43**	**2.98**	**2.67**	**2.53**	**2.19**	**2.05**	**1.98**	**1.80**

Table B-10 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 10
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 3000, 10000, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	113	100	122	116	107	**111.6**
0.1	100	83	95	84	89	90	**88.2**
0.1	200	83	72	62	62	67	**69.2**
0.5	50	28	32	34	39	37	**34.0**
0.5	100	15	19	18	28	22	**20.4**
0.5	200	11	15	8	16	6	**11.2**
1.0	50	9	10	9	15	14	**11.4**
1.0	100	6	5	5	11	8	**7.0**
1.0	200	4	3	4	4	2	**3.4**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	4.35	2.72	2.11	1.43	1.36	1.21	1.12	1.05	1.03	0.93
50	1987	3.58	2.62	2.21	1.76	1.58	1.58	1.47	1.34	1.07	1.01
50	1988	2.90	2.38	2.06	1.75	1.51	1.44	1.07	1.05	1.04	0.96
50	1989	6.82	4.01	2.39	2.09	1.85	1.84	1.60	1.52	1.45	1.36
50	1990	3.28	2.59	1.70	1.49	1.39	1.31	1.30	1.27	1.18	1.17
50	**5-yr. Avg.**	**4.18**	**2.86**	**2.09**	**1.70**	**1.54**	**1.48**	**1.31**	**1.25**	**1.15**	**1.08**
100	1986	3.56	2.00	1.42	1.18	1.01	1.01	0.93	0.86	0.81	0.72
100	1987	2.83	2.23	1.54	1.52	1.17	0.97	0.95	0.88	0.81	0.81
100	1988	3.34	1.59	1.50	1.10	1.06	0.99	0.88	0.82	0.78	0.75
100	1989	2.43	2.02	1.53	1.47	1.39	1.22	1.06	1.06	1.06	1.04
100	1990	2.29	1.76	1.75	1.35	1.33	1.25	1.17	1.11	0.96	0.87
100	**5-yr. Avg.**	**2.89**	**1.92**	**1.55**	**1.32**	**1.19**	**1.09**	**1.00**	**0.95**	**0.89**	**0.84**
200	1986	1.88	1.57	1.12	1.05	0.96	0.94	0.93	0.77	0.60	0.54
200	1987	1.56	1.38	1.23	0.98	0.72	0.70	0.66	0.63	0.60	0.60
200	1988	2.01	1.29	1.28	1.11	0.78	0.62	0.55	0.52	0.50	0.48
200	1989	1.94	1.54	1.17	1.02	0.92	0.82	0.81	0.72	0.71	0.67
200	1990	1.77	1.20	0.87	0.72	0.68	0.53	0.49	0.49	0.47	0.46
200	**5-yr. Avg.**	**1.83**	**1.40**	**1.13**	**0.97**	**0.81**	**0.72**	**0.69**	**0.63**	**0.58**	**0.55**

Table B-11 Visibility impairment associated with a coal-fired EGU located in the Eastern domain - Run/Scenario # 11
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 3000, 1000, and 50 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	48	45	59	65	54	**54.2**
0.1	100	34	34	28	46	41	**36.6**
0.1	200	21	22	20	30	21	**22.8**
0.5	50	4	3	4	7	5	**4.6**
0.5	100	2	3	2	4	4	**3.0**
0.5	200	1	1	1	4	1	**1.6**
1.0	50	1	1	1	1	2	**1.2**
1.0	100	1	0	1	0	1	**0.6**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	1.29	0.69	0.57	0.54	0.47	0.44	0.40	0.37	0.35	0.30
50	1987	1.26	0.81	0.71	0.49	0.48	0.45	0.41	0.38	0.37	0.37
50	1988	1.09	0.83	0.80	0.59	0.48	0.46	0.43	0.39	0.38	0.36
50	1989	1.60	0.78	0.76	0.66	0.66	0.52	0.52	0.47	0.46	0.43
50	1990	1.31	1.12	0.63	0.54	0.51	0.45	0.42	0.39	0.37	0.36
50	**5-yr. Avg.**	**1.31**	**0.85**	**0.69**	**0.56**	**0.52**	**0.46**	**0.43**	**0.40**	**0.38**	**0.36**
100	1986	1.28	0.51	0.49	0.37	0.36	0.31	0.28	0.26	0.25	0.24
100	1987	0.78	0.77	0.52	0.48	0.45	0.43	0.37	0.31	0.29	0.28
100	1988	1.01	0.58	0.47	0.41	0.36	0.35	0.33	0.33	0.25	0.24
100	1989	0.73	0.62	0.55	0.53	0.45	0.43	0.41	0.41	0.39	0.34
100	1990	1.25	0.73	0.56	0.52	0.48	0.46	0.44	0.39	0.38	0.37
100	**5-yr. Avg.**	**1.01**	**0.64**	**0.52**	**0.46**	**0.42**	**0.40**	**0.36**	**0.34**	**0.31**	**0.30**
200	1986	0.53	0.37	0.33	0.26	0.26	0.25	0.20	0.19	0.19	0.17
200	1987	0.53	0.37	0.33	0.31	0.29	0.29	0.24	0.22	0.20	0.18
200	1988	0.66	0.41	0.38	0.32	0.23	0.20	0.19	0.18	0.17	0.16
200	1989	0.77	0.58	0.55	0.51	0.43	0.41	0.33	0.31	0.31	0.30
200	1990	0.98	0.43	0.40	0.32	0.29	0.27	0.25	0.22	0.22	0.17
200	**5-yr. Avg.**	**0.69**	**0.43**	**0.40**	**0.34**	**0.30**	**0.29**	**0.24**	**0.22**	**0.22**	**0.20**

Table B-12 Visibility impairment associated with a coal-fired Industrial Boiler located in the Eastern domain - Run/Scenario # 12
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 7000, 1400, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	157	161	142	136	167	**152.6**
0.1	100	103	101	92	94	115	**101.0**
0.1	200	53	60	47	53	61	**54.8**
0.5	50	53	51	42	55	61	**52.4**
0.5	100	22	19	15	26	22	**20.8**
0.5	200	12	7	6	12	10	**9.4**
1.0	50	18	23	13	22	18	**18.8**
1.0	100	6	8	7	10	9	**8.0**
1.0	200	2	1	3	4	2	**2.4**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	5.99	3.27	2.51	2.01	1.98	1.84	1.77	1.56	1.39	1.34
50	1987	4.02	3.19	2.92	2.58	2.17	2.10	1.82	1.70	1.59	1.53
50	1988	3.21	2.38	2.15	2.13	1.87	1.86	1.57	1.39	1.37	1.24
50	1989	5.59	3.21	2.71	2.58	2.08	1.95	1.84	1.79	1.66	1.65
50	1990	4.33	3.35	2.68	2.20	1.79	1.73	1.70	1.69	1.61	1.40
50	**5-yr. Avg.**	**4.63**	**3.08**	**2.59**	**2.30**	**1.98**	**1.90**	**1.74**	**1.62**	**1.53**	**1.43**
100	1986	3.32	2.46	1.80	1.55	1.35	1.04	0.99	0.96	0.93	0.86
100	1987	2.52	1.81	1.39	1.26	1.16	1.08	1.07	1.06	0.83	0.81
100	1988	3.84	1.69	1.50	1.27	1.12	1.10	1.02	0.86	0.75	0.71
100	1989	3.64	1.92	1.61	1.40	1.29	1.28	1.19	1.19	1.17	1.06
100	1990	3.46	2.05	1.48	1.27	1.21	1.13	1.06	1.04	1.00	0.88
100	**5-yr. Avg.**	**3.35**	**1.99**	**1.55**	**1.35**	**1.23**	**1.12**	**1.07**	**1.02**	**0.94**	**0.86**
200	1986	1.67	1.08	0.96	0.89	0.66	0.65	0.56	0.56	0.53	0.52
200	1987	1.52	0.95	0.87	0.84	0.63	0.55	0.54	0.44	0.42	0.40
200	1988	1.94	1.18	1.12	0.84	0.76	0.51	0.49	0.38	0.36	0.33
200	1989	2.17	1.37	1.23	1.12	0.88	0.83	0.72	0.70	0.66	0.66
200	1990	2.19	1.17	0.98	0.83	0.73	0.68	0.67	0.54	0.53	0.50
200	**5-yr. Avg.**	**1.90**	**1.15**	**1.03**	**0.91**	**0.73**	**0.64**	**0.60**	**0.53**	**0.50**	**0.48**

Table B-13 Visibility impairment associated with a coal-fired Industrial Boiler located in the Western domain - Run/Scenario # 13 (CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 7000, 1400, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	252	263	251	240	247	**250.6**
0.1	100	189	195	207	181	195	**193.4**
0.1	200	103	88	83	86	95	**91.0**
0.5	50	93	93	90	81	92	**89.8**
0.5	100	41	32	31	30	36	**34.0**
0.5	200	9	6	7	18	8	**9.6**
1.0	50	33	26	21	25	21	**25.2**
1.0	100	7	6	6	40	6	**13.0**
1.0	200	1	1	1	3	2	**1.6**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	6.05	3.30	2.73	2.27	1.97	1.94	1.86	1.75	1.64	1.61
50	1987	3.89	3.11	3.09	2.53	2.26	2.01	1.92	1.81	1.74	1.65
50	1988	6.27	4.15	2.99	2.73	2.38	2.12	1.83	1.69	1.60	1.56
50	1989	5.36	4.60	3.83	3.65	3.51	3.48	3.19	3.10	3.05	2.91
50	1990	5.33	3.89	3.72	3.24	2.62	2.32	2.29	2.19	2.13	1.87
50	**5-yr. Avg.**	**5.38**	**3.81**	**3.27**	**2.88**	**2.55**	**2.38**	**2.22**	**2.11**	**2.03**	**1.92**
100	1986	1.52	1.42	1.27	1.27	1.25	1.23	1.12	0.93	0.89	0.88
100	1987	2.64	1.53	1.15	1.10	1.06	1.01	0.96	0.89	0.81	0.76
100	1988	3.01	2.64	1.56	1.33	1.20	1.10	0.91	0.89	0.81	0.80
100	1989	2.59	2.24	2.10	1.90	1.75	1.41	1.24	1.22	1.03	1.01
100	1990	3.16	1.73	1.55	1.46	1.16	1.05	1.00	0.97	0.95	0.81
100	**5-yr. Avg.**	**2.58**	**1.91**	**1.53**	**1.41**	**1.28**	**1.16**	**1.04**	**0.98**	**0.90**	**0.85**
200	1986	1.35	0.83	0.79	0.69	0.68	0.64	0.63	0.51	0.51	0.49
200	1987	1.20	0.87	0.68	0.60	0.58	0.57	0.49	0.46	0.44	0.43
200	1988	1.77	0.97	0.74	0.65	0.56	0.55	0.52	0.42	0.42	0.40
200	1989	1.69	1.40	1.07	0.91	0.85	0.84	0.79	0.73	0.70	0.68
200	1990	1.63	1.42	1.00	0.77	0.66	0.62	0.53	0.53	0.48	0.44
200	**5-yr. Avg.**	**1.53**	**1.10**	**0.86**	**0.73**	**0.67**	**0.64**	**0.59**	**0.53**	**0.51**	**0.49**

Table B-14 Visibility impairment associated with a coal-fired Industrial Boiler located in the Eastern domain - Run/Scenario # 14
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 900, 1400, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	78	86	73	79	98	**82.8**
0.1	100	33	37	27	45	34	**35.2**
0.1	200	18	15	10	6	9	**11.6**
0.5	50	12	16	9	13	10	**12.0**
0.5	100	4	3	3	2	2	**2.8**
0.5	200	1	0	1	1	1	**0.8**
1.0	50	3	3	1	4	1	**2.4**
1.0	100	1	0	1	1	0	**0.6**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	2.48	1.07	1.01	0.99	0.83	0.69	0.67	0.65	0.61	0.58
50	1987	1.56	1.36	1.14	0.99	0.86	0.79	0.77	0.71	0.67	0.60
50	1988	1.14	0.96	0.86	0.82	0.73	0.71	0.68	0.64	0.50	0.44
50	1989	2.30	1.23	1.16	1.01	0.86	0.73	0.66	0.62	0.58	0.55
50	1990	1.55	0.90	0.89	0.75	0.72	0.65	0.63	0.57	0.54	0.52
50	**5-yr. Avg.**	**1.81**	**1.10**	**1.01**	**0.91**	**0.80**	**0.71**	**0.68**	**0.64**	**0.58**	**0.54**
100	1986	1.15	0.81	0.60	0.51	0.46	0.43	0.39	0.33	0.31	0.29
100	1987	0.88	0.69	0.54	0.47	0.40	0.38	0.36	0.34	0.31	0.31
100	1988	1.29	0.55	0.53	0.47	0.38	0.34	0.31	0.29	0.25	0.25
100	1989	1.25	0.78	0.47	0.47	0.39	0.38	0.36	0.35	0.34	0.33
100	1990	0.97	0.62	0.42	0.37	0.33	0.29	0.28	0.25	0.24	0.23
100	**5-yr. Avg.**	**1.11**	**0.69**	**0.51**	**0.46**	**0.39**	**0.36**	**0.34**	**0.31**	**0.29**	**0.28**
200	1986	0.51	0.37	0.29	0.24	0.22	0.22	0.20	0.20	0.19	0.18
200	1987	0.36	0.31	0.29	0.27	0.24	0.17	0.16	0.16	0.16	0.14
200	1988	0.55	0.32	0.28	0.24	0.21	0.19	0.13	0.12	0.11	0.10
200	1989	0.75	0.33	0.26	0.23	0.20	0.18	0.18	0.17	0.16	0.16
200	1990	0.55	0.33	0.22	0.16	0.14	0.13	0.13	0.12	0.11	0.09
200	**5-yr. Avg.**	**0.54**	**0.33**	**0.27**	**0.23**	**0.20**	**0.18**	**0.16**	**0.15**	**0.15**	**0.13**

Table B-15 Visibility impairment associated with a coal-fired Industrial Boiler located in the Western domain - Run/Scenario # 15 (CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 900, 1400, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	160	170	161	155	156	**160.4**
0.1	100	102	79	94	89	100	**92.8**
0.1	200	23	18	21	21	21	**20.8**
0.5	50	33	29	23	24	19	**25.6**
0.5	100	7	5	4	5	2	**4.6**
0.5	200	1	0	1	0	2	**0.8**
1.0	50	8	8	5	11	5	**7.4**
1.0	100	0	1	1	0	1	**0.6**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	2.75	1.30	1.28	1.25	1.19	1.08	1.05	1.03	0.99	0.98
50	1987	2.17	1.49	1.44	1.27	1.16	1.10	1.07	1.06	0.92	0.85
50	1988	3.12	1.85	1.22	1.14	1.13	0.98	0.91	0.87	0.85	0.81
50	1989	2.05	1.85	1.62	1.55	1.54	1.53	1.31	1.22	1.19	1.16
50	1990	2.28	1.93	1.46	1.43	1.32	0.97	0.93	0.68	0.67	0.66
50	**5-yr. Avg.**	**2.47**	**1.68**	**1.40**	**1.33**	**1.27**	**1.13**	**1.05**	**0.97**	**0.92**	**0.89**
100	1986	0.81	0.80	0.71	0.65	0.64	0.62	0.50	0.46	0.45	0.43
100	1987	1.20	0.73	0.62	0.60	0.54	0.48	0.48	0.43	0.40	0.35
100	1988	1.20	0.95	0.73	0.54	0.44	0.40	0.40	0.38	0.37	0.36
100	1989	0.83	0.77	0.65	0.61	0.56	0.49	0.40	0.38	0.37	0.36
100	1990	1.06	0.61	0.50	0.49	0.48	0.47	0.41	0.38	0.36	0.36
100	**5-yr. Avg.**	**1.02**	**0.77**	**0.64**	**0.58**	**0.53**	**0.49**	**0.44**	**0.41**	**0.39**	**0.37**
200	1986	0.52	0.39	0.38	0.32	0.31	0.29	0.29	0.20	0.19	0.18
200	1987	0.45	0.34	0.29	0.27	0.21	0.18	0.17	0.16	0.16	0.14
200	1988	0.66	0.42	0.27	0.26	0.24	0.20	0.19	0.17	0.14	0.13
200	1989	0.47	0.46	0.34	0.26	0.24	0.24	0.21	0.21	0.20	0.20
200	1990	0.68	0.61	0.39	0.37	0.25	0.20	0.19	0.17	0.16	0.16
200	**5-yr. Avg.**	**0.56**	**0.44**	**0.34**	**0.30**	**0.25**	**0.22**	**0.21**	**0.18**	**0.17**	**0.16**

Table B-16 Visibility impairment associated with a coal-fired Industrial Boiler located in the Eastern domain - Run/Scenario # 16 (CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 900, 300, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	38	37	30	50	50	**41.0**
0.1	100	16	15	10	18	14	**14.6**
0.1	200	5	4	5	6	4	**4.8**
0.5	50	2	3	1	2	2	**2.0**
0.5	100	1	0	1	1	1	**0.8**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	1	0	0	1	0	**0.4**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	1.20	0.53	0.42	0.35	0.32	0.30	0.30	0.27	0.24	0.24
50	1987	0.68	0.54	0.52	0.48	0.37	0.35	0.30	0.27	0.27	0.26
50	1988	0.55	0.39	0.35	0.34	0.32	0.31	0.27	0.25	0.20	0.19
50	1989	1.06	0.55	0.46	0.44	0.35	0.31	0.31	0.29	0.26	0.25
50	1990	0.73	0.54	0.45	0.36	0.30	0.29	0.28	0.27	0.25	0.23
50	**5-yr. Avg.**	**0.84**	**0.51**	**0.44**	**0.39**	**0.33**	**0.31**	**0.29**	**0.27**	**0.25**	**0.24**
100	1986	0.56	0.40	0.28	0.25	0.22	0.15	0.15	0.14	0.13	0.13
100	1987	0.41	0.27	0.22	0.20	0.17	0.16	0.16	0.15	0.13	0.12
100	1988	0.65	0.26	0.23	0.19	0.18	0.16	0.14	0.12	0.11	0.11
100	1989	0.60	0.28	0.26	0.22	0.20	0.19	0.19	0.18	0.17	0.15
100	1990	0.54	0.32	0.22	0.19	0.18	0.17	0.16	0.15	0.14	0.13
100	**5-yr. Avg.**	**0.55**	**0.31**	**0.24**	**0.21**	**0.19**	**0.16**	**0.16**	**0.15**	**0.14**	**0.13**
200	1986	0.25	0.17	0.14	0.12	0.10	0.09	0.09	0.09	0.08	0.08
200	1987	0.22	0.14	0.12	0.12	0.10	0.08	0.07	0.07	0.06	0.06
200	1988	0.30	0.17	0.17	0.12	0.11	0.07	0.07	0.05	0.05	0.05
200	1989	0.35	0.20	0.17	0.16	0.12	0.11	0.10	0.10	0.09	0.09
200	1990	0.32	0.16	0.14	0.11	0.10	0.09	0.09	0.08	0.08	0.07
200	**5-yr. Avg.**	**0.29**	**0.17**	**0.15**	**0.13**	**0.11**	**0.09**	**0.08**	**0.08**	**0.07**	**0.07**

Table B-17 Visibility impairment associated with a coal-fired Industrial Boiler located in the Western domain - Run/Scenario # 17
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 900, 300, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	76	76	72	58	72	**70.8**
0.1	100	31	19	23	17	21	**22.2**
0.1	200	7	3	3	10	4	**5.4**
0.5	50	2	2	3	9	4	**4.0**
0.5	100	0	0	1	0	1	**0.4**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	1	0	1	0	1	**0.6**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	1.20	0.57	0.45	0.39	0.37	0.37	0.35	0.33	0.31	0.30
50	1987	0.74	0.56	0.50	0.46	0.37	0.35	0.34	0.33	0.31	0.30
50	1988	1.28	0.77	0.51	0.45	0.38	0.36	0.31	0.30	0.28	0.28
50	1989	0.99	0.84	0.68	0.66	0.64	0.63	0.54	0.53	0.53	0.49
50	1990	1.01	0.73	0.65	0.59	0.48	0.40	0.39	0.36	0.33	0.30
50	**5-yr. Avg.**	**1.04**	**0.69**	**0.56**	**0.51**	**0.45**	**0.42**	**0.39**	**0.37**	**0.35**	**0.33**
100	1986	0.27	0.26	0.22	0.22	0.21	0.20	0.20	0.15	0.15	0.15
100	1987	0.46	0.23	0.20	0.19	0.18	0.17	0.15	0.14	0.13	0.13
100	1988	0.51	0.43	0.25	0.21	0.19	0.17	0.15	0.14	0.13	0.13
100	1989	0.41	0.36	0.33	0.30	0.27	0.22	0.19	0.18	0.16	0.15
100	1990	0.52	0.26	0.24	0.23	0.18	0.17	0.17	0.16	0.13	0.13
100	**5-yr. Avg.**	**0.44**	**0.31**	**0.25**	**0.23**	**0.21**	**0.19**	**0.17**	**0.15**	**0.14**	**0.13**
200	1986	0.22	0.14	0.13	0.11	0.11	0.10	0.10	0.07	0.07	0.07
200	1987	0.19	0.14	0.11	0.09	0.08	0.08	0.07	0.07	0.07	0.06
200	1988	0.28	0.16	0.11	0.09	0.09	0.08	0.08	0.06	0.06	0.06
200	1989	0.26	0.21	0.16	0.13	0.12	0.12	0.11	0.11	0.10	0.10
200	1990	0.26	0.24	0.16	0.13	0.10	0.09	0.08	0.07	0.07	0.07
200	**5-yr. Avg.**	**0.24**	**0.18**	**0.13**	**0.11**	**0.10**	**0.09**	**0.09**	**0.08**	**0.07**	**0.07**

Table B-18 Visibility impairment associated with a coal-fired Industrial Boiler located in the Eastern domain - Run/Scenario # 18 (CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 0, 1000, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	40	42	39	52	52	**45.0**
0.1	100	18	20	17	25	13	**18.6**
0.1	200	9	5	2	6	2	**4.8**
0.5	50	5	4	2	4	1	**3.2**
0.5	100	1	0	1	1	0	**0.6**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	1	1	0	1	0	**0.6**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	1.36	0.63	0.63	0.61	0.55	0.42	0.39	0.37	0.36	0.33
50	1987	1.03	0.72	0.69	0.55	0.46	0.44	0.42	0.41	0.38	0.37
50	1988	0.71	0.54	0.50	0.44	0.41	0.38	0.36	0.36	0.30	0.26
50	1989	1.24	0.73	0.63	0.55	0.49	0.38	0.36	0.34	0.34	0.34
50	1990	0.85	0.47	0.42	0.41	0.40	0.37	0.35	0.32	0.30	0.29
50	**5-yr. Avg.**	**1.04**	**0.62**	**0.57**	**0.51**	**0.46**	**0.40**	**0.38**	**0.36**	**0.34**	**0.32**
100	1986	0.57	0.39	0.30	0.27	0.26	0.25	0.22	0.21	0.19	0.18
100	1987	0.47	0.43	0.31	0.26	0.24	0.23	0.21	0.20	0.18	0.17
100	1988	0.61	0.33	0.28	0.28	0.21	0.18	0.17	0.16	0.14	0.13
100	1989	0.67	0.49	0.27	0.23	0.22	0.21	0.21	0.19	0.17	0.16
100	1990	0.46	0.28	0.20	0.20	0.18	0.17	0.15	0.14	0.14	0.12
100	**5-yr. Avg.**	**0.56**	**0.38**	**0.27**	**0.25**	**0.22**	**0.21**	**0.19**	**0.18**	**0.17**	**0.15**
200	1986	0.26	0.18	0.15	0.12	0.12	0.12	0.12	0.11	0.10	0.09
200	1987	0.21	0.17	0.16	0.15	0.13	0.10	0.09	0.09	0.09	0.08
200	1988	0.23	0.14	0.11	0.11	0.09	0.09	0.06	0.06	0.06	0.05
200	1989	0.37	0.18	0.13	0.11	0.11	0.11	0.10	0.08	0.06	0.06
200	1990	0.26	0.10	0.09	0.08	0.06	0.05	0.05	0.05	0.05	0.04
200	**5-yr. Avg.**	**0.27**	**0.15**	**0.13**	**0.11**	**0.10**	**0.09**	**0.08**	**0.08**	**0.07**	**0.06**

Table B-19 Visibility impairment associated with a coal-fired Industrial Boiler located in the Eastern domain - Run/Scenario # 19 (CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 0, 500, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	17	25	19	30	25	**23.2**
0.1	100	8	8	5	7	4	**6.4**
0.1	200	1	1	1	1	1	**1.0**
0.5	50	1	1	0	1	0	**0.6**
0.5	100	0	0	0	0	0	**0.0**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	0	0	0	0	0	**0.0**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	0.72	0.33	0.32	0.31	0.29	0.21	0.20	0.19	0.19	0.17
50	1987	0.53	0.37	0.35	0.29	0.23	0.23	0.22	0.21	0.20	0.19
50	1988	0.36	0.28	0.26	0.23	0.21	0.19	0.19	0.19	0.16	0.14
50	1989	0.64	0.37	0.32	0.28	0.25	0.19	0.19	0.17	0.17	0.17
50	1990	0.44	0.24	0.21	0.21	0.21	0.19	0.18	0.17	0.16	0.15
50	**5-yr. Avg.**	**0.54**	**0.32**	**0.29**	**0.26**	**0.24**	**0.20**	**0.19**	**0.18**	**0.17**	**0.16**
100	1986	0.29	0.19	0.15	0.14	0.13	0.13	0.11	0.11	0.10	0.09
100	1987	0.24	0.22	0.16	0.13	0.12	0.12	0.11	0.10	0.09	0.08
100	1988	0.31	0.17	0.14	0.14	0.10	0.09	0.08	0.08	0.07	0.07
100	1989	0.34	0.25	0.14	0.11	0.11	0.11	0.10	0.09	0.09	0.08
100	1990	0.23	0.14	0.10	0.10	0.09	0.08	0.08	0.07	0.07	0.06
100	**5-yr. Avg.**	**0.28**	**0.19**	**0.14**	**0.12**	**0.11**	**0.11**	**0.10**	**0.09**	**0.08**	**0.08**
200	1986	0.13	0.09	0.07	0.06	0.06	0.06	0.06	0.06	0.05	0.05
200	1987	0.10	0.08	0.08	0.08	0.06	0.05	0.05	0.05	0.04	0.04
200	1988	0.12	0.07	0.06	0.05	0.05	0.05	0.03	0.03	0.03	0.02
200	1989	0.18	0.09	0.07	0.06	0.06	0.05	0.05	0.04	0.03	0.03
200	1990	0.13	0.05	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02
200	**5-yr. Avg.**	**0.13**	**0.08**	**0.06**	**0.06**	**0.05**	**0.05**	**0.04**	**0.04**	**0.04**	**0.03**

Table B-20 Visibility impairment associated with a coal-fired Industrial Boiler located in the Western domain - Run/Scenario # 20
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 0, 1000, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	117	105	98	105	106	**106.2**
0.1	100	59	49	52	48	61	**53.8**
0.1	200	10	5	7	8	7	**7.4**
0.5	50	15	11	10	12	7	**11.0**
0.5	100	2	1	1	0	1	**1.0**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	1	1	2	1	2	**1.4**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	1.58	0.88	0.84	0.81	0.79	0.69	0.68	0.66	0.64	0.63
50	1987	1.46	0.98	0.90	0.83	0.76	0.70	0.69	0.68	0.60	0.51
50	1988	1.88	1.07	0.75	0.74	0.70	0.59	0.56	0.55	0.53	0.51
50	1989	1.08	0.99	0.95	0.90	0.87	0.83	0.77	0.65	0.63	0.62
50	1990	1.27	1.17	0.83	0.81	0.78	0.55	0.51	0.43	0.42	0.38
50	**5-yr. Avg.**	**1.45**	**1.02**	**0.85**	**0.82**	**0.78**	**0.67**	**0.64**	**0.59**	**0.57**	**0.53**
100	1986	0.51	0.50	0.45	0.41	0.40	0.38	0.29	0.27	0.27	0.26
100	1987	0.70	0.47	0.39	0.37	0.34	0.31	0.30	0.27	0.25	0.21
100	1988	0.64	0.48	0.42	0.35	0.27	0.25	0.24	0.23	0.23	0.22
100	1989	0.45	0.41	0.35	0.33	0.32	0.27	0.24	0.24	0.23	0.22
100	1990	0.51	0.35	0.29	0.28	0.27	0.25	0.24	0.23	0.23	0.22
100	**5-yr. Avg.**	**0.56**	**0.44**	**0.38**	**0.35**	**0.32**	**0.29**	**0.26**	**0.25**	**0.24**	**0.23**
200	1986	0.28	0.23	0.21	0.19	0.19	0.17	0.17	0.12	0.11	0.10
200	1987	0.24	0.20	0.17	0.16	0.12	0.10	0.09	0.09	0.08	0.08
200	1988	0.35	0.24	0.17	0.16	0.14	0.12	0.10	0.09	0.09	0.08
200	1989	0.26	0.20	0.18	0.16	0.13	0.12	0.12	0.11	0.10	0.09
200	1990	0.39	0.34	0.22	0.22	0.14	0.11	0.11	0.09	0.09	0.09
200	**5-yr. Avg.**	**0.30**	**0.24**	**0.19**	**0.18**	**0.14**	**0.12**	**0.12**	**0.10**	**0.09**	**0.09**

Table B-21 Visibility impairment associated with a coal-fired Industrial Boiler located in the Western domain - Run/Scenario # 21 (CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 0, 500, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	63	59	51	50	57	**56.0**
0.1	100	20	11	11	14	14	**14.0**
0.1	200	3	1	2	1	4	**2.2**
0.5	50	1	2	2	2	2	**1.8**
0.5	100	0	0	0	0	0	**0.0**
0.5	200	0	0	0	0	0	**0.0**
1.0	50	0	0	0	0	0	**0.0**
1.0	100	0	0	0	0	0	**0.0**
1.0	200	0	0	0	0	0	**0.0**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	0.82	0.46	0.44	0.41	0.41	0.35	0.35	0.34	0.33	0.32
50	1987	0.75	0.50	0.46	0.42	0.39	0.36	0.35	0.34	0.31	0.27
50	1988	0.98	0.55	0.39	0.38	0.35	0.31	0.29	0.28	0.27	0.27
50	1989	0.55	0.50	0.48	0.46	0.45	0.42	0.39	0.32	0.31	0.31
50	1990	0.65	0.60	0.43	0.42	0.39	0.28	0.26	0.22	0.22	0.20
50	**5-yr. Avg.**	**0.75**	**0.52**	**0.44**	**0.42**	**0.40**	**0.34**	**0.33**	**0.30**	**0.29**	**0.27**
100	1986	0.25	0.25	0.23	0.21	0.20	0.19	0.15	0.14	0.14	0.13
100	1987	0.35	0.24	0.20	0.19	0.17	0.15	0.15	0.14	0.13	0.11
100	1988	0.32	0.24	0.21	0.18	0.13	0.13	0.12	0.12	0.12	0.11
100	1989	0.23	0.20	0.18	0.17	0.16	0.14	0.12	0.12	0.12	0.11
100	1990	0.25	0.18	0.15	0.14	0.14	0.13	0.12	0.11	0.11	0.11
100	**5-yr. Avg.**	**0.28**	**0.22**	**0.19**	**0.18**	**0.16**	**0.15**	**0.13**	**0.13**	**0.12**	**0.12**
200	1986	0.14	0.11	0.10	0.09	0.09	0.08	0.08	0.06	0.05	0.05
200	1987	0.12	0.10	0.08	0.08	0.06	0.05	0.05	0.04	0.04	0.04
200	1988	0.17	0.12	0.08	0.08	0.07	0.06	0.05	0.05	0.04	0.04
200	1989	0.13	0.10	0.09	0.08	0.06	0.06	0.06	0.05	0.05	0.05
200	1990	0.20	0.17	0.11	0.11	0.07	0.06	0.05	0.05	0.05	0.04
200	**5-yr. Avg.**	**0.15**	**0.12**	**0.09**	**0.09**	**0.07**	**0.06**	**0.06**	**0.05**	**0.05**	**0.04**

Table B-22 Visibility impairment associated with a coal-fired Industrial Boiler located in the Eastern domain - Run/Scenario # 22
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 7000, 1400, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	148	152	134	133	171	**147.6**
0.1	100	97	100	90	94	113	**98.8**
0.1	200	54	60	48	51	62	**55.0**
0.5	50	46	44	40	51	57	**47.6**
0.5	100	22	19	15	25	22	**20.6**
0.5	200	10	7	6	13	10	**9.2**
1.0	50	16	17	13	16	15	**15.4**
1.0	100	7	8	6	10	8	**7.8**
1.0	200	2	1	3	4	2	**2.4**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	5.35	3.07	2.30	1.90	1.82	1.64	1.61	1.38	1.31	1.26
50	1987	4.12	2.83	2.58	2.16	2.05	1.87	1.72	1.52	1.38	1.36
50	1988	3.08	2.28	1.99	1.84	1.76	1.59	1.47	1.33	1.24	1.21
50	1989	5.04	3.05	2.64	2.47	2.06	1.74	1.62	1.54	1.52	1.47
50	1990	4.08	3.16	2.46	2.21	1.66	1.59	1.57	1.55	1.35	1.26
50	**5-yr. Avg.**	**4.34**	**2.88**	**2.39**	**2.12**	**1.87**	**1.68**	**1.60**	**1.46**	**1.36**	**1.31**
100	1986	3.10	2.32	1.87	1.46	1.31	1.05	1.02	0.88	0.86	0.85
100	1987	2.45	1.86	1.45	1.23	1.15	1.10	1.08	1.05	0.76	0.74
100	1988	3.81	1.66	1.39	1.27	1.13	1.12	0.95	0.87	0.77	0.72
100	1989	3.52	1.90	1.63	1.43	1.23	1.20	1.17	1.16	1.12	1.08
100	1990	3.50	2.06	1.48	1.28	1.21	1.14	1.08	1.04	0.94	0.88
100	**5-yr. Avg.**	**3.28**	**1.96**	**1.57**	**1.33**	**1.20**	**1.12**	**1.06**	**1.00**	**0.89**	**0.85**
200	1986	1.66	1.10	0.92	0.90	0.69	0.66	0.55	0.54	0.52	0.51
200	1987	1.46	0.96	0.87	0.87	0.64	0.58	0.55	0.44	0.42	0.41
200	1988	1.98	1.23	1.13	0.85	0.76	0.50	0.47	0.39	0.35	0.33
200	1989	2.08	1.37	1.25	1.14	0.91	0.84	0.71	0.71	0.67	0.65
200	1990	2.21	1.19	0.98	0.87	0.73	0.69	0.68	0.54	0.54	0.52
200	**5-yr. Avg.**	**1.88**	**1.17**	**1.03**	**0.93**	**0.74**	**0.65**	**0.59**	**0.52**	**0.50**	**0.48**

Table B-23 Visibility impairment associated with a coal-fired Industrial Boiler located in the Western domain - Run/Scenario # 23
(CALPUFF model estimates are based on SO2, NOx, and PM2.5 emissions of 7000, 1400, and 20 tpy, respectively)

Days Above Delta-dv Threshold

Threshold (delta-dv)	Distance (km)	1986	1987	1988	1989	1990	5-year Avg.
0.1	50	248	256	247	240	241	**246.4**
0.1	100	187	193	202	179	192	**190.6**
0.1	200	103	88	83	85	93	**90.4**
0.5	50	86	87	86	73	80	**82.4**
0.5	100	39	31	31	28	32	**32.2**
0.5	200	9	6	7	18	8	**9.6**
1.0	50	24	26	20	24	18	**22.4**
1.0	100	7	5	6	9	6	**6.6**
1.0	200	1	1	1	3	2	**1.6**

Ten Highest Delta-dv Values

Dist (km)	Year	1	2	3	4	5	6	7	8	9	10
50	1986	5.11	3.24	2.60	2.27	1.81	1.78	1.70	1.62	1.55	1.53
50	1987	3.51	3.07	3.02	2.35	2.21	1.97	1.72	1.72	1.64	1.56
50	1988	5.50	4.04	2.66	2.52	2.22	2.10	1.78	1.62	1.53	1.41
50	1989	5.16	3.84	3.55	3.33	3.30	3.22	3.18	2.99	2.89	2.81
50	1990	5.29	3.80	3.50	2.97	2.50	2.23	2.21	2.16	2.09	1.86
50	**5-yr. Avg.**	**4.91**	**3.60**	**3.07**	**2.69**	**2.41**	**2.26**	**2.12**	**2.02**	**1.94**	**1.83**
100	1986	1.52	1.37	1.24	1.24	1.24	1.21	1.08	0.92	0.88	0.85
100	1987	2.58	1.50	1.17	1.10	1.02	0.99	0.93	0.89	0.80	0.75
100	1988	2.63	2.29	1.49	1.26	1.17	1.04	0.90	0.87	0.83	0.82
100	1989	2.62	2.14	2.11	1.90	1.78	1.40	1.22	1.20	1.01	0.97
100	1990	3.23	1.76	1.57	1.51	1.10	1.04	0.97	0.97	0.96	0.80
100	**5-yr. Avg.**	**2.52**	**1.81**	**1.52**	**1.40**	**1.26**	**1.14**	**1.02**	**0.97**	**0.89**	**0.84**
200	1986	1.34	0.82	0.79	0.69	0.66	0.64	0.63	0.52	0.51	0.49
200	1987	1.21	0.86	0.67	0.60	0.58	0.56	0.49	0.45	0.44	0.42
200	1988	1.71	0.97	0.71	0.69	0.55	0.53	0.52	0.43	0.40	0.40
200	1989	1.72	1.41	1.07	0.93	0.85	0.84	0.81	0.70	0.69	0.68
200	1990	1.58	1.44	0.98	0.78	0.66	0.60	0.55	0.53	0.49	0.44
200	**5-yr. Avg.**	**1.51**	**1.10**	**0.85**	**0.74**	**0.66**	**0.64**	**0.60**	**0.53**	**0.51**	**0.48**