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MODELING FUGITIVE DUST IMPACTS FROM SURFACE COAL MINING OPERATIONS - PHASE III

Evaluating Model Performance

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Evaluating Model Performance

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Emissions, Monitoring, and Analysis Division
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PREFACE

This report presents the results of a statistical evaluation of several models for predicting the ambient impact of fugitive dust emissions from surface coal mines. The evaluation includes recent improvements to the Industrial Source Complex (ISC) model applicable to fugitive particulate emissions, and improvements to the emission factors used to estimate emissions from surface coal mine activities. The results show improved performance by the new model and emission factors relative to the original model and AP-42 emission factors.

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1. INTRODUCTION

The Clean Air Act Amendments, Section 234(a), require the Environmental Protection Agency (EPA) to analyze the accuracy of the Industrial Source Complex (ISC2) air quality dispersion model and AP-42 emission factors to determine the effect on the air quality of fugitive dust emissions from surface coal mines. Under Contract No. 68-D2-20159, Work Assignment No. 8, Midwest Research Institute developed a comprehensive data base (EPA, 1994) containing the following information in electronic format: (a) 24-hour ambient air quality data for TSP (particles captured by the standard high-volume air samples) and PM_{10} (particles no greater than 10 micrometers in aerodynamic diameter) from a nine-station monitoring network distributed in and around the Cordero mine in Wyoming during the period May-July 1993; (b) on-site meteorological data (including temperature, precipitation, wind speed, and wind direction) during the monitoring period; (c) time-resolved information about mine operations (source activity) during the monitoring period; (d) estimation of hourly emission rates for all significant sources (i.e., vehicle traffic on haul roads and equipment operations associated with topsoil, overburden, and coal removal) operating during the monitoring period; and (e) a statistical model evaluation protocol (EPA, 1995a) (hereafter referred to as the "protocol") describing the models and data bases to be used for testing.

The purpose of this report is to document the results of a rigorous statistical model performance evaluation that was performed using the developed protocol. Section 2 describes the implementation issues that were addressed for input to the models used in the evaluation. Section 3 describes how the mine emission sources were characterized for the dispersion models. Section 4 describes the monitored ambient air data used in the evaluation. Section 5 describes the dispersion modeling that was performed to generate predicted concentrations. Section 6 describes the statistical model evaluation methodology and results.

An attempt has been made not to duplicate the discussions in the EPA reports mentioned above (EPA, 1994 and EPA, 1995a). Therefore, in order to follow this report it will be necessary to have these other two reports available.

2. MODEL IMPLEMENTATION

In order to perform the statistical evaluation of the models as described in the protocol the following modifications to the ISCST2 and ISCST3 (called ISCSTM in the protocol, EPA, 1995a) models were made:

The capability to read hourly emissions data from a separate input file for the various sources was incorporated into the two models. This capability was needed in order to model the scenarios with daily shift values more efficiently.

An option to ignore the check for consecutiveness of the hourly meteorological data records (NOCHKD) was made to both the models. This was necessary in order to be able to run the models to estimate concentrations for alternate days, since the monitored data for the study was collected in that manner.

An option to specify an initial σ_z for area sources was added to the source parameter cards in the ISCST3 model. This allows for specifying an initial vertical mixing created by the eddies due to the movement of the vehicles, as specified in the protocol.

These modifications were made to the original code with appropriate source code documentation. The modifications were thoroughly tested.

3. SOURCE CHARACTERIZATION

This section describes the various steps involved in preparing the Cordero mine data for dispersion modeling.

3.1 Overview of the Field Study

In 1993, the EPA conducted an intensive atmospheric and source activity monitoring program at the Cordero mine in Wyoming (a typical western surface coal mine) for the purpose of compiling a comprehensive, quality-assured data base for use in subsequent dispersion model evaluation (EPA 1994). The study focused on spatially distributed, time-integrated measurements of 24-hour PM_{10} and TSP concentration, coincident meteorological data resolved to hourly values, and monitored source activity resolved to a shift basis for much more accurate estimation of short-term emission rates associated with the removal, transfer, and transport of mined materials. This study was conducted during the period May 19 - July 18, 1993 with data collected on alternate days; 30 daily values were archived. This work included the following activities:

- Collecting 24-hour air quality data for TSP (particulate matter captured by the standard high-volume air samples) and PM_{10} (particulate matter nominally 10 microns and less in aerodynamic diameter) from a nine-station monitoring network distributed in and around the Cordero mine;
- Collecting continuous on-site meteorological data (including temperature, precipitation, wind speed, and wind direction) both above grade and inside an active pit within the mine;
- Collecting time-resolved information about mining operations (source activity) during three observation periods constituting each 24-hour monitoring period.
- Estimating hourly emission rates for all significant sources (i.e., traffic on haul roads and equipment operations associated with topsoil, overburden, and coal removal) operating during the monitoring periods; and
- Assembling a comprehensive data base containing all of the above information in a suitable electronic format.

3.2 Identifying and Allocating Emission Components

The following emission activities were included in the Cordero mine emission inventory input to the dispersion models considered for evaluation in accordance with Section 3 of the protocol:

Haul trucks traveling on unpaved haul roads
Water trucks traveling on unpaved haul roads (to control dust emissions)
Light-duty vehicles traveling on unpaved haul roads
Grader travel on unpaved haul roads (for road maintenance)
Dragline (bucket dumping overburden)
Haul truck loading (with power shovel)
- coal
- overburden

Haul truck dumping
- coal
- overburden

Bulldozing (in truck loading area)
- coal
- overburden

Scraper travel on unpaved surfaces (for topsoil removal and scoria mining)
Wind erosion of active surface areas
- haul roads
- truck loading areas for coal and overburden
- truck unloading areas for overburden

In addition to the sources within the Cordero mine property, haul trucks traveling on the main unpaved haul road at the Caballo Rojo mine to the north constitute a potentially significant source impacting on the air quality monitoring stations under northerly wind conditions. The approach used to model this road was the same as that used for roads at the Cordero mine. All of the above activities were modeled as sources shown below in Table 3-1.

Table 3-1. Sources Used to Represent Emission Activities at Cordero Mine

SOURCE ID	SOURCE NAME	MRI IDENTIFIER*	SOURCE TYPE
R0010201 - R0130302	Roads at Cordero and Caballo Rojo mines	Roads A-Z	area or volume
A1-G9, V1-Z4	Scraper/Dragline Activity	Areas A1-G9,V1-Z4	area
NORTHPIT	North pit	Areas A,B,C	openpit
SOUTHPIT	South pit	Area H	openpit
LOVERN	Overburden loading North	Area D	volume
LOVERS	Overburden loading South	Area G	volume
UOVERN	Overburden unloading North	Area E	volume
UOVERS	Overburden unloading South	Area I	volume
UCOAL	Coal unloading	Area F	volume

* *As shown in the protocol (EPA, 1995a)*

The emissions from haul trucks, water trucks, light duty vehicles and graders travelling on unpaved roads are accounted for in the roadway sources in Table 3-1. The vehicles travelling on portions of roads that are inside the pits are included in the North and South pits. The emissions from dragline and scrapers are accounted for in the North and South pits and in the area sources A1-G9 and V1-Z4. All coal loading activities by haul trucks and bulldozers are accounted for in the North and South pits. The overburden loading by haul trucks and bulldozers are associated with the overburden loading sources in the North and the South areas. The overburden dumping (or unloading) by haul trucks are associated with the overburden unloading sources in the North and the South areas. The coal dumping is accounted for in the coal unloading source. The wind erosion on haul roads is associated with the roadway sources. The wind erosion at coal and overburden loading and unloading areas are accounted for in the coal and overburden loading and unloading areas, respectively. The details of these associations between the emission activities and ISCST2/ ISCST3 sources, including the filenames, are shown in Table 3-2.

The locations and sizes of the pits were obtained from engineering drawings and phone conversations with the personnel at Cordero mine, Wyoming. The locations of the scraper/dragline activity gridded sources were created by determining the model coordinates of the north-western vertex of each grid cell. The locations and sizes of the other sources were obtained from the raw data provided by MRI (EPA, 1995a). The coordinates supplied by MRI for the areas were for the south-west corner. When creating volume sources for ISCST2 and ISCST3, these coordinates were modified to reflect the center of the volume source (by adding 200/2, i.e. half the source width to the coordinates, to the dimensions). The base elevation of all the sources was set to zero.

Table 3-2. Emission Components Associated with Sources

SOURCE	MATERIAL	ACTIVITY	REGION	SOURCE ID	FILE NAME*
TRUCKS	BOTH	MOVING	BOTH	GRIDS A1-G9, V1-Z4	ROADS.EM?
GRADER	OVERBURDEN	MOVING	ROADS	ROADS	part of ROADS.EM?
DRAGLINE	OVERBURDEN	MOVING	BOTH	GRIDS A1-G9, V1-Z4	DRAGLINE.EM?
TRUCKS	COAL	LOADING	NORTH	NORTHPIT	LCOAL-N.EM?
TRUCKS	COAL	LOADING	SOUTH	SOUTHPIT	LCOAL-S.EM?
TRUCKS	OVERBURDEN	LOADING	NORTH	LOVERN	LOVER-N.EM?
TRUCKS	OVERBURDEN	LOADING	SOUTH	LOVERS	LOVER-S.EM?
TRUCKS	COAL	UNLOADING	-	UCOAL	UCOAL.EM?
TRUCKS	OVERBURDEN	UNLOADING	NORTH	UOVERN	UOVER-N.EM?
TRUCKS	OVERBURDEN	UNLOADING	SOUTH	UOVERS	UOVER-S.EM?
DOZER	COAL	LOADING	NORTH	NORTHPIT	DCOAL-N.EM?
DOZER	COAL	LOADING	SOUTH	SOUTHPIT	DCOAL-S.EM?
DOZER	OVERBURDEN	LOADING	NORTH	LOVERN	DOVER-N.EM?
DOZER	OVERBURDEN	LOADING	SOUTH	LOVERS	DOVER-S.EM?
SCRAPER	BOTH	MOVING	BOTH	GRIDS A1-G9, V1-Z4	SCRAPER.EM?
WIND EROSION	BOTH	MOVING	ROADS	ROADS	part of ROADS.EM?
WIND EROSION	COAL	LOADING	NORTH	NORTHPIT	WCOAL-N.EM?
WIND EROSION	COAL	LOADING	SOUTH	SOUTHPIT	WCOAL-S.EM?
WIND EROSION	OVERBURDEN	LOADING	NORTH	LOVERN	WLOVER-N.EM?
WIND EROSION	OVERBURDEN	LOADING	SOUTH	LOVERS	WLOVER-S.EM?
WIND EROSION	OVERBURDEN	UNLOADING	NORTH	UOVERN	WUOVER-N.EM?
WIND EROSION	OVERBURDEN	UNLOADING	SOUTH	UOVERS	WUOVER-S.EM?

* *The "?" in the filenames stands for '1', '2' and '3' for the emission sets 1,2 and 3, respectively, that are described in the protocol (EPA, 1995a)*

The coal loading and unloading areas were characterized as emission sources with characteristics described in Section 3.6 of the protocol (EPA, 1995a) with the exception of the coal unloading area. Based on a conversation with EPA and Kirk Winges (see Appendix A), it was decided that a volume source with a release height of the 3 meters would be more representative of the unloading zone as opposed to an area source. Also, the initial vertical dispersion parameter (σ_z) for the coal unloading source was set to 10 meters and the initial horizontal dispersion parameter (σ_y) was set to 5 meters.

3.3 Data Processing

The raw data obtained from MRI were not in a form that could easily by input to the ISCST2 and ISCST3 models. A significant amount of manipulation and reformatting of the data had to be performed in order to make the data useful for the purpose of this study. Specifically, there were two major tasks that were carried out in this area. (1) The raw emissions from the various activities in the two pits were originally reported as aggregated numbers for both the pits combined. For modeling the mine emissions correctly, these emissions had to be disaggregated and recomposed into the North and South pits separately. (2) The emission data for the various components of the roads (vehicle traffic, graders and wind erosion) were provided in separate files in different formats. These data had to be combined and reformatted into one set consisting of all possible emissions from roads. The details of the two tasks mentioned follow.

The MRI worksheets contained combined emissions from the NORTHPIT and the SOUTHPIT (ramps G+A+F+T described in Figure 2-8 of the protocol (EPA, 1995a)) for each of the activities. In able to determine which pit the emissions from each of the roads is associated with, it was necessary to know the road emissions for the north pit roads and the south pit roads separately. The worksheets were modified to segregate the emissions for the north and the south pits by splitting the emissions due to the north pit ramps G+F+A from the south pit ramp T. The worksheet equations were modified to use the sum of the activities on roads G, F and A for the north pit and the activity on road T for the south pit, instead of the original equation that used the sum of the activities on all the 4 roads to calculate the combined emissions.

The emissions data from the MRI files *vehsum-1*, *vehsum-2* and *vehsum-3* provided the emission rates from haul trucks, water trucks and other vehicles from each of the three set of emission factors. The MRI worksheets *wind-1rd.wq1* and *graders.wq1* provided the emission from wind erosion and graders, respectively, for each road. These emissions were combined into one file, reformatted and again combined with the file for roadway emissions. The graders worksheet did not contain emission information for individual roads. Another MRI file called *graders.loc* was used to determine the roads on which the graders were active at any given time. The total emissions as listed in the original graders worksheet were then split equally into these active roads. Emissions for the other non-active roads were set to zero for that period. There were some cases where there were emissions listed in the graders worksheet, but no road locations specified in the graders locations file. In such cases, the graders were assumed by PES to be active on certain roads. These assumptions were made by looking at historical activity of the graders. Table 3-3 lists the changes that were made:

Table 3-3. Changes Made to Graders Data

JULIAN DAY	SHIFT	CORRECTION MADE
151	1	Emissions split between roads M and F
165	1	Emissions split between roads M and C, D, E
169	1	Emissions split between roads M and G
179	1&2	Interchanged the emissions between shifts 1 & 2 *(in the original data, there were emission rates for shift 2 but no locations and no emission rates for shift 1 but there were locations listed)*
187	2	Emissions split between roads A,G,V and T

Emission files for the 3 emission sets (EPA, 1995a) were created for PM_{10} as well as for TSP. The emissions data from MRI were for PM_{10} with a list of TSP/PM_{10} ratios provided to obtain the TSP emission rates (see Appendix A). These conversion factors are shown in Table 3-4. Further adjustments to the emissions data were made. Control factors based on the mitigative effects of rainfall were also provided by MRI in a letter memorandum (see Appendix A). These factors are listed in Table 3-5 below. As per the protocol (EPA, 1995a), these were applied to the graders, bulldozers and wind erosion by multiplying the emission rates with the appropriate factor.

Table 3-4. Ratio of TSP to PM_{10} Based on Emission Factor Equations

SOURCE	RATIO OF TSP to PM_{10}		
	SET 1	SET 2	SET 3
Coal loading	5.49	2.11	2.11
Coal unloading	2.00	2.11	2.11
Overburden loading	2.00	2.11	2.11
Overburden unloading	2.00	2.11	2.11
Dragline	4.98	2.11	2.11
Coal haul truck travel	5.70	4.71	5.00
Overburden haul truck travel	5.70	4.71	5.00
Water truck travel	5.70	4.71	5.00
LDV travel	2.78	2.22	5.54
Coal bulldozing	3.71	3.71	3.71
Overburden bulldozing	5.24	5.24	5.24
Graders	3.48	3.48	3.48
Scrapers	5.52	5.52	5.52
Wind erosion: coal loading	2.00	2.00	2.00
Wind erosion: overburden loading	2.00	2.00	2.00
Wind erosion: haul roads	2.00	2.00	2.00
Caballo Rojo	See coal haul truck travel		

Table 3-5. Control Efficiency for Rainfall

DATE	JULIAN DAY	SHIFT	NO. OF HOURS WITH RAIN	FRACTIONAL CONTROL EFFICIENCY (c)
5/21	141	2	1	0.13
5/27	147	2	4	0.50
5/29	149	0	1	0.17
6/6	157	2	5	0.63
6/8	159	0	3	0.50
6/16	167	0	2	0.33
		1	4	0.40
		2	8	1.00
6/18	169	0	2	0.33
		1	2	0.20
		2	3	0.38
6/22	173	1	4	0.40
6/30	181	0	2	0.33
		1	1	0.10
7/4	185	1	2	0.20
7/6	187	1	1	0.08
7/14	195	1	1	0.08
7/16	197	1	1	0.08

NOTE: To get the controlled emission rate, the emission rate is multiplied by (1-c).

Although mentioned in the protocol, the correction due to rainfall mitigation had not been applied to the emissions due to vehicle traffic on haul roads for Set 3 (see Appendix A). This was corrected by using the hourly rainfall data from the file *24hrvph* and applying an emission control factor based on the number of consecutive hours and the quantity of rainfall. This was in accordance with the scheme listed in Appendix A of the protocol (EPA, 1995a).

Also, emission control due to watering of roads was not applied to the light duty vehicles for Set 2, as mentioned in the protocol (see Appendix A). This was corrected by reducing the emissions due to light duty vehicles on a road by 50% when there was any road watering activity on that road.

3.4 MINEMISS - An Emissions Preprocessor for Open Pit Mines

An emissions pre-processor called **MINEMISS** was developed to expedite the source characterization of the raw data from the Cordero mine and create files for input to the ISCST3 model. The program was made generic enough that it can be used for characterizing emissions from any surface coal mine operation.

The program reads various inputs such as the definition of work shifts, locations and dimensions of road segments, pits, loading and unloading areas, areas of dragline and scraper activity, emission rates by shift from different sources including different vehicle types, wind erosion and loading and unloading activities. It then creates AREA, VOLUME and OPENPIT sources for ISCST3 as requested by the user. It also creates AREA or VOLUME sources out of road segments. The emissions from the various activities for each shift are then allocated appropriately into these various sources. If a road segment is inside the defined pit, the program adds the portion of emissions from those segments to the total pit emissions. The final outputs from the program are (1) an ISCST3-format file with the source location and parameter cards, and (2) an hourly emissions file corresponding to these sources.

Another version of the program was created to output ISCST2 format data. Since there is no OPENPIT source type in ISCST2, the emissions for the pits were distributed into multiple area sources that represented the pits.

Instructions for running the emissions pre-processor are provided in Appendix B.

4. MONITORED AMBIENT AIR DATA

The initial monitored ambient air data base for PM_{10} and TSP was modified to account for background concentration values. The regional background concentrations for PM_{10} and TSP listed in Table 9 of the protocol were appropriately subtracted from the monitored concentrations and a new data base was created for use in the Model Evaluation Methodology (MEM) software. Any reported negative concentrations were reassigned a value of -99.0 to reflect the missing values. Along with the predicted concentrations, Appendix C lists the monitored ambient concentrations for PM_{10} and TSP, respectively, for each of the monitor sites with the background concentration subtracted.

5. DISPERSION MODELING

This section describes the dispersion modeling effort for this model evaluation. The following sub-sections elaborate on the various components of this task - source and receptor data preparation, meteorological data processing, modeling options that were used, etc. Figure 5-1 depicts modeling domain with the sources and receptors identified. The predicted and monitored 24-hour average concentrations for each monitor and each model are shown in Appendix C for PM_{10} and TSP, respectively. The summaries of model results are provided in Appendix D.

5.1 Modeling Scenarios

The dispersion modeling was carried out for the eight modeling systems described in the protocol (EPA, 1995a) for both PM_{10} and TSP. For the purpose of the evaluation study these modeling systems are referred to as "models". Table 5-1 lists the details of each of the models. The **BASE** model refers to the original ISCST2 model with the original AP-42 emission factors. The other model names are made up of three characters identifying the dispersion model component, the emissions resolution component, and the type of sources used to characterize the roadway emissions. There are two options for the model: **B** for base model (ISCST2) or **N** for new model (ISCST3). There are three options for the emissions resolution: **L** for low resolution (Set 2 emission factors for vehicles traveling on haul roads and other sources with 30-day average shift activity resolution); **M** for medium resolution (Set 2 emission factors for vehicles traveling on haul roads and other sources with daily shift activity resolution); and **H** for high resolution (Set 3 emission factors for vehicles traveling on haul roads, Set 2 emission factors for other sources, and daily shift activity resolution). See Table 8 of the protocol (EPA, 1995a) for a description of the three sets of emission factors. There are two options for roadway sources: **V** for roads as volume sources and **A** for roads as area sources. The **BASE** model also uses 30-day average shift activity resolution and roads as volume sources.

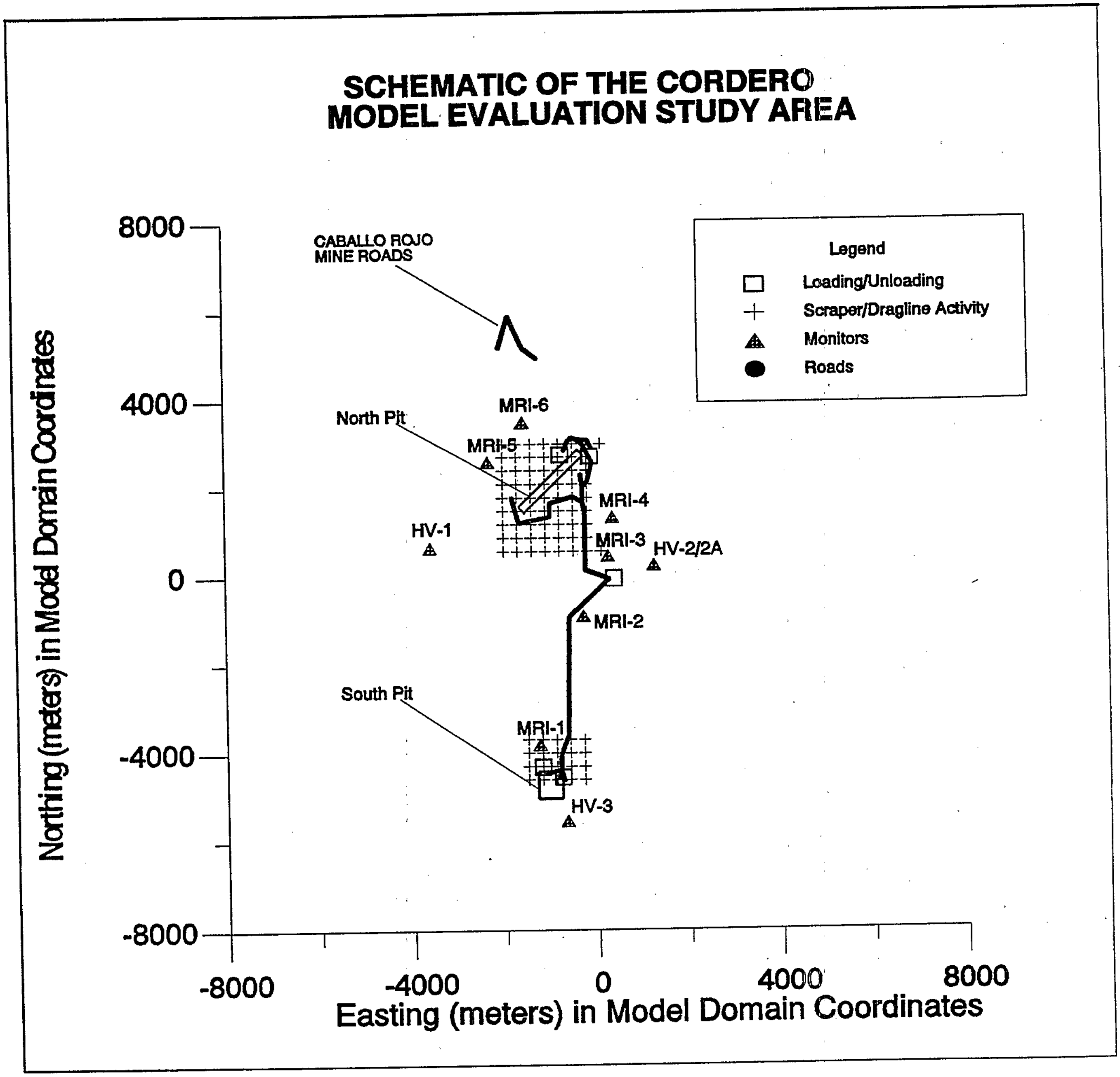

Figure 5.1 - Schematic of the Model Domain

Table 5-1. Characteristics of Various Models Used in the Evaluation

MODEL NUMBER	MODEL NAME*	POLLUTANT	EMISSION SET FOR HAUL ROAD VEHICLES	EMISSION SET FOR OTHER SOURCES	EMISSION AVERAGING	ROADS AS AREAS OR VOLUMES
1	BASE	PM_{10} / TSP	1	1	30-DAY AVERAGE SHIFT VALUE	VOLUME
2	BHV	PM_{10} / TSP	3	2	DAILY SHIFT VALUE	VOLUME
3	NLV	PM_{10} / TSP	2	2	30-DAY AVERAGE SHIFT VALUE	VOLUME
4	NMV	PM_{10} / TSP	2	2	DAILY SHIFT VALUE	VOLUME
5	NHV	PM_{10} / TSP	3	2	DAILY SHIFT VALUE	VOLUME
6	NLA	PM_{10} / TSP	2	2	30-DAY AVERAGE SHIFT VALUE	AREA
7	NMA	PM_{10} / TSP	2	2	DAILY SHIFT VALUE	AREA
8	NHA	PM_{10} / TSP	3	2	DAILY SHIFT VALUE	AREA

*: *B = Base Model, N = New Model, L = Low Resolution Emissions, M = Medium Resolution Emissions, H = High Resolution Emissions, V = Roads as Volume Sources, A = Roads as Area Sources*

5.2 Source Data

The pre-processor **MINEMISS** was run for emission sets 1,2 and 3 for each of the 8 models separately using the various source descriptions and emissions as characterized in Section 3. The program created two ISCST3 input files for each of the models - a file containing the SOURCE LOCATION and SOURCE PARAMETER cards and another containing the 'hourly' emission rates for each of the sources. The files containing the source locations and parameters was used to generate the final runstream input files. The sources were grouped into five ISCST2/ISCST3 source groups. This was done so that the model could output predicted concentration from all the sources combined, as well as from individual source groups of interest, such as the pits, the roads, etc.

Source Group	Activities Included
ROADS	All road sources
NORTHPIT	The north pit activities including ramps
SOUTHPIT	The south pit activities including ramps
ACTIVITY	The gridded sources representing the roaming scraper and dragline activity
OTHERS	Coal and overburden loading and unloading sources
ALL	All the sources combined

Since the model domain was considered essentially flat (Section 5.5), all the sources were assigned a base elevation of zero. The particle size categories for PM_{10} and TSP were obtained from Table 7 in the protocol (EPA, 1995a). The mass mean diameter for each particle size category was calculated (EPA, 1995b). Table 5-2 lists the particle size distribution data that was used in the modeling.

5.3 Receptor Data

The receptor coordinates used in the modeling analysis were extracted from Table 2.5 of the Phase I report (EPA, 1994). The original coordinates of the monitor locations were listed in feet in the Wyoming coordinate system. These were converted to the model coordinate system by subtracting 454000 ft from the easting and 1226000 ft from the northing, which are the coordinates of the origin of the model coordinate system. These new coordinates were then converted to meters. Since the model domain was considered essentially flat, all the receptors were assigned a base elevation of zero. Based on a conversation between PES, MRI, the EPA and Mr. Kirk Winges of McCulley, Frick & Gilman (see Appendix A), the height of the monitor intakes above ground were used as flagpole heights for the receptors. Table 5-3 shows the receptor data used in the modeling analysis.

Table 5-2. Particle Size Data for Cordero Mine

Particle Diameter (μm)	Weight% < Stated Diameter		Mass Mean Diameter (μm)	Settling Velocity (m/s)	Mass Fraction	
	TSP	PM_{10}			TSP	PM_{10}
32.0	100	-				
			28.642	2.4422E-02	0.39	-
25.0	61	-				
			22.592	1.5194E-02	0.2	-
20.0	41	-				
			17.618	9.2404E-03	0.12	-
15.0	29	-				
			12.664	4.7747E-03	0.08	-
10.0	21	100				
			7.768	1.7964E-03	0.07	0.33
5.0	14	67				
			3.884	4.4909E-04	0.05	0.24
2.5	9	43				
			1.851	1.0202E-04	0.05	0.24
1.0	4	19				
			0.630	1.1814E-05	0.04	0.19
0.0	0	0				

Table 5-3. Receptor Data for Cordero Mine

RECEPTOR	EAST (M)	NORTH (M)	ELEV (M)	FLAGPOLE (M)
MRI-1	-1249.68	-3810.00	0	3.4
MRI-2	-265.18	-914.40	0	3.5
MRI-3	283.46	448.06	0	3.5
MRI-4	384.05	1319.78	0	3.5
MRI-5	-2310.38	2590.80	0	3.5
MRI-6	-1554.48	3496.06	0	3.5
HV-1	-3582.62	656.84	0	4.5
HV-2	1272.54	228.60	0	4.4
HV-2A	1272.54	228.60	0	4.4
HV-3	-664.46	-5539.74	0	4.6

5.4 Meteorological Data

The hourly meteorological data used in the model evaluation were collected at Site HV-1 shown in Figure 5-1. The meteorological parameters that were collected on an hourly basis from a 10-meter tower included wind speed, wind direction, standard deviation of the wind direction fluctuations (σ_θ), ambient temperature, and precipitation (EPA, 1994).

The original meteorological data set for Cordero included some missing data, which were substituted by MRI using data from the Caballo Rojo mine (located on adjacent property to the north) or the next closest station. The meteorological data used in the analysis are shown in Appendix E with the substituted missing data appropriately identified.

The ISCST dispersion model also requires input data on mixing height and the Pasquill-Gifford (P-G) atmospheric stability category. Since plume dispersion from the type of ground-level, non-buoyant sources modeled in this study should not be influenced significantly by reflection from the top of the mixed layer, a default value of 3,000 meters was used for the mixing height. The P-G stability categories were determined from the σ_θ and wind speed data using the Meteorological Processor for Regulatory Models (MPRM), which is EPA's meteorological preprocessor for on-site data and implements the guidance in the on-site meteorological guidance document (EPA, 1987).

The new deposition algorithm in the ISCST3 model also requires the surface roughness length, surface friction velocity and Monin-Obukhov length. The surface roughness length is also used as an input to MPRM to adjust the stability category boundaries for σ_θ. An objective method was used to estimate the surface roughness length based on the 10-meter σ_θ data for high wind speed cases. Under these conditions, the following approximation holds:

$$\sigma_\theta^2 \approx \left(\frac{\sigma_v}{u}\right)^2 \approx \frac{2k^2}{[\ln(z/z_0)]^2} \qquad (5\text{-}1)$$

Solving this equation for surface roughness length, z_0, gives:

$$z_0 \approx z \exp\left(\frac{-\sqrt{2}\,k}{\sigma_\theta}\right) \qquad (5\text{-}2)$$

where σ_θ is the standard deviation of wind direction (degrees), σ_v is the standard deviation of the crosswind component of the wind speed (m/s), u is the scalar wind speed (m/s), k is the von Karman constant (0.4), z is the measurement height (m) and z_0 is the surface roughness length (m).

Using wind speeds greater than 5 m/s, the median value of z_0 for the Cordero mine data set was determined to be about 10 cm. This value of z_0 is considered to be a reasonable estimate based on published tables of surface roughness length for various types of surface.

The resulting distribution of PG stability categories was examined for reasonableness by examining the results for cloudless days and nights as suggested in the on-site meteorological guidance document. Cloud cover data for this purpose was obtained for the Gillette Airport located about 20 miles north of Cordero mine. The diurnal distribution of P-G stability classes for these conditions appears reasonable, and therefore no adjustments to the σ_θ boundaries were made.

The Monin-Obukhov length (L) was calculated as a function of surface roughness length and the P-G stability category using the method currently implemented in the ISCLT3 model. This method is based on Golder (1972), and uses the following equation:

$$L = \frac{1}{a\,Z_0^{\,b}} \qquad (5\text{-}3)$$

where L is the Monin-Obukhov length (m). The values for a and b, which depend on the P-G stability category, are given by Irwin (1979). Table 5-4 shows the values calculated using Equation 5-3 for a surface roughness length of 10 cm.

Table 5-4. L as a Function of the P-G Stability Class for a Surface Roughness of 10 cm

P-G Stability Class	A	B	C	D	E	F
Monin-Obukhov Length (m)	-9	-18	-61	9000	61	18

The surface friction velocity (u_*) was also calculated the same as that implemented in the ISCLT3 model (EPA, 1995b) as a function of surface roughness length, surface-layer (10-meter) wind speed, and sensible heat flux; the latter is specified as a function of the P-G stability category. The algorithm used for estimating u_* is based on Wang and Chen (1980). Table 5-5 shows the estimated friction velocities as a function of stability and wind speed and assuming a surface roughness length of 10 cm.

Table 5-5. u_* as a Function of Wind Speed and P-G Stability Class for a Surface Roughness of 10 cm

Wind Speed (m/s)	P-G Stability Class					
	A	B	C	D	E	F
1.5	0.19	0.19	0.18	0.13	0.07	0.07
2.5	0.28	0.28	0.27	0.22	0.11	0.11
4.3	0.43	0.42	0.41	0.37	0.34	0.34
6.8	0.63	0.62	0.61	0.59	0.57	0.57
9.5	0.85	0.84	0.84	0.83	0.81	0.81
12.5	1.10	1.10	1.09	1.09	1.08	1.08

5.5 Modeling Input Options

In order the appropriately model the particulate emission scenarios, the depletion of dispersed particles from the plume due to gravitational settling and other dry deposition factors were considered. The model was furnished with particle size, density and mass fraction information for the site (see Section 5.2).

Following the guidance in Section 8.2.8 of the Guideline on Air Quality Models (EPA, 1993), the areas within about 3 km of any facility can be classified according to the land use typing scheme proposed by Auer (1978). The region being modeled is clearly in a rural setting with no major urban developments, and the area can be classified as rural for the purpose of specifying dispersion parameters. Therefore, the rural modeling option was used. Use of this option also specifies that the mixing heights used in the modeling were the rural mixing heights computed by the meteorological processor.

For this application, the regulatory default option (DFAULT) in ISCST2 and ISCST3 was used for all modeling runs.

For any hour of meteorology with a calm wind, concentration estimates were not made.

With the exception of the pit sources, all the emission sources are essentially surface releases. The pit sources were modeled as described in Section 3.4. The pit and the area source algorithms are capable of making predictions in the flat terrain, but are not capable of accounting for the effects of elevated or complex terrain. The topography of the general area is also relatively flat. Therefore, the flat terrain option was selected.

For each run, the POSTFILE output option of ISCST2 and ISCST3 was selected. This type of output would contain 24-hour average concentration predictions at each receptor for each of the 30 days that were modeled. This output was suitable for performing the statistical model evaluation.

6. STATISTICAL EVALUATION

The statistical model evaluation study was performed strictly adhering to the model evaluation protocol (EPA, 1995a). Section 6.1 provides an overview of the model evaluation protocol. The EPA Model Evaluation Methodology (MEM) software was used to perform these statistical evaluations (Strimaitis, *et al.*, 1993). Section 6.2 describes some of the changes that were made to this software in order to perform the evaluation. Section 6.3 describes the steps involved in the actual analysis and sections 6.4 and 6.5 discuss the results of the two steps of the model evaluation.

6.1 Overview of the Evaluation Protocol

Eight models were evaluated separately for PM_{10} and TSP in a two step process - (1) determining the best performing model and (2) assessing model overprediction (EPA 1995a).

6.1.1 Best Performing Model

The best performing models were determined as follows. For each monitor, a Robust Highest Concentration (RHC) was calculated. The Absolute Fractional Bias (AFB) of the RHC for each monitor were used to calculate a composite performance measure using weights as listed in Table 10 of the protocol (EPA, 1995a). The smaller the CPM, the better the overall performance of the model. The difference in CPM between various model pairs resulted in a Model Comparison Measure (MCM) with confidence limits for each model pair.

6.1.2 Model Overprediction

As per the protocol, the model overprediction analysis involved only three stations with the highest observed mean concentration for PM_{10} and TSP. These stations were identified in the protocol. For each of the three stations, the RHC, the non-weighted CPM and the Fractional Bias (FB) for each model with only an upper confidence limit were calculated for PM_{10} and TSP separately. The FB values were used in determining if a model was significantly overpredicting, as described in the protocol.

6.2 Modifications to the Model Evaluation Methodology (MEM) Software

In order to perform the model evaluation according to the protocol, a few modifications to the MEM program software were necessary. The revised version of the program was called EPAMEM. The modifications are as follows:

- The original MEM program was capable of calculating the composite performance measure (CPM) for each specified model using only one weight factor per run. The protocol calls for the use of different weights for the different monitors. MEM was modified so that the user can define one weight factor per monitor and use it in calculating the CPM as described in equation 6 in Section 6.3 of the protocol.

- The original program calculated a 95% confidence interval on the MCM. This was modified to 90% to be consistent with the protocol.

- A new version of the program (after the above two changes) was created to perform the model overprediction analysis. This version of the program is called OVERMEM.

6.3 Data Processing

Three types of inputs were provided to the MEM software. (1) The POSTFILE outputs from each of the eight model runs; (2) the PM_{10} or TSP background-adjusted monitored ambient concentrations; (3) MEM control file. The MEM program created outputs which were then plotted.

6.4 Determination of Best-Performing Model

The results of the best-performing model analysis are shown in Figures 6-1 through 6-4. Figures 6-1 and 6-2 depict the CPM with confidence intervals for PM_{10} and TSP, respectively. Figures 6-3 and 6-4 show the MCM with confidence limits for PM_{10} and TSP, respectively. These figures show that: the improved ISC3 model performs better than the original ISC2 model at predicting ambient concentrations of PM_{10} and TSP from a surface coal mine; the improved ISC3 model performed better for TSP than PM_{10}; model performance improved with the use of the new emission factors versus the existing AP-42 emission factors; model performance when the roadways were treated as area sources was indistinguishable from model performance when the roadways were modeled as volume sources; the ISC3 model with emission rates averaged by shift over the length of the study (lowest emission resolution) performed better than the others; and that there were statistically significant differences among pairs of models.

6.5 Evaluation of Model Overprediction

The results of the model overprediction analysis for PM_{10} and TSP are shown in Figures 6-5 through 6-8. For clarity, the plots for each pollutant were split into roads modeled as area sources and roads modeled as volume sources. Table 6-1 lists the FB for each model-monitor pair for PM_{10} and Table 6-2 lists the same for TSP. These figures show that in spite of the improved performance of the ISC3 model, the model significantly overpredicts (as defined in the protocol) for PM_{10} but not for TSP.

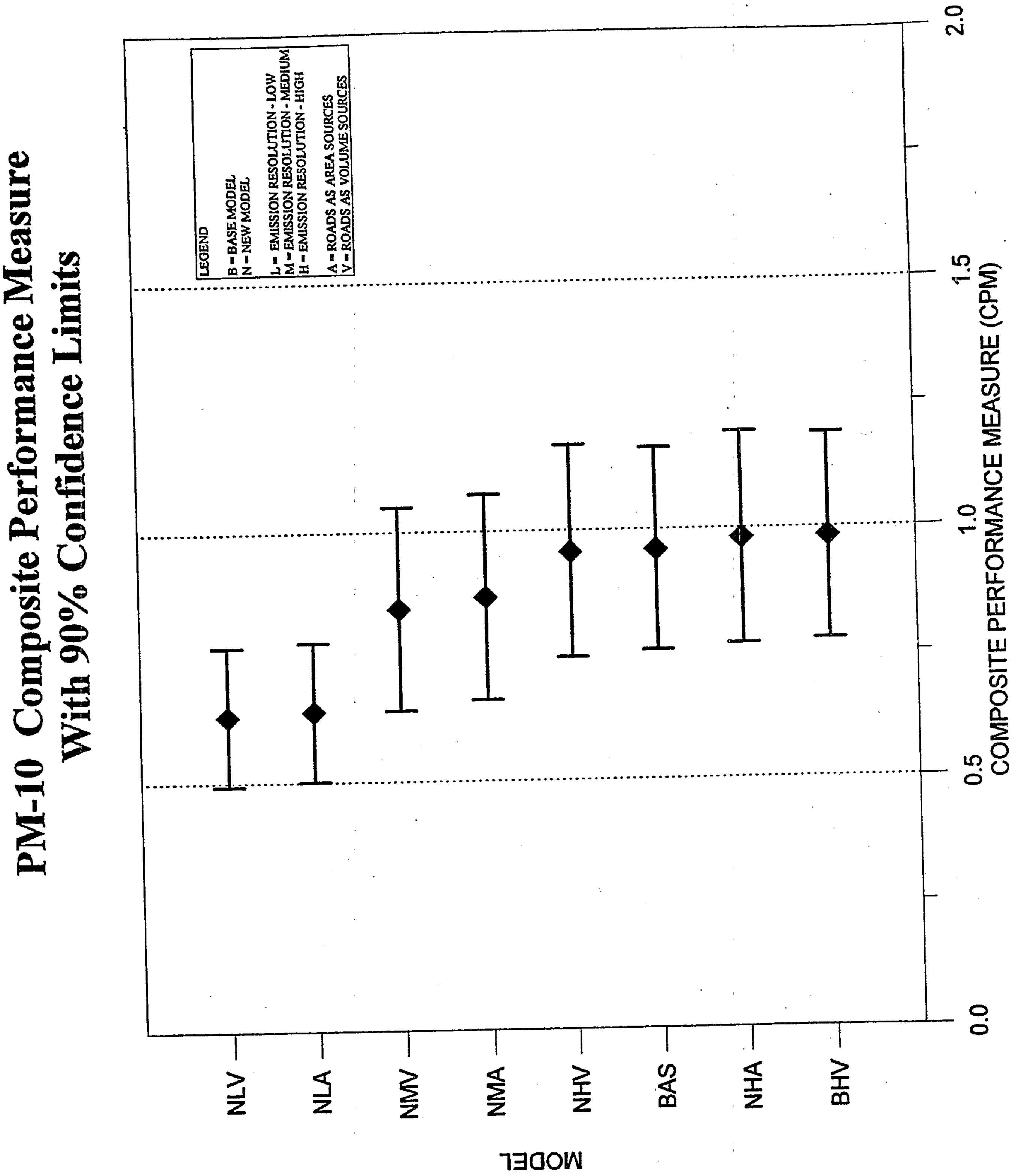

Figure 6.1 Composite Performance Measure with Confidence Interval - PM_{10}

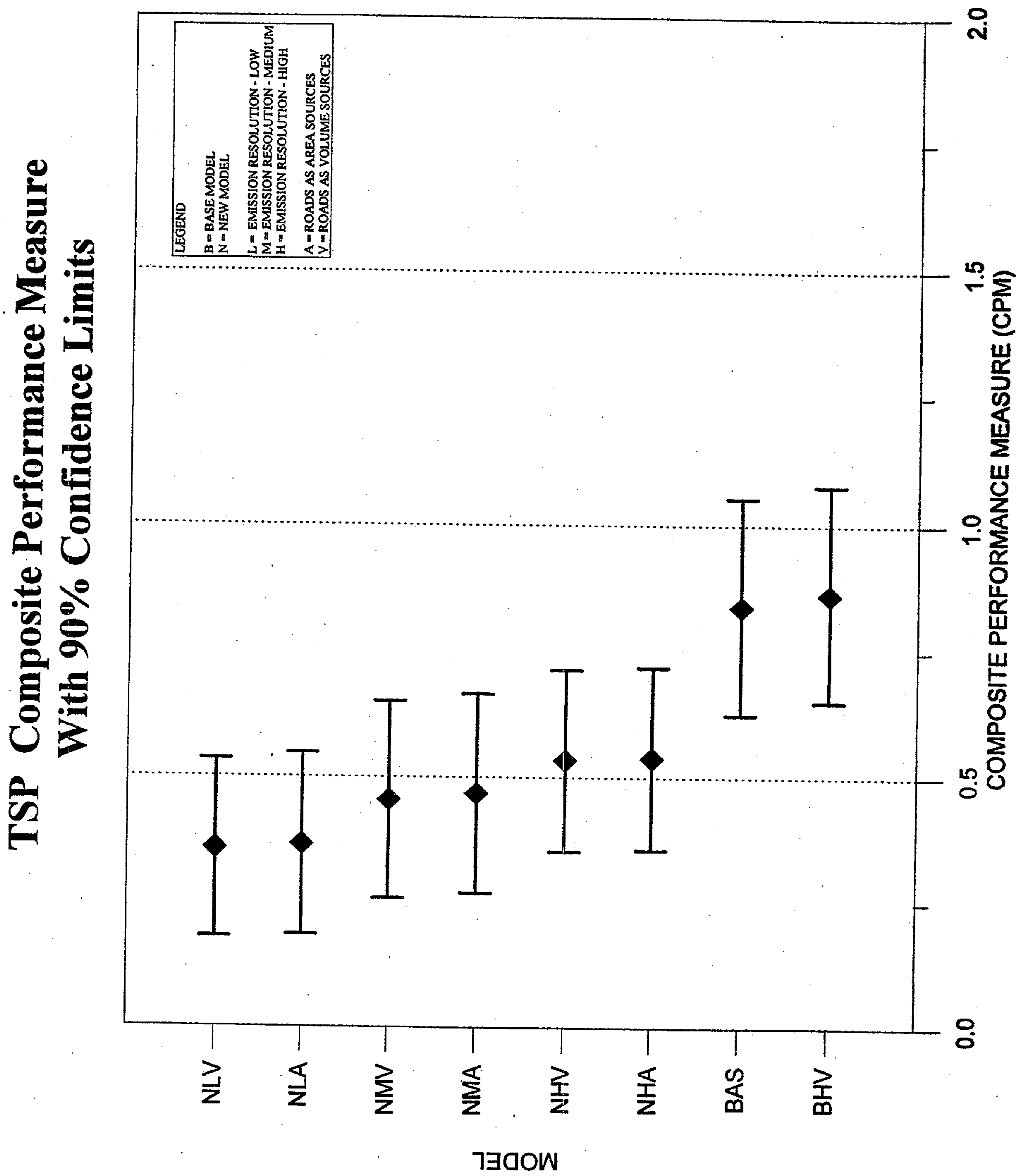

Figure 6.2 Composite Performance Measure with Confidence Interval - TSP

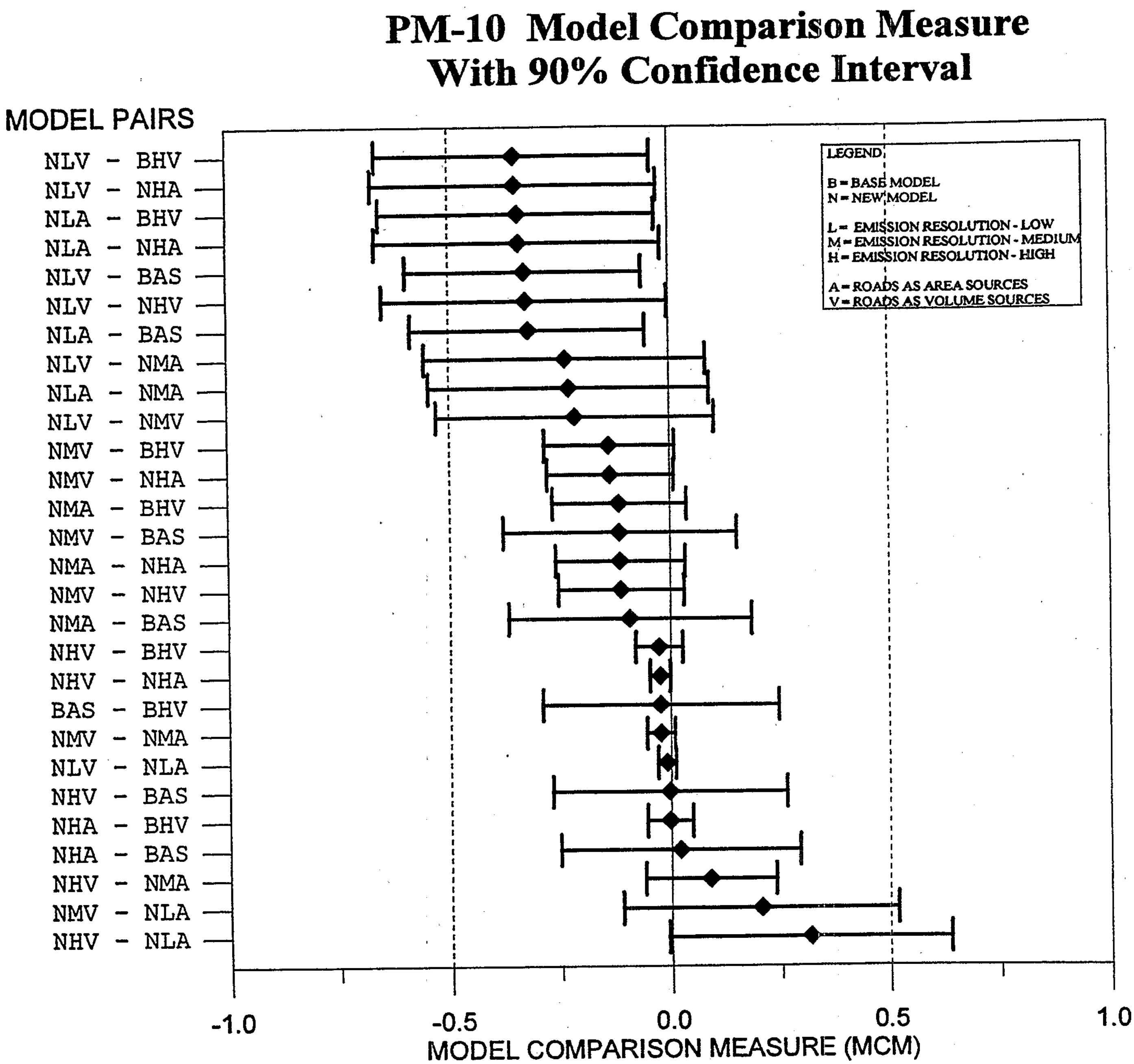

Figure 6.3 Model Comparison Measure with Confidence Interval - PM_{10}

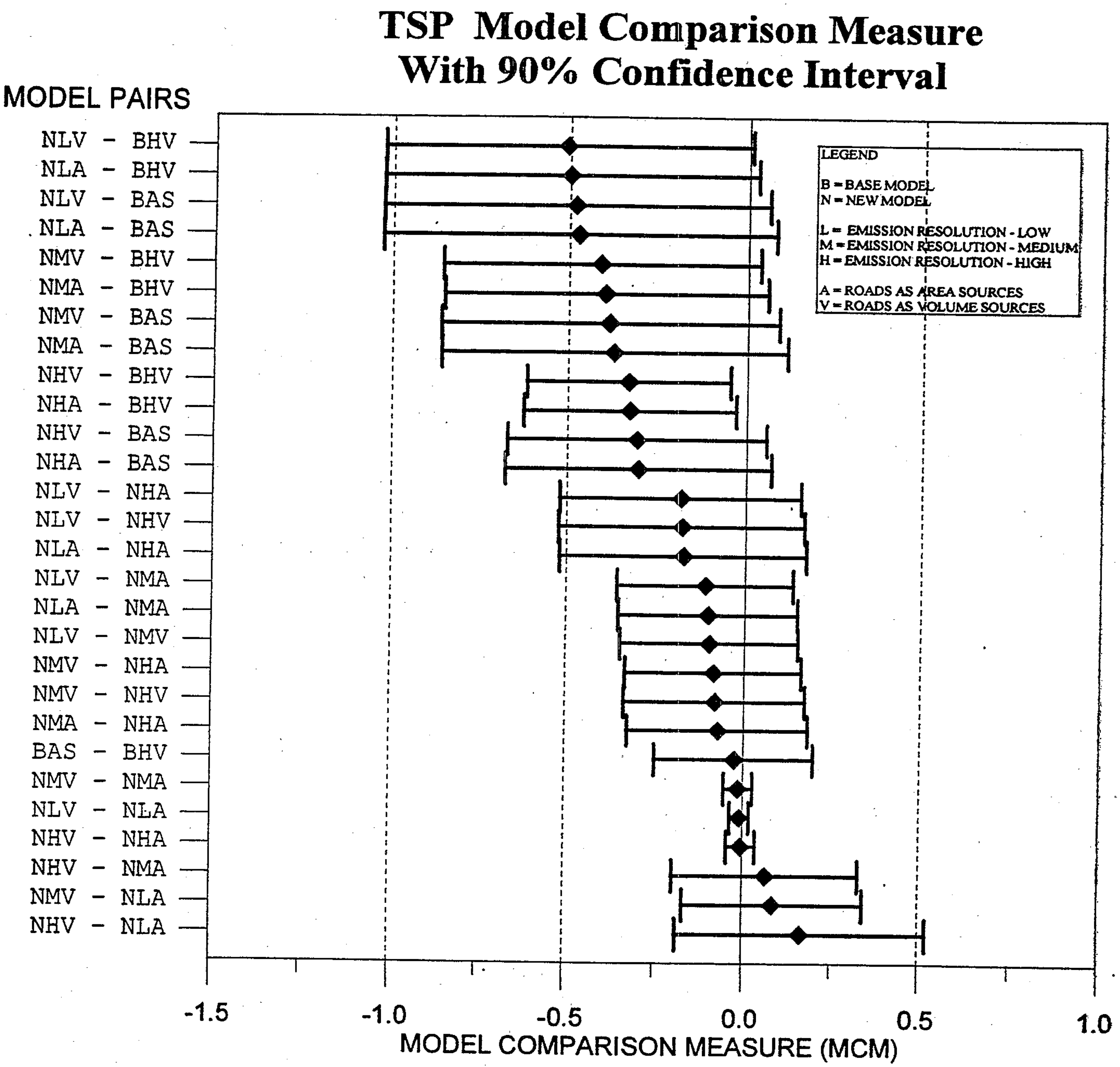

Figure 6.4 Model Comparison Measure with Confidence Interval - TSP

PM-10 OVERPREDICTION MEASURE WITH 90% UPPER BOUND (Roads as Volume Sources)

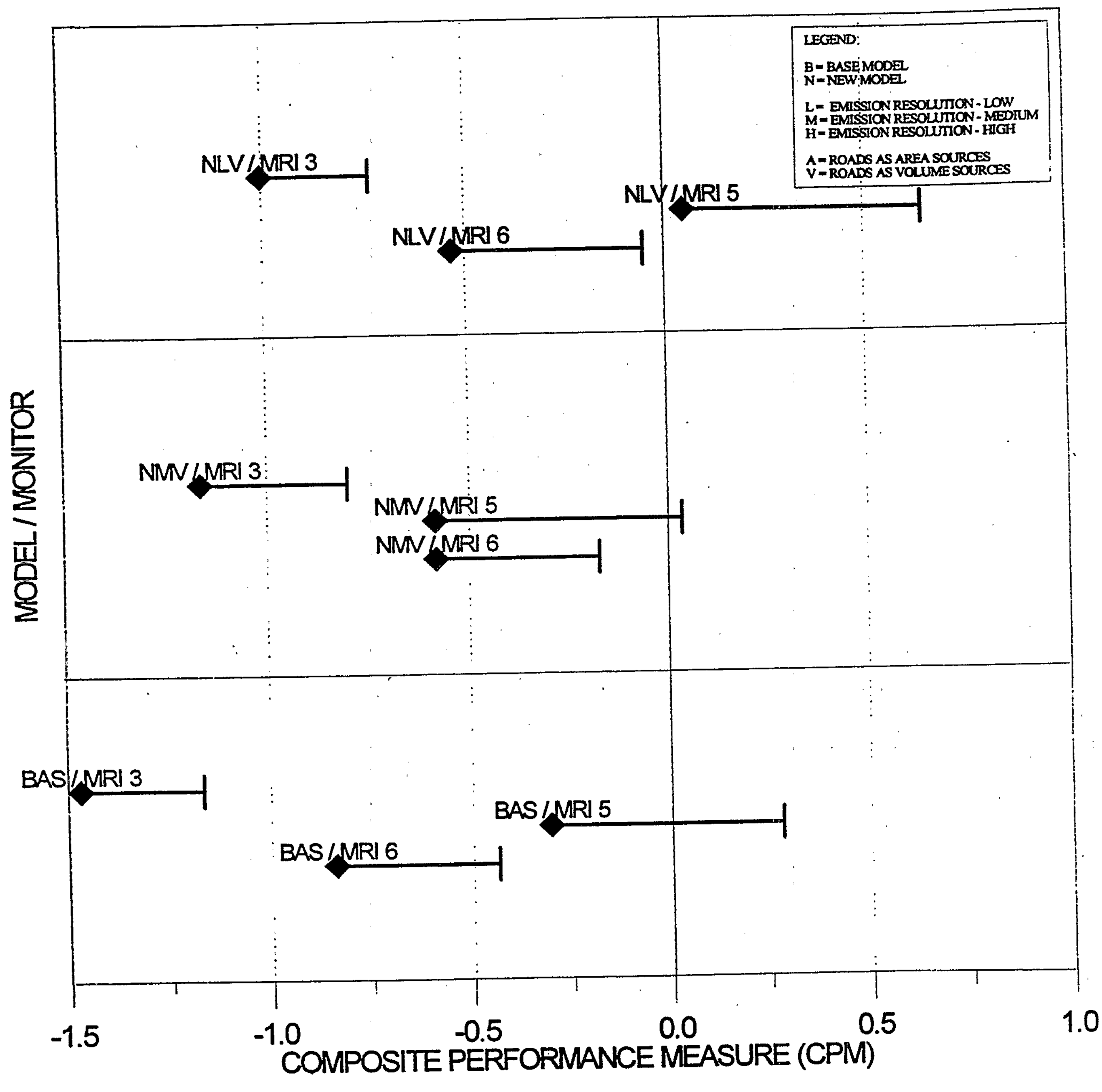

Figure 6.5 Model Overprediction Analysis - PM_{10} (Roads as Volume Sources)

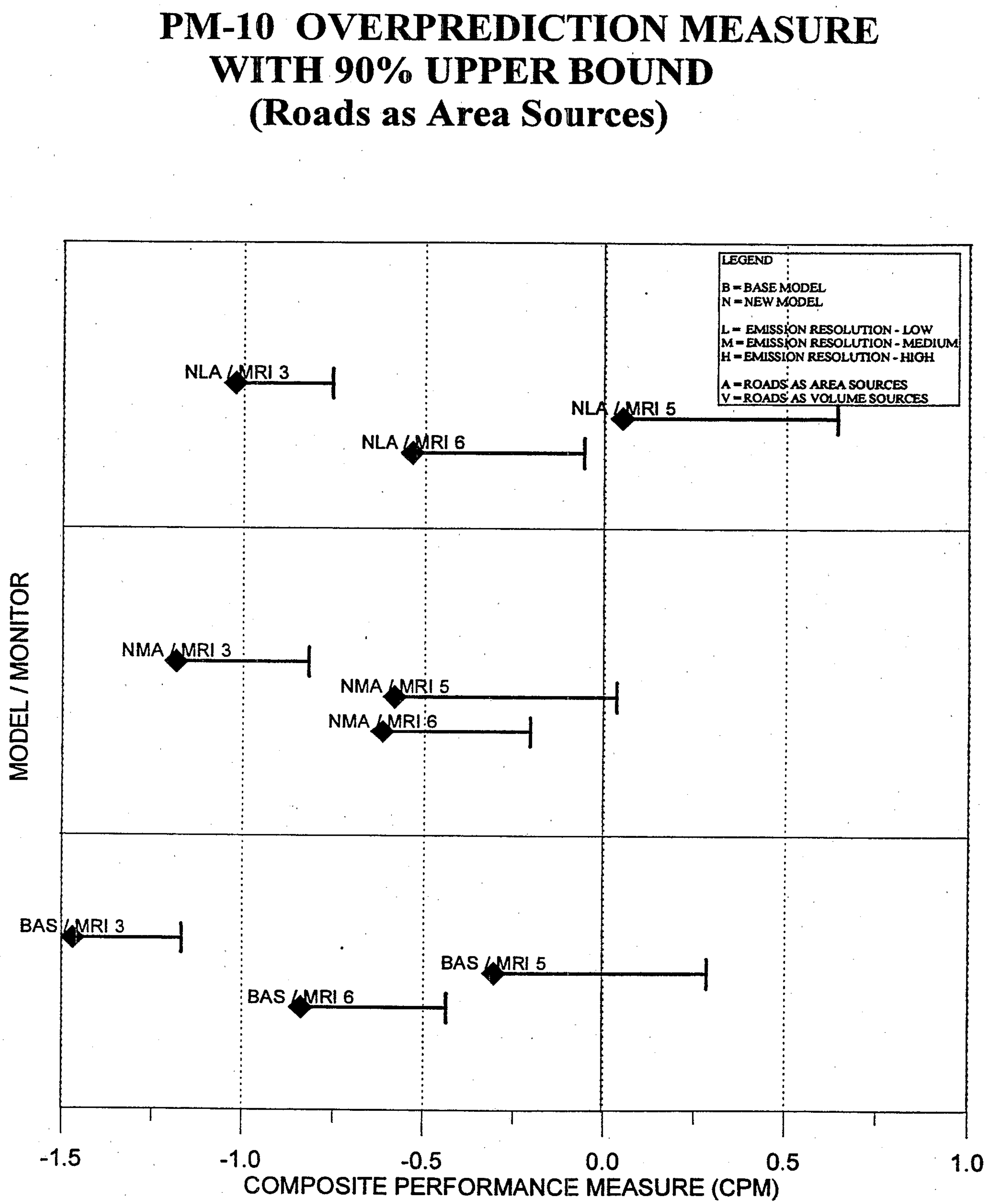

Figure 6.6 Model Overprediction Analysis - PM_{10} (Roads as Area Sources)

TSP OVERPREDICTION MEASURE WITH 90% UPPER BOUND (Roads as Volume Sources)

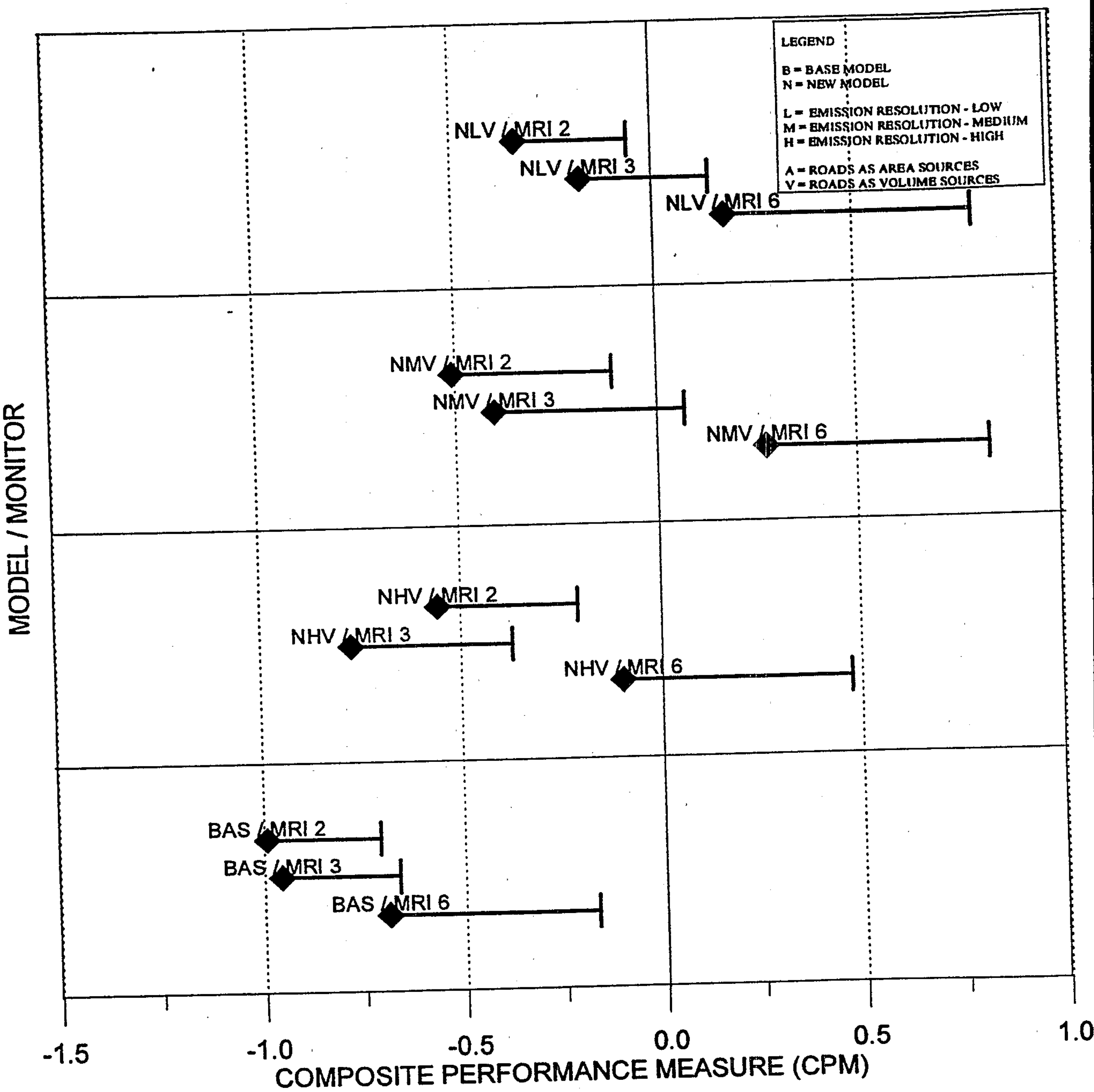

Figure 6.7 Model Overprediction Analysis - TSP (Roads as Volume Sources)

TSP OVERPREDICTION MEASURE WITH 90% UPPER BOUND (Roads as Area Sources)

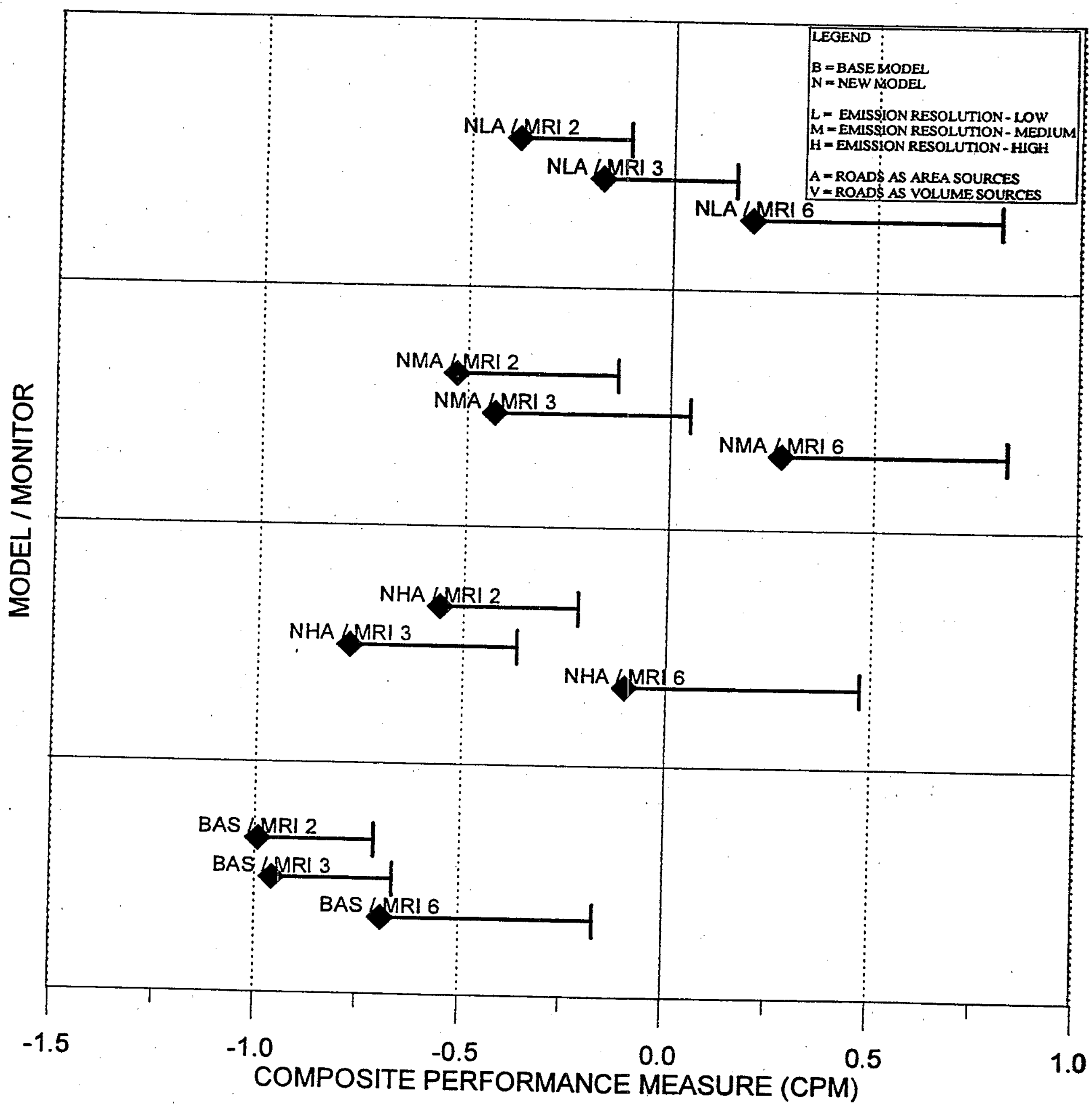

Figure 6.8 Model Overprediction Analysis - TSP (Roads as Area Sources)

Table 6-1. Fractional Bias for Model-Monitor Pairs : PM_{10}

MONITOR	NLV	NLA	NMV	NMA	NHV	NHA	BASE	BHV
MRI-1	0.29263	0.27208	-0.71586	-0.74287	-0.78837	-0.81610	-0.77573	-0.88085
MRI-2	-0.92659	-0.97187	-1.03625	-1.06014	-1.02309	-1.07239	-1.09894	-1.06419
MRI-3	-1.00204	-1.02199	-1.16550	-1.18479	-1.36195	-1.38246	-1.46970	-1.38013
MRI-4	-1.44299	-1.45828	-1.49066	-1.51124	-1.48677	-1.50934	-1.53440	-1.51085
MRI-5	0.05038	0.04761	-0.58224	-0.58390	-0.67354	-0.67694	-0.30341	-0.66053
MRI-6	-0.53179	-0.53672	-0.58066	-0.61689	-0.79840	-0.82175	-0.83780	-0.79816
HV-1	-0.74841	-0.74831	-0.73867	-0.74112	-1.04200	-1.04375	-1.04942	-1.14094
HV-2	-1.00805	-1.01586	-1.03270	-1.04400	-1.26791	-1.27062	-1.19849	-1.32095
HV-3	-0.16247	-0.15040	-0.36699	-0.38177	-0.33770	-0.35908	-0.80768	-0.42324

Table 6-2. Fractional Bias for Model-Monitor Pairs : TSP

MONITOR	NLV	NLA	NMV	NMA	NHV	NHA	BASE	BHV
MRI-1	0.38276	0.37490	-0.61178	-0.61768	-0.70570	-0.71640	-0.68693	-1.06081
MRI-2	-0.33962	-0.38080	-0.50762	-0.52740	-0.55643	-0.55817	-0.99196	-0.84346
MRI-3	-0.17830	-0.17154	-0.40356	-0.43271	-0.77314	-0.77578	-0.95670	-1.08157
MRI-4	-1.02891	-1.03086	-1.12657	-1.12637	-1.25200	-1.25570	-1.47090	-1.40544
MRI-5	0.61643	0.62506	0.23157	0.24366	0.08389	0.09737	-0.21283	-0.40129
MRI-6	0.18246	0.19630	0.27679	0.27230	-0.09775	-0.09891	-0.69029	-0.56665
HV-1	0.06668	0.08972	0.10179	0.12253	-0.39841	-0.37763	-0.92508	-0.98893
HV-2	-0.19681	-0.17081	-0.19473	-0.16148	-0.61950	-0.58743	-1.01380	-1.06365
HV-3	-0.01908	0.01298	-0.29377	-0.28919	-0.28041	-0.27494	-0.99495	-0.69844

7. ADDITIONAL ISSUES

The statistical model evaluation dealt with the 24-hour averaged RHC values. In this section we briefly investigate some issues that were revealed during the investigation and how they may affect the results.

7.1 Analyses of 30-Day Averages

In order to determine the presence of any significant spatial trends in the overpredictions, the ratio of the 30-day average model predicted to observed concentration values for the best performing (NLV) model were examined. Using 30-day averages was thought to be a robust means for investigating bias. Figure 7-1 shows the TSP values on the x-axis and the corresponding ratio results for PM_{10} on the y-axis. The receptor sites having the largest overprediction are all near the roads and are all in the same general vicinity, namely: MRI-2, HV-2, MRI-3, and MRI-4. A review of the emissions data shows that roadway emissions constitute about 75 percent of the total mine emissions (see Appendix F).

Two conclusions are evident from these results. First, overprediction is more evident for PM_{10} than TSP. Second, the receptors where overpredictions occur are generally the same for both PM_{10} and TSP. This suggests that common deficiencies in characterizing the emissions are higher for PM_{10} than TSP in the vicinity of these receptors. Another possible explanation might be that the dispersion from the sources in vicinity of these receptors is poorly characterized in some unique fashion or circumstance for these particular receptors.

7.2 Treatment of Background Concentrations

The background concentration for PM_{10} and TSP was defined as the lowest 24-hour observed concentration (see Section 5.4 of the protocol). Such a definition has a natural bias to overestimate the background concentration. If the observed concentrations are generally large in comparison to the background, the uncertainties associated with the background concentration are usually negligible. To assess this we computed the ratio of average estimated background PM_{10} concentrations to maximum observed PM_{10} concentrations to be 0.51, while the ratio for TSP is 0.26. As discussed in the previous section, there is some tendency for overprediction for both TSP and PM_{10}, but more so for PM_{10} than TSP. These results are consistent with the bias one would expect if the background concentration was somewhat overestimated, and the uncertainties in the background values were higher for PM_{10} than TSP.

7.3 Influence of Terrain

Flat terrain was assumed in the evaluation study because the pit and the area source algorithms cannot handle complex terrain. Some monitors, e.g., MRI 3 were located on a higher terrain than the surface of the pit and the roads. However, accurate topographical maps were not available to determine the difference in terrain to incorporate as the flagpole height of the receptor at these monitors.

Further sensitivity analyses are required to better understand the results and develop an approach for removing model overprediction.

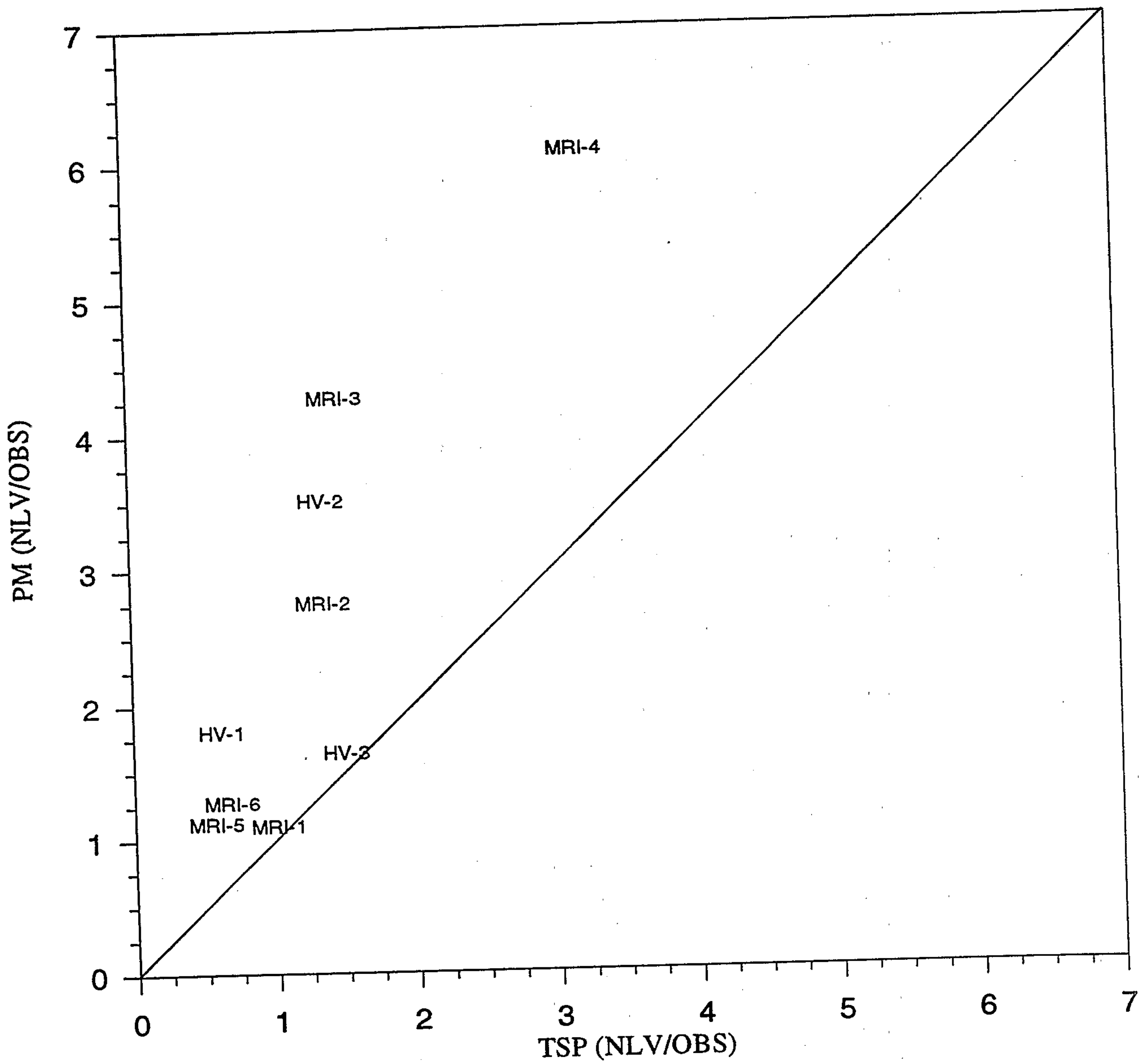

Figure 7-1. Ratio of 30-Day Average Modeled to Observed Concentrations for the Best Performing (NLV) Model

8. SUMMARY & CONCLUSIONS

A three-step process to identify the best-performing model for predicting the impacts of particulate emissions from surface coal mines and to identify significant overprediction was described in the model evaluation protocol (EPA, 1995a). This report is the first part of this three-step process.

This report compares the performance of the Industrial Source Complex (ISC2) dispersion model with the new ISC3 model which contains improved algorithms for area sources, open pit sources, and dry deposition. Observed data include on-site meteorological data and 24-hour air quality data for TSP and PM_{10} from a nine-station network distributed in and around a surface coal mine in Wyoming's Powder River Basin. Time-resolved information about mining operations (source activity) was collected during each 24-hour monitoring period. Emission rates from all significant sources operating during the monitoring period (traffic on haul roads and equipment operations) were obtained using the existing AP-42 emission factors, new emission factors and site specific emission factors. Emissions were adjusted by the effects of mitigation measures. Eight modeling groups consisting of a combination of: a dispersion model, an emission factor, a set of source location and activity level, and a geometric method for source representation for both TSP and PM_{10}. Model performance was compared using objective statistical measures. Appendix G provides a guide to the emissions and modeling data base used in this analysis.

The results of the model evaluation study show that:

1. The improved ISC3 model with new emission factors performs better than the original ISC2 model and original factors at predicting ambient concentrations of PM_{10} and TSP from a surface coal mine.

2. The improved ISC3 model performed better for TSP than PM_{10}.

3. There are statistical differences among pairs of models. The ISC3 model with emission rates averaged by shift over the length of the study (lowest emission resolution) performed better than the others.

4. In spite of the improved performance of the ISC3 model, the model significantly overpredicts (as defined in the protocol) for PM_{10} but not for TSP.

5. The receptors where overpredictions occur are generally the same for both PM_{10} and TSP. This suggests a common deficiency in either characterizing the emissions or the dispersion in some unique fashion for these particular receptors.

Other analyses that are left for further study include: 1) a comparison between the trends and relationships in the observed concentration values and meteorological data in this period with a 5-year historical data period in the Powder River Basin; 2) a sensitivity analysis to examine model response under various meteorological conditions, examine source characterization input, and evaluate boundaries of model use.

9. REFERENCES

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APPENDIX A

DOCUMENTATION OF MEMOS AND COMMUNICATIONS

This appendix includes a description of significant memos and other communications that serve to document the evaluation study, especially providing significant information that supplements the model evaluation protocol (EPA, 1995a).

Subject: **Telephone Communication between PES, EPA and Kirk Winges regarding source and receptor characteristics**

Date: 1/20/95

Participants: Jawad Touma, John Irwin, Dennis Atkinson, Russ Lee (of EPA); Roger Brode (of PES); Kirk Winges (of McCulley, Frick & Gilman)

Summary of Discussion:

It was decided that the coal dumping area is not represented well by an area source. It should, instead, be modeled as a volume source with dimensions of 20m X 20m with an initial sigma-y of 5m and an initial sigma-z of 10m.

Also, use the height of the intake valve of the monitors as flagpole height of the receptors in ISC modeling.

The flat terrain option should be chosen for this modeling study.

Subject: **Telephone Communication between PES and MRI regarding questions on the emission data from MRI**

Date: 3/21/95

Participants: Roger Brode, Jayant Hardikar (of PES); Greg Muleski (of MRI)

Summary of Discussion:

PES suggested that the Set 3 emissions do not seem to be corrected for rainfall mitigation. After some rechecking, MRI agreed that these corrections had not been applied.

cc: G. Muleski
R. Neulicht

MEMORANDUM

MIDWEST RESEARCH INSTITUTE

October 18, 1994

TO: Joe Touma

FROM: Chat Cowherd

SUBJECT: Project No. 4601-06, Final Data Submittals (Final Description)

Enclosed are three diskettes containing the data files required for ISC model evaluation according to the Model Evaluation Protocol (4/20/94) as corrected on 8/31/94 and 9/21/94. Table 1 lists the files contained on each diskette. Included are the files originally submitted in connection with Volume II (dated 10/26/93) of the draft Phase I report (see INSTRUCT.ME and MINEDATA.EXE).

AMBIENT AIR CONCENTRATIONS FOR PM-10/TSP: These files can be found in Section 2, Site/Month Concentrations, of Volume II, or on the diskette provided in November, 1993. The file names are HV1.MAY, HV1.JUN, ... , MRI6.JUN, MRI6.JUL; they are being provided again at this time.

METEOROLOGICAL DATA: The meteorological data file can be found in Section 3, Inter-Mountain Laboratories, Inc. (IML) Meteorological Data, of Volume II. It is being provided on diskette, and the file name is IMLMET.DAT. The file of calculated hourly atmospheric stability classes is named CARDIMAG.MET.

EMISSION INVENTORY: RATES AND LOCATIONS: Table 2 lists the files that are being provided for the PM-10 emission rates; Table 3 lists the files that contain source locations. The file named 24HRVPH, previously submitted as Section 6 of Volume II, is needed to apportion coal and overburden loading emissions to the respective source areas. A separate file, GRADERS.LOC, has been created to identify (by day/shift) the road segments where graders were observed to be operating.

A hard copy of AREA-A.ER was submitted on 9/8/94 as an example of an emission rate summary file for an area source. Similarly, a hard copy of RD-A.ER was submitted on 9/9/94 as an example of an emission rate summary file for a road segment.

Table 4 gives the control efficiencies afforded by rainfall during the affected monitoring days. The emission rate files for the following sources need to be adjusted to reflect these efficiencies: graders, bulldozing, and wind erosion.

Table 5 presents the TSP/PM-10 emission rate conversion ratios needed to generate the TSP emission rate files from the corresponding PM-10 emission rate files.

EMISSION CHARACTERISTICS

The values of release height, initial vertical dispersion (σ_{zo}), and particle size distribution as required for ISC implementation can be found in the Model Evaluation Protocol. These values are as follows: 2 m for the release height and 3 m for the initial vertical dispersion. Table 6 gives the aerodynamic particle size distributionus, which represent the particles as unit density spheres.

TABLE 1. LIST OF FILES ON EACH DISKETTE

DISKETTE 1

IMLMET.DAT **10/13/94**
CARDIMAG.MET **10/18/94**
24HRVPH. 10/8/93

Previous.
MINEDATA.EXE 11/11/93
INSTRUCT.ME 11/11/93

Ambient.Air
HV1.MAY ... MRI6.JUL 8/27/93

DISKETTE 2

Source.Loc
AREAS.LOC **10/18/94**
DRAGLINE.LOC 8/27/93
GRADERS.LOC 9/27/94
SCRAPER.LOC 8/27/93
ALL-RDS.(M) **10/18/94**
ROADA.LOC ... ROADZ.LOC 8/27/93

Traffic.ER
VEHHRS-1.ZIP **10/14/94**
VEHHRS-2.ZIP **10/14/94**
VEHHRS-3.ZIP **10/14/94**
VEHSUM-1. **10/14/94**
VEHSUM-2. **10/14/94**
VEHSUM-3. **10/14/94**

DISKETTE 3

Category.ER
CABALLOR.WQ1 **9/28/94**
DOZ-COAL.WQ1 9/7/94
DOZ-OVB.WQ1 9/7/94
DRAGLINE.WQ1 9/7/94
GRADERS.WQ1 9/13/94
LD-COAL.WQ1 9/7/94
LD-OVB.WQ1 9/7/94
SCRAPERS.WQ1 9/7/94
UNL-COAL.WQ1 9/7/94
UNLD-OVB.WQ1 9/7/94
WIND-1CO.WQ1 **9/30/94**
WIND-1OV.WQ1 **9/30/94**
WIND-1RD.WQ1 **10/17/94**
WIND-2CO.WQ1 **9/30/94**
WIND-2OV.WQ1 **9/30/94**
WIND-2RD.WQ1 **10/18/94**

Source.Sum
AR-A-SUM.WQ1 9/7/94
RD-A-SUM.WQ1 9/13/94

NOTE: The date following the file name is the date of the latest version. BOLD indicates that the file has been revised (or added) since the list was submitted on Sept. 27, 1994.

TABLE 2. PM-10 EMISSION RATES

Source Categories	File Names for Emission Rates Based on Three Sets of Emission Factors		
	Set 1	Set 2	Set 3
Caballo Rojo haul truck traffic	CABALLOR.WQ1	CABALLOR.WQ1	CABALLOR.WQ1
Coal bulldozing	DOZ-COAL.WQ1	*DOZ-COAL.WQ1*	*DOZ-COAL.WQ1*
Coal loading	LD-COAL.WQ1	LD-COAL.WQ1	*LD-COAL.WQ1*
Coal unloading	UNL-COAL.WQ1	UNL-COAL.WQ1	*UNL-COAL.WQ1*
Dragline	DRAGLINE.WQ1	DRAGLINE.WQ1	*DRAGLINE.WQ1*
Graders	GRADERS.WQ1	*GRADERS.WQ1*	*GRADERS.WQ1*
Overburden bulldozing	DOZ-OVB.WQ1	*DOZ-OVB.WQ1*	*DOZ-OVB.WQ1*
Overburden loading	LD-OVB.WQ1	LD-OVB.WQ1	*LD-OVB.WQ1*
Overburden unloading	UNL-OVB.WQ1	UNL-OVB.WQ1	*UNL-OVB.WQ1*
Scrapers	SCRAPERS.WQ1	*SCRAPERS.WQ1*	*SCRAPERS.WQ1*
Traffic: ● haul trucks (coal/overburden) ● water trucks ● light duty vehicles	VEHSUM-1.* VEHHRS-1.ZIP**	VEHSUM-2. VEHHRS-2.ZIP	VEHSUM-3. VEHHRS-3.ZIP
Wind erosion, coal loading areas	WIND-1CO.WQ1	WIND-2CO.WQ1	*WIND-2CO.WQ1*
Wind erosion, disturbed roads	WIND-1RD.WQ1	WIND-2RD.WQ1	*WIND-2RD.WQ1*
Wind erosion, overburden loading/unloading areas	WIND-1OV.WQ1	WIND-2OV.WQ1	*WIND-2OV.WQ1*

Italics indicate that the emission factor does not change from the previous set's emission factor.
* Files with "SUM" designation contain emission rate values for each shift of each day.
** Files with "HRS" designation contain emission rate values for each hour of each day.

TABLE 3. SOURCE LOCATIONS

Source designation	Component Source Categories	File Name
Roads A...Z*	Coal/overburden haul truck traffic Water truck traffic Light duty vehicle traffic Wind erosion of disturbed roads	ROADA.LOC... ROADZ.LOC
	Graders	GRADERS.LOC
Areas a,b,c,h**	Coal loading Coal bulldozing Wind erosion, coal loading area	AREAS.LOC (includes areas a,b,c,d,e,f,g,h,i)
Areas d,e,g,i	Overburden loading Overburden bulldozing Wind erosion, overburden loading area	AREAS.LOC
Area f	Coal unloading	AREAS.LOC
A1...Z4	Dragline Scrapers	DRAGLINE.LOC SCRAPER.LOC

* See Phase I report (5/31/94)
** See Model Evaluation Protocol

TABLE 4. CONTROL EFFICIENCY FOR RAINFALL

Date	Julian Day	Shift	No. of hours with rain	Fractional control efficiency (c)
5/21	141	2	1	0.13
5/27	147	2	4	0.50
5/29	149	0	1	0.17
6/6	157	2	5	0.63
6/8	159	0	3	0.50
6/16	167	0	2	0.33
		1	4	0.40
		2	8	1.00
6/18	169	0	2	0.33
		1	2	0.20
		2	3	0.38
6/22	173	1	4	0.40
6/30	181	0	2	0.33
		1	1	0.10
7/4	185	1	2	0.20
7/6	187	1	1	0.08
7/14	195	1	1	0.08
7/16	197	1	1	0.08

NOTE: To get the controlled emission rate, the emission rate is multiplied by (1-c).

TABLE 5. RATIO OF TSP TO PM-10
BASED ON THE EMISSION FACTOR EQUATIONS

Source	Ratio of TSP to PM-10		
	Set 1	Set 2	Set 3
Coal loading	5.49	2.11	2.11
Coal unloading	2.00	2.11	2.11
Overburden loading	2.00	2.11	2.11
Overburden unloading	2.00	2.11	2.11
Dragline	4.98	2.11	2.11
Coal haul truck travel	5.70	4.71	5.00
Overburden haul truck travel	5.70	4.71	5.00
Water truck travel	5.70	4.71	5.00
LDV travel	2.78	2.22	5.54
Coal bulldozing	3.71	3.71	3.71
Overburden bulldozing	5.24	5.24	5.24
Graders	3.48	3.48	3.48
Scrapers	5.52	5.52	5.52
Wind erosion: coal loading	2.00	2.00	2.00
Wind erosion: overburden loading	2.00	2.00	2.00
Wind erosion: haul roads	2.00	2.00	2.00
Caballo Rojo	See coal haul truck travel		

INTEROFFICE COMMUNICATION

MIDWEST RESEARCH INSTITUTE

June 15, 1995

To: Joe Touma

From: Chat Cowherd

Subject: Mining Emission Inventory Adjustment

Pursuant to our recent telephone discussions, we have concluded that the Set 2 emission factors for light-duty vehicles traveling on unpaved haul roads require adjustment for the mitigative effect of road watering. Specifically for any road segment where water trucks were observed during any particular shift of any particular day, the emissions from light-duty vehicles for that segment, day and shift should be divided by 2 to reflect the assigned watering control efficiency of 50%.

Please contact me if you have any questions.

cc: Jay Hardikar, PES

APPENDIX B

USER INSTRUCTIONS FOR THE MINE EMISSIONS PREPROCESSOR (MINEMISS)

This appendix includes a description of the user instructions for the mine emissions preprocessor program called MINEMISS. The MINEMISS preprocessor was used to generate the emission source parameters and hourly emission rates needed for input to the ISC model.

The input file of the mine emissions preprocessor makes use of the keyword/parameter approach similar to the ISC2 models. The detailed description of the general instructions for this approach can be found in Section 2.1 of the ISC2 Users Guide (EPA, 1992a).

There are four pathways in the **MINEMISS** runstream - CO (the COntrol pathway), RD (the RoaDs pathway), OP (the Open Pit pathway), and EM (the EMissions pathway). Each pathway has mandatory STARTING and FINISHED keywords. The various keywords and their usage are described in the following tables. Note that the 'M' in the TYPE column stands for mandatory, 'O' for optional, 'N' for non-repeatable and 'R' for repeatable.

Table B-1. Description of the CONTROL (CO) Pathway for MINEMISS

KEYWORD	TYPE	PARAMETERS	DESCRIPTION
INPUNITS	M - N	G/S LB/HR	The units of the raw input emission files (grams/second or pounds/hour)
OUEMITYP	M - N	SHIFT SHIFTAVG	Type of output emissions - by shift or shift-averaged over the entire period
ISC2FILE	M - N	*filename*	ISCST2/3 source location/parameter output file name
HOUREMIS	M - N	*filename*	ISCST2/3 hourly emissions output file name
SHIFTDEF	M - N	*filename*	Input file with shift start and end times

Table B-2. Description of the ROADS (RD) Pathway for MINEMISS

KEYWORD	TYPE	PARAMETERS	DESCRIPTION
SOURCTYP	M - N	VOLUME AREA	Output source type of roads - volume or area sources
EMISFILE	M - N	*filename*	Input file containing roadway emissions for every shift
LOCAFILE	M - N	*filename*	Input file containing road segment end point coordinates and the name of the pit they are within, if any

Table B-3. Description of the OPENPIT (OP) Pathway for MINEMISS

KEYWORD	TYPE	PARAMETERS	DESCRIPTION
LOCATION	M - R	*pitname* OPENPIT *x, y, z*	Source name, source type, x, y, z of the pit source
SRCPARAM	M - R	*pitname , q , hbase, xinit, yinit, pitvol, pitang*	Source name, emission rate, height above base, dimensions of the pit in relative terms similar to the ISCST2 area source parameter card, pit volume, angle of orientation

Table B-4. Description of the EMISSION (EM) Pathway for MINEMISS

KEYWORD	TYPE	PARAMETERS	DESCRIPTION
LOCAFILE	M - N	*filename*	File containing additional source location coordinates
EMISFILE	M - R	*filename*	Numerous emission files containing emissions by shift and the name of the source they are associated with. -contain julian day, shift (0/1/2), Q, source name to which the emissions are associated

A complete sample input file is shown below:

```
** Options file for MINEMIS run - SET 2 - shift avg emis - Roads as Volume Srcs
** Options pathway
CO STARTING
CO INPUNITS lb/hr            [or g/s - the units of the raw input emissions]
CO OUEMITYP shift            [or shiftavg - type of output emissions - by shift
                              or shift-averaged over the period]
CO ISC2FILE pset2sv.so       [ISCST2 Source Location/Parameter Output File Name]
CO HOUREMIS pset2sv.emi      [ISCST2 Hourly Emissions Output File Name]
CO SHIFTDEF shifts.def 3     [Input File with Shift Start and End Times]
CO FINISHED

** Roads Pathway
RD STARTING
RD SOURCTYP volume           [or area - Output Source Type of zroads - Vol/Area]
RD EMISFILE roads.em2 5      [Input File containing Roadway Emissions by Shift]
RD LOCAFILE roads.loc        [Input File containing Road Segment End Point Coordinates
                              and the Name of the Pit they are in, if any]
RD FINISHED

** Open Pit Pathway
OP STARTING
OP LOCATION northpit OPENPIT  -1524.  1439.  0.         [source name, source type, x,y,z]
OP LOCATION southpit OPENPIT  -1295. -5030.  0.
OP SRCPARAM northpit 1.0  0.0  1829 183 16.7353E6  -45.     [source name, emission rate,
                                                             ht above base, xinit,yinit,pitvol,
                                                             angle of orientation]
OP SRCPARAM southpit 1.0  0.0   518 610 12.9550E6  00.
OP FINISHED

** Emissions Pathway
EM STARTING
EM LOCAFILE SOURCES.LOC                     [File Containing Source Location Coordinates]

EM EMISFILE DCOAL-N.em2                     [Numerous Emission Files Containing Emissions
EM EMISFILE DCOAL-S.em2                      by Shift and the Name of the Source They are
EM EMISFILE LCOAL-N.em2                      associated with.
EM EMISFILE LCOAL-S.em2                      -contain julian day, shift (0/1/2), Q, Source
EM EMISFILE WCOAL-N.em2                      name to which the emissions are associated]
EM EMISFILE WUOVER-S.em2
EM EMISFILE WUOVER-N.em2
EM EMISFILE WLOVER-S.em2
EM EMISFILE WLOVER-N.em2
EM EMISFILE UOVER-S.em2
EM EMISFILE WCOAL-S.em2
EM EMISFILE UOVER-N.em2
EM EMISFILE LOVER-S.em2
EM EMISFILE UCOAL.em2
EM EMISFILE SCRAPER.em2
EM EMISFILE LOVER-N.em2
EM EMISFILE DOVER-S.em2
EM EMISFILE DRAGLINE.em2
EM EMISFILE DOVER-N.em2
EM FINISHED
```

Once the input file and the auxiliary files have been prepared, the program is executed by typing **MINEMISS** ***inputfile disgnostic_outputfile*** at the DOS prompt. The program will create the ISC2 or ISC3 format output files as specified in the input file. These output files will then be ready to be cut and pasted into ISCST2 or ISCST3 runstream files. Note that the output for the AREA source type for roads can only be used with the ISCST3 model, since it uses rectangular areas of arbitrary orientation and the ISCST2 area source algorithm is limited to square areas oriented north-south. The diagnostic output file will report any error messages that may be encountered during the run.

APPENDIX C

MODELED AND MONITORED CONCENTRATIONS FOR THE CORDERO MINE MODEL EVALUATION STUDY

This appendix presents the modeled and monitored concentrations for the Cordero Mine from the model evaluation study. The modeled results are presented for each of the eight models (see Table 5-1), for each of the nine monitor locations, and for each of the 30 days in the study period. The monitored concentrations presented in the last column have been corrected for background concentration. The PM_{10} concentrations are presented first, followed by the TSP concentrations.

C.1

PM_{10}

PM10 modeled and observed concentrations by receptor / by day (ug/m3)
The monitored concentrations have the appropriate background concentration removed.

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93051924	MRI-1	-1249.67993	-3810.00000	5.70851	1.49043	5.79780	1.70870	1.35953	6.07160	1.71966	1.36589	9.86000
93051924	MRI-2	-265.17999	-914.40002	19.83825	10.94580	16.81942	11.60105	10.45834	17.82976	11.66443	10.55327	10.9600
93051924	MRI-3	283.45999	448.06000	29.46590	32.30623	21.80133	23.98236	32.71926	22.29355	24.42117	33.82416	9.69000
93051924	MRI-4	384.04999	1319.77991	25.17963	18.31929	17.85694	13.82383	17.71452	18.24353	14.15596	18.27633	12.4700
93051924	MRI-5	-2310.38013	2590.80005	12.18196	22.50407	8.41231	16.27852	22.42430	8.48071	16.65323	23.06404	10.2100
93051924	MRI-6	-1554.47998	3496.06006	8.62773	10.86381	7.75005	8.35733	10.58508	7.82285	8.21220	10.34799	11.5100
93051924	HV-1	-3582.62012	656.83997	5.95008	10.44892	4.66836	7.87168	10.95317	4.67687	7.91531	11.03057	7.63000
93051924	HV-2	1272.54004	228.60001	13.28425	10.88464	8.64012	7.13980	10.95895	8.68169	7.19805	11.08767	9.14000
93051924	HV-3	-664.46002	-5539.74023	6.60245	0.62540	5.12766	0.79705	0.56924	5.18712	0.79455	0.56727	8.23000
93052124	MRI-1	-1249.67993	-3810.00000	10.40178	2.56535	3.25471	1.84520	2.38912	3.25906	1.87509	2.43781	5.64000
93052124	MRI-2	-265.17999	-914.40002	6.24337	0.78879	6.47759	1.06934	0.76358	7.08127	1.07698	0.76356	6.08000
93052124	MRI-3	283.45999	448.06000	65.05108	29.63918	26.74177	42.94592	27.93851	27.62109	44.69554	28.93733	9.58000
93052124	MRI-4	384.04999	1319.77991	21.87471	21.15163	20.70531	28.75292	20.28117	20.97257	28.74034	20.26381	4.34000
93052124	MRI-5	-2310.38013	2590.80005	1.18617	0.22919	0.85376	0.18429	0.17254	0.85188	0.18436	0.17317	3.63000
93052124	MRI-6	-1554.47998	3496.06006	10.03269	6.93306	6.80850	5.33840	6.68363	6.77703	5.31621	6.64471	5.16000
93052124	HV-1	-3582.62012	656.83997	0.30843	0.08354	0.13590	0.04686	0.06558	0.13516	0.04686	0.06561	0.000000
93052124	HV-2	1272.54004	228.60001	14.21409	10.56289	9.82756	12.96282	9.71488	9.78212	12.83311	9.61430	6.52000
93052124	HV-3	-664.46002	-5539.74023	1.49117	0.00153	0.60369	0.00204	0.00080	0.59278	0.00187	0.00076	1.08000
93052324	MRI-1	-1249.67993	-3810.00000	1.64007	1.39126	1.26517	1.44248	1.54419	1.25086	1.42130	1.50952	2.62000
93052324	MRI-2	-265.17999	-914.40002	22.38106	24.24873	19.52144	15.63658	23.53579	20.63044	15.78668	23.88935	3.84000
93052324	MRI-3	283.45999	448.06000	46.10854	50.19354	35.31519	35.59476	45.67433	35.54884	35.63789	45.85453	2.50000
93052324	MRI-4	384.04999	1319.77991	19.86160	8.12818	14.67699	8.52457	6.70892	14.60291	8.40072	6.51943	2.38000
93052324	MRI-5	-2310.38013	2590.80005	0.17519	0.14926	0.11920	0.07939	0.14228	0.12051	0.08027	0.14386	6.14000
93052324	MRI-6	-1554.47998	3496.06006	0.93480	0.78694	0.62139	0.40972	0.73435	0.62077	0.40950	0.73396	10.0400
93052324	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.620000
93052324	HV-2	1272.54004	228.60001	11.37745	8.74485	7.53570	6.14509	7.93685	7.50499	6.12643	7.93996	0.000000
93052324	HV-3	-664.46002	-5539.74023	15.54887	4.48904	7.90097	2.29146	4.18679	7.78030	2.32853	4.26689	0.290000
93052524	MRI-1	-1249.67993	-3810.00000	18.05023	0.00000	7.50227	0.00000	0.00000	7.54195	0.00000	0.00000	1.32000
93052524	MRI-2	-265.17999	-914.40002	4.90587	0.00000	4.35080	0.00000	0.00000	4.51984	0.00000	0.00000	4.99000
93052524	MRI-3	283.45999	448.06000	55.20713	31.73326	22.08626	24.05081	31.52487	23.11331	25.29577	33.26698	6.02000
93052524	MRI-4	384.04999	1319.77991	25.14332	19.25290	12.12191	13.80661	18.86495	12.40407	14.13996	19.39474	2.29000
93052524	MRI-5	-2310.38013	2590.80005	16.97311	9.96299	10.63380	11.91075	9.41163	10.69449	11.99699	9.47412	3.99000
93052524	MRI-6	-1554.47998	3496.06006	38.36670	22.36108	25.36711	25.29880	23.15608	25.39331	25.26859	23.16711	6.94000
93052524	HV-1	-3582.62012	656.83997	1.17877	0.00000	0.87283	0.00000	0.00000	0.87342	0.00000	0.00000	0.000000
93052524	HV-2	1272.54004	228.60001	0.95758	0.00000	0.79824	0.00000	0.00000	0.79754	0.00000	0.00000	1.74000
93052524	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.800000
93052724	MRI-1	-1249.67993	-3810.00000	3.27318	1.17321	3.05178	1.86534	1.07198	3.14077	1.86494	1.07149	7.40000
93052724	MRI-2	-265.17999	-914.40002	17.18410	11.95470	16.43259	17.35829	10.96997	17.47440	18.03416	11.46548	8.45000
93052724	MRI-3	283.45999	448.06000	21.85673	22.43896	14.74687	16.77092	21.52464	15.15058	17.33101	22.36062	4.20000
93052724	MRI-4	384.04999	1319.77991	9.68482	5.75613	6.46754	5.87815	5.34975	6.54932	5.98905	5.37322	4.65000
93052724	MRI-5	-2310.38013	2590.80005	4.81560	1.62094	3.66582	3.95387	1.83975	3.65991	3.94706	1.83802	6.65000
93052724	MRI-6	-1554.47998	3496.06006	0.80636	0.74979	0.57136	0.41325	0.67237	0.56535	0.41194	0.67727	12.5000
93052724	HV-1	-3582.62012	656.83997	4.32319	2.10235	3.30558	4.44916	1.84015	3.31686	4.47513	1.84792	2.63000
93052724	HV-2	1272.54004	228.60001	5.82967	4.83560	3.98221	3.95839	4.68988	4.02356	4.00240	4.72590	0.000000
93052724	HV-3	-664.46002	-5539.74023	6.67392	1.42323	5.42419	2.12560	1.25371	5.42482	2.13252	1.25801	3.47000
93052924	MRI-1	-1249.67993	-3810.00000	13.95493	1.28409	5.24687	1.32180	1.17684	5.25936	1.30386	1.16231	-99.0000
93052924	MRI-2	-265.17999	-914.40002	17.10517	5.72951	16.29060	7.34224	5.49419	17.11243	7.08800	5.27498	4.01000
93052924	MRI-3	283.45999	448.06000	61.63769	45.42616	41.45609	53.94922	44.01115	43.21215	56.70110	46.20819	6.16000
93052924	MRI-4	384.04999	1319.77991	41.23833	22.92447	30.77906	28.86642	22.68903	31.08982	28.91580	22.94865	1.68000
93052924	MRI-5	-2310.38013	2590.80005	2.94315	2.23034	1.72867	1.37923	2.26885	1.72174	1.37455	2.25938	1.89000
93052924	MRI-6	-1554.47998	3496.06006	15.24210	12.33964	10.22974	10.28727	12.74417	10.27008	10.31885	12.82812	-99.0000
93052924	HV-1	-3582.62012	656.83997	0.42828	0.52097	0.29027	0.28422	0.50952	0.29214	0.29058	0.52092	0.000000
93052924	HV-2	1272.54004	228.60001	12.30774	9.59874	10.91842	12.35325	9.10213	10.98558	12.43456	9.15986	0.580000
93052924	HV-3	-664.46002	-5539.74023	7.14563	0.52694	3.54703	0.57611	0.48540	3.59310	0.57174	0.48304	0.100000
93053124	MRI-1	-1249.67993	-3810.00000	17.50365	0.00000	9.30180	0.00000	0.00000	9.43498	0.00000	0.00000	-99.0000
93053124	MRI-2	-265.17999	-914.40002	0.06274	0.00000	0.05095	0.00000	0.00000	0.03526	0.00000	0.00000	3.84000
93053124	MRI-3	283.45999	448.06000	27.09593	10.34729	7.00274	7.89806	10.29631	7.25367	8.17708	10.67935	3.73000
93053124	MRI-4	384.04999	1319.77991	14.86205	2.34498	1.71334	1.98070	2.29559	1.60953	1.85876	2.13484	2.85000
93053124	MRI-5	-2310.38013	2590.80005	16.47768	7.13765	11.39792	9.08157	6.66845	11.44318	9.12882	6.70331	4.86000
93053124	MRI-6	-1554.47998	3496.06006	30.58388	13.86895	20.72661	19.10674	14.68535	20.74143	19.13356	14.71387	6.65000
93053124	HV-1	-3582.62012	656.83997	1.13809	0.04733	0.83050	0.05525	0.04714	0.83122	0.05438	0.04640	-99.0000
93053124	HV-2	1272.54004	228.60001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.680000

C.1 Modeled and Monitored PM10 Concentrations for the Cordero Mine Model Evaluation Study

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NHV	HHV	NLA	NHA	HHA	MONITORED
93053124	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93060224	MRI-1	-1249.67993	-3810.00000	3.96893	0.72734	3.38220	1.75942	0.63616	3.40968	1.68112	0.47566	1.10000
93060224	MRI-2	-265.17999	-914.40002	20.52457	2.20381	13.38488	3.65195	2.00861	13.90130	3.67334	2.18432	0.540000
93060224	MRI-3	283.45999	448.06000	23.82307	1.04785	16.49940	3.98588	0.92366	17.00265	4.03746	0.92662	0.710000
93060224	MRI-4	384.04999	1319.77991	21.50773	1.15560	16.38296	2.86681	0.98653	17.08066	2.85004	0.98442	0.450000
93060224	MRI-5	-2310.38013	2590.80005	2.85767	0.45090	1.52434	0.40609	0.36045	1.51428	0.40565	0.36089	1.44000
93060224	MRI-6	-1554.47998	3496.06006	2.46602	0.79017	1.30771	0.51021	0.65431	1.29600	0.50747	0.65183	2.59000
93060224	HV-1	-3582.62012	656.83997	3.12211	0.28479	2.04397	0.43981	0.26112	2.03321	0.43783	0.26021	0.250000
93060224	HV-2	1272.54004	228.60001	14.71776	0.55259	10.23979	1.84437	0.47558	10.27652	1.83547	0.47230	0.000000
93060224	HV-3	-664.46002	-5539.74023	5.07345	8.47490	3.22213	5.64268	7.33258	3.26546	5.91548	7.71948	1.14000
93060424	MRI-1	-1249.67993	-3810.00000	23.23139	0.00000	5.81349	0.00000	0.00000	5.81054	0.00000	0.00000	1.49000
93060424	MRI-2	-265.17999	-914.40002	0.48109	0.00000	0.30608	0.00000	0.00000	0.29805	0.00000	0.00000	1.50000
93060424	MRI-3	283.45999	448.06000	40.39729	25.03619	7.98720	13.15759	23.28775	8.08773	13.32327	23.73652	5.16000
93060424	MRI-4	384.04999	1319.77991	13.08166	5.85403	2.00614	3.21232	5.42078	1.93361	3.08846	5.15140	0.730000
93060424	MRI-5	-2310.38013	2590.80005	1.51930	0.04085	0.96224	0.22562	0.03542	0.93718	0.19017	0.03056	2.39000
93060424	MRI-6	-1554.47998	3496.06006	21.12143	23.41013	14.04683	21.69008	21.82378	14.00427	21.59543	21.70448	5.29000
93060424	HV-1	-3582.62012	656.83997	0.42509	0.00000	0.13811	0.00000	0.00000	0.13578	0.00000	0.00000	1.66000
93060424	HV-2	1272.54004	228.60001	0.04393	0.00000	0.03078	0.00000	0.00000	0.02955	0.00000	0.00000	-99.0000
93060424	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93060624	MRI-1	-1249.67993	-3810.00000	13.26885	2.76066	9.08499	1.25248	2.58833	9.46492	1.26268	2.61785	4.57000
93060624	MRI-2	-265.17999	-914.40002	17.41418	9.80957	7.20079	4.59947	9.33749	7.32347	4.61978	9.38470	3.29000
93060624	MRI-3	283.45999	448.06000	10.12150	3.04063	9.21355	2.32892	2.69472	9.98884	2.49879	2.84657	2.06000
93060624	MRI-4	384.04999	1319.77991	13.24276	2.80147	6.49821	1.89842	2.39832	6.56082	1.93909	2.46528	2.48000
93060624	MRI-5	-2310.38013	2590.80005	14.11373	8.42567	11.12709	8.32928	8.96639	11.10940	8.27487	8.91078	2.72000
93060624	MRI-6	-1554.47998	3496.06006	10.54408	3.29095	7.83839	2.81618	3.00881	7.83393	2.80967	3.00282	3.91000
93060624	HV-1	-3582.62012	656.83997	18.18413	14.53458	13.60122	10.12742	13.06227	13.54748	10.10522	13.03959	0.370000
93060624	HV-2	1272.54004	228.60001	0.50890	0.00000	0.45166	0.00000	0.00000	0.44983	0.00000	0.00000	0.410000
93060624	HV-3	-664.46002	-5539.74023	1.30291	0.50067	0.54483	0.29706	0.45744	0.54189	0.29165	0.44510	0.840000
93060824	MRI-1	-1249.67993	-3810.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.940000
93060824	MRI-2	-265.17999	-914.40002	4.54422	0.00069	4.55893	0.00076	0.00049	5.20745	0.00034	0.00021	1.73000
93060824	MRI-3	283.45999	448.06000	23.66357	35.62239	17.30197	23.73591	30.51119	17.90306	24.54408	31.75499	1.61000
93060824	MRI-4	384.04999	1319.77991	25.32632	41.72960	22.34990	34.65112	35.05406	22.82344	35.42672	35.98792	-99.0000
93060824	MRI-5	-2310.38013	2590.80005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.890000
93060824	MRI-6	-1554.47998	3496.06006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.55000
93060824	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93060824	HV-2	1272.54004	228.60001	15.35315	21.91458	11.17246	15.43712	17.26814	11.17082	15.40366	17.24236	-99.0000
93060824	HV-3	-664.46002	-5539.74023	0.50336	0.00000	0.07714	0.00000	0.00000	0.07714	0.00000	0.00000	0.250000
93061024	MRI-1	-1249.67993	-3810.00000	34.62246	4.39167	9.40534	3.89289	4.07112	9.43109	3.89286	4.07108	1.96000
93061024	MRI-2	-265.17999	-914.40002	5.30895	15.57215	5.15505	7.06660	15.45420	5.47491	7.08960	15.50786	1.28000
93061024	MRI-3	283.45999	448.06000	87.02097	71.49789	28.66444	48.70462	71.67771	30.53619	51.85959	76.35210	5.23000
93061024	MRI-4	384.04999	1319.77991	28.34258	30.72594	11.87554	21.80581	30.45041	12.20823	22.53681	31.13170	3.39000
93061024	MRI-5	-2310.38013	2590.80005	2.35947	0.64478	2.01938	0.50579	0.63672	1.96492	0.50062	0.62913	1.46000
93061024	MRI-6	-1554.47998	3496.06006	31.14515	46.81983	26.78580	37.95599	49.73627	26.89187	38.08253	50.01839	4.99000
93061024	HV-1	-3582.62012	656.83997	0.85286	0.00002	0.31512	0.00002	0.00003	0.30848	0.00002	0.00003	0.000000
93061024	HV-2	1272.54004	228.60001	3.92619	2.99937	2.22596	3.60918	2.97683	2.27676	3.69492	3.01607	1.80000
93061024	HV-3	-664.46002	-5539.74023	0.48808	0.00000	0.25119	0.00000	0.00000	0.24995	0.00000	0.00000	0.640000
93061224	MRI-1	-1249.67993	-3810.00000	4.53083	0.98396	4.31561	1.17180	0.83468	4.52519	1.17671	0.83656	4.15000
93061224	MRI-2	-265.17999	-914.40002	15.01943	6.27535	14.62377	5.95715	6.29676	15.49210	5.85917	6.23115	4.24000
93061224	MRI-3	283.45999	448.06000	37.36736	72.66840	29.05940	51.82946	71.40160	30.61585	54.66510	75.90720	2.89000
93061224	MRI-4	384.04999	1319.77991	24.19287	48.97996	22.95713	39.04448	48.89532	24.02541	40.99244	51.78398	1.80000
93061224	MRI-5	-2310.38013	2590.80005	12.77589	25.74088	12.20739	22.59496	26.06847	11.73613	22.30326	25.73185	2.64000
93061224	MRI-6	-1554.47998	3496.06006	13.18902	27.08511	10.75133	31.65750	25.79192	11.86436	35.51399	28.45328	4.22000
93061224	HV-1	-3582.62012	656.83997	9.02671	10.84074	5.39955	7.13543	7.71913	5.37702	7.14954	7.73238	0.230000
93061224	HV-2	1272.54004	228.60001	17.32648	28.44031	13.54581	21.12942	27.35431	13.75086	21.50007	27.82444	1.60000
93061224	HV-3	-664.46002	-5539.74023	4.08827	0.35021	1.84116	0.34444	0.27814	1.82020	0.33826	0.27386	0.000000
93061424	MRI-1	-1249.67993	-3810.00000	2.81277	0.16890	2.89336	0.23974	0.17602	3.07988	0.23988	0.17615	3.24000
93061424	MRI-2	-265.17999	-914.40002	7.35340	0.56059	6.67479	0.77744	0.57002	7.55765	0.91877	0.67439	0.870000
93061424	MRI-3	283.45999	448.06000	23.60969	55.08602	15.09447	28.49528	54.87252	16.61717	31.50628	59.28115	3.85000
93061424	MRI-4	384.04999	1319.77991	20.13874	47.92699	13.20507	25.33847	48.45102	14.24925	27.39373	51.57383	1.98000
93061424	MRI-5	-2310.38013	2590.80005	13.20098	5.69626	11.27235	7.99926	5.46656	11.28782	8.04428	5.49115	3.00000
93061424	MRI-6	-1554.47998	3496.06006	5.62787	31.93113	4.79169	23.32953	28.52990	4.85623	23.72980	29.05139	7.09000
93061424	HV-1	-3582.62012	656.83997	2.77823	0.55229	1.40319	0.43933	0.48219	1.39191	0.43413	0.47633	1.03000
93061424	HV-2	1272.54004	228.60001	12.02414	27.47441	6.43074	11.72996	26.78472	6.44346	11.75044	26.71379	0.000000

C.1 Modeled and Monitored PM10 Concentrations for the Cordero Mine Model Evaluation Study (cont.)

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93061424	HV-3	-664.46002	-5539.74023	0.15606	0.04361	0.13935	0.07086	0.05010	0.14001	0.07012	0.04967	0.970000
93061624	MRI-1	-1249.67993	-3810.00000	2.90112	0.81687	2.09643	0.93741	0.69855	2.10783	0.93212	0.69710	3.20000
93061624	MRI-2	-265.17999	-914.40002	23.67010	9.15976	17.17409	10.17490	8.30026	17.98508	10.21384	8.33931	3.03000
93061624	MRI-3	283.45999	448.06000	28.02046	26.27606	19.77675	18.77349	25.73943	20.37679	19.38808	26.78431	2.54000
93061624	MRI-4	384.04999	1319.77991	21.31261	19.34827	14.30728	16.34687	18.62154	14.43837	16.61482	19.11095	3.57000
93061624	MRI-5	-2310.38013	2590.80005	0.79007	0.18787	0.40258	0.13103	0.16900	0.41076	0.13156	0.16896	3.17000
93061624	MRI-6	-1554.47998	3496.06006	0.80129	0.79701	0.48792	0.37895	0.67939	0.49137	0.38148	0.68392	3.70000
93061624	HV-1	-3582.62012	656.83997	0.45013	0.49113	0.33723	0.34129	0.37196	0.32869	0.33532	0.36808	1.65000
93061624	HV-2	1272.54004	228.60001	6.28846	5.22403	4.83865	4.68961	5.01541	4.84967	4.69924	5.01912	-99.0000
93061624	HV-3	-664.46002	-5539.74023	7.21024	4.10050	5.36426	3.43372	3.58332	5.41469	3.46025	3.62151	2.23000
93061824	MRI-1	-1249.67993	-3810.00000	41.00183	30.03555	14.19398	27.35812	30.38123	14.54008	27.87789	31.08414	0.980000
93061824	MRI-2	-265.17999	-914.40002	5.46876	5.38588	3.65623	4.07966	5.39147	3.92030	4.40709	5.85722	0.330000
93061824	MRI-3	283.45999	448.06000	131.23210	29.88905	25.67122	27.76207	29.88342	26.64364	28.53452	30.89988	1.19000
93061824	MRI-4	384.04999	1319.77991	12.64618	8.07118	6.89877	6.51700	8.07470	7.19927	6.79050	8.41929	0.390000
93061824	MRI-5	-2310.38013	2590.80005	16.57511	23.39491	13.33865	17.85723	22.94557	13.46525	17.95055	22.96418	0.940000
93061824	MRI-6	-1554.47998	3496.06006	49.04361	24.59511	38.27882	26.14570	24.61845	38.12268	26.02910	24.53304	0.740000
93061824	HV-1	-3582.62012	656.83997	2.27772	5.04556	1.46260	3.60249	4.92107	1.47219	3.62363	4.94694	0.160000
93061824	HV-2	1272.54004	228.60001	0.86920	0.33469	0.55878	0.25713	0.34112	0.53337	0.25407	0.33601	-99.0000
93061824	HV-3	-664.46002	-5539.74023	0.81908	0.00000	0.84171	0.00000	0.00000	0.83961	0.00000	0.00000	-99.0000
93062224	MRI-1	-1249.67993	-3810.00000	5.81850	4.64091	4.25910	4.79868	5.01051	4.36601	4.77246	4.98111	3.35000
93062224	MRI-2	-265.17999	-914.40002	17.88587	21.62271	15.80089	31.46039	21.08980	16.86207	34.10794	22.54080	6.74000
93062224	MRI-3	283.45999	448.06000	40.25837	35.33260	28.21989	27.63460	34.47528	30.27978	29.66843	37.34962	5.61000
93062224	MRI-4	384.04999	1319.77991	36.39769	36.67210	28.95628	28.00647	35.10541	29.98985	28.71258	36.04922	0.860000
93062224	MRI-5	-2310.38013	2590.80005	13.80530	8.93686	11.31875	8.47635	8.37254	11.62809	8.51670	8.35985	2.54000
93062224	MRI-6	-1554.47998	3496.06006	6.67252	3.04686	5.02455	2.21642	2.76159	4.97801	2.22432	2.75288	4.64000
93062224	HV-1	-3582.62012	656.83997	5.19745	5.59584	4.40031	4.98687	5.12365	4.38032	4.99967	5.12009	1.23000
93062224	HV-2	1272.54004	228.60001	5.34411	5.23481	4.83199	5.48306	5.00144	4.86596	5.53239	5.05005	1.49000
93062224	HV-3	-664.46002	-5539.74023	1.01852	0.96486	0.72914	1.70304	1.03108	0.72251	1.68055	1.02167	0.740000
93062424	MRI-1	-1249.67993	-3810.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.730000
93062424	MRI-2	-265.17999	-914.40002	9.76763	16.46492	9.75513	18.10425	15.66852	10.90779	20.31079	17.57818	5.73000
93062424	MRI-3	283.45999	448.06000	44.86693	31.25897	36.09718	29.78968	31.08171	37.90904	31.17782	32.75480	7.16000
93062424	MRI-4	384.04999	1319.77991	54.34848	40.53744	51.48670	55.37954	39.99693	54.94162	58.98146	42.09488	4.36000
93062424	MRI-5	-2310.38013	2590.80005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.820000
93062424	MRI-6	-1554.47998	3496.06006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	3.73000
93062424	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93062424	HV-2	1272.54004	228.60001	27.81422	17.26946	20.85181	20.52173	15.96167	20.91453	20.55058	15.98369	3.39000
93062424	HV-3	-664.46002	-5539.74023	0.36010	0.14968	0.07078	0.04697	0.03941	0.07078	0.04697	0.03941	0.900000E-01
93062624	MRI-1	-1249.67993	-3810.00000	8.42844	29.75414	6.15106	29.29524	27.54022	6.24056	30.34792	28.61505	7.91000
93062624	MRI-2	-265.17999	-914.40002	8.46745	27.03600	8.03232	25.41644	27.02958	8.86452	28.61553	29.89065	3.87000
93062624	MRI-3	283.45999	448.06000	20.80046	13.02729	12.64561	7.48695	13.01404	14.96284	8.03481	13.37448	4.63000
93062624	MRI-4	384.04999	1319.77991	9.64153	7.54069	8.11875	4.08916	7.54435	8.90531	4.11993	7.59748	0.730000
93062624	MRI-5	-2310.38013	2590.80005	14.68613	5.52062	9.69544	3.54752	5.32200	9.80900	3.55937	5.32681	2.36000
93062624	MRI-6	-1554.47998	3496.06006	26.19603	8.16511	16.09127	4.12308	7.55050	16.08962	4.10867	7.51851	4.21000
93062624	HV-1	-3582.62012	656.83997	5.49702	4.67730	4.82632	3.81216	4.49893	4.82793	3.80426	4.49229	0.000000
93062624	HV-2	1272.54004	228.60001	2.00139	1.35826	1.52413	1.13547	1.37594	1.58560	1.16513	1.39359	0.900000E-01
93062624	HV-3	-664.46002	-5539.74023	1.33373	2.84508	1.08295	2.68885	2.44122	1.07909	2.67440	2.43796	-99.0000
93062824	MRI-1	-1249.67993	-3810.00000	13.74791	11.16784	6.93743	13.04430	9.50060	7.08205	13.24214	9.63118	-99.0000
93062824	MRI-2	-265.17999	-914.40002	2.46031	4.86461	1.85445	4.86730	4.57341	1.94437	5.42475	5.07247	2.19000
93062824	MRI-3	283.45999	448.06000	41.67376	2.70208	9.82165	1.98359	2.23936	10.12635	1.94662	2.20263	7.48000
93062824	MRI-4	384.04999	1319.77991	8.78489	0.68323	3.67159	0.54743	0.65412	3.70607	0.53107	0.63365	2.47000
93062824	MRI-5	-2310.38013	2590.80005	8.02444	6.94404	5.33913	5.67497	5.47039	5.29389	5.63512	5.42594	22.3400
93062824	MRI-6	-1554.47998	3496.06006	21.77114	13.27264	14.72311	9.50323	11.17564	14.65897	9.49543	11.16995	21.4300
93062824	HV-1	-3582.62012	656.83997	1.17962	2.45762	0.63910	2.25261	1.85589	0.63423	2.23508	1.84177	0.000000
93062824	HV-2	1272.54004	228.60001	0.77849	0.12324	0.60279	0.06843	0.09790	0.59858	0.06877	0.09851	2.77000
93062824	HV-3	-664.46002	-5539.74023	0.96176	1.38877	0.39077	2.02273	1.77829	0.38394	1.97959	1.75137	-99.0000
93063024	MRI-1	-1249.67993	-3810.00000	6.04360	1.64588	5.21905	1.38266	1.64702	5.51652	1.46568	1.75117	3.50000
93063024	MRI-2	-265.17999	-914.40002	6.40877	13.50400	5.55082	11.38058	13.60229	6.23735	12.76901	15.26176	3.02000
93063024	MRI-3	283.45999	448.06000	30.39447	21.72078	20.34714	23.79907	21.87608	23.19539	27.48228	24.90033	-99.0000
93063024	MRI-4	384.04999	1319.77991	41.45387	21.67333	28.20756	23.24757	21.66228	30.07932	24.50674	22.95036	1.42000
93063024	MRI-5	-2310.38013	2590.80005	24.60955	15.64247	17.88884	25.20296	16.43470	17.87531	25.17738	16.41448	2.85000
93063024	MRI-6	-1554.47998	3496.06006	20.24802	10.55675	12.98864	15.43623	9.53501	13.12121	15.55649	9.59301	2.63000
93063024	HV-1	-3582.62012	656.83997	3.32272	1.62597	2.23643	1.75680	1.59075	2.21310	1.72997	1.56996	1.57000
93063024	HV-2	1272.54004	228.60001	14.56869	8.27100	7.88389	7.04175	8.03260	7.99925	7.16002	8.15658	1.91000
93063024	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-99.0000

C.1 Modeled and Monitored PM10 Concentrations for the Cordero Mine Model Evaluation Study (cont.)

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	MHV	NHV	NLA	MHA	NHA	MONITORED
93070224	MRI-1	-1249.67993	-3810.00000	13.74846	32.01258	7.31047	22.78698	28.53068	7.61121	23.86362	29.67716	10.2900
93070224	MRI-2	-265.17999	-914.40002	9.63606	15.11042	3.54055	15.23414	13.77001	3.52986	15.85228	14.06396	4.55000
93070224	MRI-3	283.45999	448.06000	21.81149	5.81260	6.35201	5.90310	5.18319	6.52436	5.91834	5.19459	3.63000
93070224	MRI-4	384.04999	1319.77991	4.23396	2.26666	3.51307	2.21534	1.84282	3.59955	2.23155	1.85644	2.45000
93070224	MRI-5	-2310.38013	2590.80005	14.91176	18.29679	11.93265	16.85724	19.32989	11.96655	16.88564	19.31824	7.83000
93070224	MRI-6	-1554.47998	3496.06006	38.63042	33.29579	23.11387	24.64089	28.61599	23.57604	25.14777	29.47322	8.27000
93070224	HV-1	-3582.62012	656.83997	2.50337	8.57254	1.38882	4.63037	7.46740	1.37894	4.60394	7.42640	1.00000
93070224	HV-2	1272.54004	228.60001	3.99378	2.20150	1.43381	2.12439	1.83922	1.46009	2.02499	1.75493	-99.0000
93070224	HV-3	-664.46002	-5539.74023	1.03868	3.80769	0.76213	4.42153	3.24948	0.77358	4.50592	3.28076	1.25000
93070424	MRI-1	-1249.67993	-3810.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.900000
93070424	MRI-2	-265.17999	-914.40002	6.60954	11.34264	6.83271	9.86930	10.39890	7.74653	11.24672	11.85643	2.43000
93070424	MRI-3	283.45999	448.06000	28.15981	13.23707	23.00606	11.36320	11.24158	24.15936	11.81979	11.73376	9.98000
93070424	MRI-4	384.04999	1319.77991	43.46650	24.61707	37.94097	24.77689	20.19806	38.49318	25.17947	20.79074	8.68000
93070424	MRI-5	-2310.38013	2590.80005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.02000
93070424	MRI-6	-1554.47998	3496.06006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.940000
93070424	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-99.0000
93070424	HV-2	1272.54004	228.60001	17.27134	8.15020	13.75094	7.32576	6.40210	13.77178	7.31718	6.37990	3.65000
93070424	HV-3	-664.46002	-5539.74023	0.18825	0.05371	0.03323	0.01812	0.01557	0.03323	0.01812	0.01557	0.000000
93070624	MRI-1	-1249.67993	-3810.00000	4.27672	6.69447	3.96538	3.67906	6.43122	3.98088	3.66302	6.41181	0.930000
93070624	MRI-2	-265.17999	-914.40002	17.68750	9.35563	17.17467	5.82029	9.27452	18.94349	6.04552	9.58584	2.25000
93070624	MRI-3	283.45999	448.06000	45.72052	37.84953	35.29302	34.97580	37.71666	37.67569	37.07898	40.14345	4.21000
93070624	MRI-4	384.04999	1319.77991	65.10049	57.84842	52.59992	53.34599	57.48041	54.76355	55.48897	60.27980	3.77000
93070624	MRI-5	-2310.38013	2590.80005	0.36640	0.48475	0.25376	0.26230	0.47023	0.25389	0.26243	0.47047	1.65000
93070624	MRI-6	-1554.47998	3496.06006	0.11433	0.18512	0.07833	0.09824	0.17612	0.07095	0.09161	0.16422	2.80000
93070624	HV-1	-3582.62012	656.83997	0.18194	0.23586	0.12491	0.12794	0.22703	0.12260	0.12566	0.22293	0.890000
93070624	HV-2	1272.54004	228.60001	28.63888	17.77045	20.16394	14.93468	17.43838	20.46325	14.99953	17.52707	3.79000
93070624	HV-3	-664.46002	-5539.74023	1.93702	0.19646	0.90239	0.19832	0.17202	0.90795	0.19646	0.16724	0.000000
93070824	MRI-1	-1249.67993	-3810.00000	0.37829	0.19845	0.16724	0.14806	0.12555	0.16739	0.14717	0.12532	3.94000
93070824	MRI-2	-265.17999	-914.40002	20.36274	5.12610	19.12190	10.91150	4.97735	20.53301	11.51705	4.99598	6.98000
93070824	MRI-3	283.45999	448.06000	73.28058	75.65441	61.89947	55.31625	75.83306	63.77376	56.97127	78.22330	25.8500
93070824	MRI-4	384.04999	1319.77991	46.96776	22.89244	40.52064	24.82013	20.81328	41.29017	25.72396	21.41991	4.39000
93070824	MRI-5	-2310.38013	2590.80005	0.00094	0.00092	0.00067	0.00051	0.00091	0.00040	0.00030	0.00055	6.28000
93070824	MRI-6	-1554.47998	3496.06006	0.41138	0.44792	0.28878	0.24354	0.43699	0.28830	0.24155	0.43341	12.4400
93070824	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93070824	HV-2	1272.54004	228.60001	29.20701	24.44454	23.75201	20.59262	24.21164	24.00784	20.98189	24.61999	4.47000
93070824	HV-3	-664.46002	-5539.74023	14.81926	8.53599	6.64019	9.80289	8.17425	6.67895	9.68679	8.09606	9.71000
93071024	MRI-1	-1249.67993	-3810.00000	5.96090	1.09276	4.52608	1.27677	0.90868	4.53490	1.28958	0.91589	1.10000
93071024	MRI-2	-265.17999	-914.40002	26.49933	6.55806	23.12889	7.26772	5.92915	23.96807	7.71955	6.15973	6.66000
93071024	MRI-3	283.45999	448.06000	28.33274	27.66441	21.18049	14.54242	25.59613	21.37505	14.78123	26.09990	0.710000
93071024	MRI-4	384.04999	1319.77991	8.63858	3.23395	7.94001	2.31396	3.02828	8.14430	2.30811	3.01780	1.17000
93071024	MRI-5	-2310.38013	2590.80005	1.15352	1.54168	0.68457	0.71404	1.26734	0.69109	0.71608	1.27100	5.16000
93071024	MRI-6	-1554.47998	3496.06006	1.08466	2.76399	0.66887	1.31860	2.36364	0.65994	1.30156	2.33309	8.32000
93071024	HV-1	-3582.62012	656.83997	0.49798	0.93203	0.38737	0.41604	0.74571	0.38739	0.41920	0.75136	1.28000
93071024	HV-2	1272.54004	228.60001	4.35857	1.50854	3.24423	1.00098	1.28360	3.17500	0.98774	1.26165	0.000000
93071024	HV-3	-664.46002	-5539.74023	11.81792	14.55335	6.99938	17.28945	13.67220	7.05768	17.75083	13.99409	-99.0000
93071224	MRI-1	-1249.67993	-3810.00000	4.91499	0.34890	2.08239	0.34810	0.25413	2.08250	0.34930	0.25427	4.10000
93071224	MRI-2	-265.17999	-914.40002	12.26264	2.01615	11.25380	2.38467	1.57372	11.70458	2.37414	1.56842	4.51000
93071224	MRI-3	283.45999	448.06000	32.93937	12.72775	19.64587	15.09705	10.62689	20.04657	15.30936	10.65978	6.14000
93071224	MRI-4	384.04999	1319.77991	11.15577	4.78192	8.94639	5.92749	3.91957	8.98822	5.85959	3.88810	2.12000
93071224	MRI-5	-2310.38013	2590.80005	1.29999	1.41988	0.82708	1.10666	1.63924	0.81814	1.09240	1.60478	5.44000
93071224	MRI-6	-1554.47998	3496.06006	9.80611	16.44319	5.53392	9.29108	14.40146	5.54836	9.33004	14.46849	10.7600
93071224	HV-1	-3582.62012	656.83997	0.16741	0.00357	0.08830	0.00153	0.00274	0.08792	0.00126	0.00227	0.000000
93071224	HV-2	1272.54004	228.60001	3.49511	1.70339	2.50385	1.94902	1.40580	2.53823	1.95414	1.41004	0.180000
93071224	HV-3	-664.46002	-5539.74023	7.37054	0.21211	4.22175	0.16303	0.14962	4.21354	0.15935	0.14745	1.17000
93071424	MRI-1	-1249.67993	-3810.00000	8.28783	12.11511	3.19204	10.84825	9.90295	3.25621	11.10580	10.07413	19.1200
93071424	MRI-2	-265.17999	-914.40002	4.89969	6.89751	3.36641	3.92811	5.66949	3.44191	3.99794	5.73512	1.49000
93071424	MRI-3	283.45999	448.06000	16.04064	6.76298	6.55799	3.64371	5.62401	6.83683	3.76766	5.85177	2.61000
93071424	MRI-4	384.04999	1319.77991	6.02939	4.16668	3.58265	1.77996	3.29930	3.65417	1.79727	3.37133	1.44000
93071424	MRI-5	-2310.38013	2590.80005	3.37830	3.49692	2.05650	2.11246	2.89365	2.05323	2.11145	2.88777	-99.0000
93071424	MRI-6	-1554.47998	3496.06006	10.38532	10.40821	7.02409	6.00030	8.51755	6.98629	5.94929	8.43873	16.5000
93071424	HV-1	-3582.62012	656.83997	1.04820	1.21515	0.41916	0.65101	0.87318	0.41998	0.65297	0.88059	0.780000
93071424	HV-2	1272.54004	228.60001	2.40436	0.83398	1.18464	0.79401	0.58232	1.18946	0.78625	0.57004	0.820000
93071424	HV-3	-664.46002	-5539.74023	0.89938	2.10728	0.52926	1.45507	1.53651	0.53498	1.46740	1.55081	0.000000
93071624	MRI-1	-1249.67993	-3810.00000	6.53705	1.64163	4.00892	2.13620	1.43261	3.98590	2.12708	1.42210	3.97000

C.1 Modeled and Monitored PM10 Concentrations for the Cordero Mine Model Evaluation Study (cont.)

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93071624	MRI-2	-265.17999	-914.40002	35.93932	8.05774	32.13894	11.08674	7.50734	34.23412	11.29296	7.66247	4.30000
93071624	MRI-3	283.45999	448.06000	31.69745	8.35261	28.78372	17.19963	7.51347	29.24346	17.11827	7.45359	3.44000
93071624	MRI-4	384.04999	1319.77991	21.47556	24.10982	21.78645	60.77407	22.68731	22.61738	61.76532	22.93770	3.51000
93071624	MRI-5	-2310.38013	2590.80005	0.56632	0.00000	0.36497	0.00000	0.00000	0.36467	0.00000	0.00000	9.95000
93071624	MRI-6	-1554.47998	3496.06006	1.01584	0.00000	0.67750	0.00000	0.00000	0.67665	0.00000	0.00000	6.14000
93071624	HV-1	-3582.62012	656.83997	0.20666	0.00000	0.13108	0.00000	0.00000	0.13114	0.00000	0.00000	2.39000
93071624	HV-2	1272.54004	228.60001	10.76821	7.95606	9.94241	18.68852	7.37327	9.98133	18.42625	7.28562	3.07000
93071624	HV-3	-664.46002	-5539.74023	13.04573	2.18337	8.64584	2.65590	1.95175	8.59612	2.65200	1.95330	2.94000
93071824	MRI-1	-1249.67993	-3810.00000	11.01238	16.93663	6.87752	7.77550	15.28975	7.02143	7.87568	15.55225	4.44000
93071824	MRI-2	-265.17999	-914.40002	39.15094	37.18324	28.54655	29.29882	35.52543	30.04329	29.46732	36.05313	4.04000
93071824	MRI-3	283.45999	448.06000	43.96441	61.41028	37.44181	53.41396	58.63261	38.47137	55.11011	60.82682	1.57000
93071824	MRI-4	384.04999	1319.77991	28.05310	53.58863	21.91409	41.65356	50.45592	21.72104	41.14264	50.48666	0.450000
93071824	MRI-5	-2310.38013	2590.80005	6.77014	5.95712	3.69899	4.56297	5.53964	3.68476	4.55086	5.51802	5.87000
93071824	MRI-6	-1554.47998	3496.06006	1.60480	0.01022	1.07396	0.00553	0.00988	1.07557	0.00000	0.00000	6.61000
93071824	HV-1	-3582.62012	656.83997	9.88669	14.82152	4.04120	6.77010	13.23039	4.01901	6.77525	13.25948	1.58000
93071824	HV-2	1272.54004	228.60001	9.35227	18.10717	7.06654	13.16793	17.07390	7.08027	13.21159	17.17108	0.180000
93071824	HV-3	-664.46002	-5539.74023	17.61544	2.10741	9.59788	1.72631	1.72210	9.50696	1.69766	1.67051	1.59000

C.1 Modeled and Monitored PM10 Concentrations for the Cordero Mine Model Evaluation Study (cont.)

C.2

TSP

TSP modeled and observed concentrations by receptor / by day (ug/m3)
The monitored concentrations have the appropriate background concentration removed.

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93051924	MRI-1	-1249.67993	-3810.00000	26.18139	6.43393	14.85357	3.94043	3.62020	15.07373	3.86558	3.53961	22.9700
93051924	MRI-2	-265.17999	-914.40002	85.88589	47.50690	48.88178	30.02543	31.62456	50.76294	29.33645	30.93782	-99.9900
93051924	MRI-3	283.45999	448.06000	142.97112	141.34779	58.24948	64.68082	99.95993	57.77295	63.88620	99.88433	42.5600
93051924	MRI-4	384.04999	1319.77991	112.39636	76.02637	47.39215	37.31252	52.34009	47.18752	37.48034	52.73398	44.7500
93051924	MRI-5	-2310.38013	2590.80005	50.18962	93.03385	18.88683	36.33755	57.49624	18.73254	36.37165	57.63175	30.3000
93051924	MRI-6	-1554.47998	3496.06006	39.00932	45.62880	17.76118	19.35486	28.40733	17.54979	18.64618	27.17377	42.9700
93051924	HV-1	-3582.62012	656.83997	23.33007	42.68486	9.25140	14.84771	24.60062	9.08056	14.61151	24.19958	26.2900
93051924	HV-2	1272.54004	228.60001	59.38863	45.07713	19.85459	16.83457	28.12806	19.48235	16.65995	27.73929	32.9500
93051924	HV-3	-664.46002	-5539.74023	26.04059	2.61168	12.80843	1.79897	1.46320	12.73435	1.75295	1.42266	21.2300
93052124	MRI-1	-1249.67993	-3810.00000	27.01322	9.95334	8.29249	4.54203	6.73605	8.22085	4.54627	6.74286	14.2800
93052124	MRI-2	-265.17999	-914.40002	30.65927	3.00004	21.00520	2.43616	2.12512	22.43671	2.43216	2.11947	25.8000
93052124	MRI-3	283.45999	448.06000	198.48143	123.95602	71.59727	110.19458	89.51070	71.88557	111.20184	90.13204	54.6100
93052124	MRI-4	384.04999	1319.77991	99.48016	90.15859	54.41700	71.20551	63.45858	53.35939	68.89482	61.61328	15.2800
93052124	MRI-5	-2310.38013	2590.80005	5.02157	0.93728	1.73374	0.31410	0.38817	1.67612	0.30512	0.37818	4.44000
93052124	MRI-6	-1554.47998	3496.06006	46.30204	28.29067	18.02243	14.08169	19.65278	17.68904	13.90245	19.28930	17.6500
93052124	HV-1	-3582.62012	656.83997	1.01308	0.33242	0.28605	0.08713	0.14135	0.28103	0.08488	0.13728	5.46000
93052124	HV-2	1272.54004	228.60001	56.46794	44.19236	22.52135	27.36938	26.31954	21.72689	26.28057	25.32489	26.2500
93052124	HV-3	-664.46002	-5539.74023	5.14273	0.00547	1.62515	0.00264	0.00160	1.57560	0.00241	0.00150	0.750000
93052324	MRI-1	-1249.67993	-3810.00000	6.49135	5.43260	2.13512	2.48141	3.13400	2.08527	2.43094	3.04731	5.52000
93052324	MRI-2	-265.17999	-914.40002	105.82935	104.10892	53.59330	35.79720	62.34902	56.18711	35.32420	61.42192	29.1800
93052324	MRI-3	283.45999	448.06000	211.94279	218.88509	91.14902	95.58176	138.95201	88.97143	92.99405	135.08110	37.2300
93052324	MRI-4	384.04999	1319.77991	83.42020	30.48830	37.14555	21.85519	19.33434	35.99247	21.28826	18.66294	17.2700
93052324	MRI-5	-2310.38013	2590.80005	0.88556	0.66181	0.25015	0.16660	0.31698	0.24250	0.16151	0.30729	24.7400
93052324	MRI-6	-1554.47998	3496.06006	4.75621	3.51144	1.56664	1.03113	1.96194	1.50826	0.99325	1.88987	37.2300
93052324	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93052324	HV-2	1272.54004	228.60001	51.98509	36.46371	18.22493	15.15467	20.82644	17.66857	14.77876	20.26754	6.80000
93052324	HV-3	-664.46002	-5539.74023	52.16911	19.12240	18.78039	3.70754	7.95463	18.12872	3.65010	7.83774	3.23000
93052524	MRI-1	-1249.67993	-3810.00000	54.21550	0.00000	18.12731	0.00000	0.00000	17.85607	0.00000	0.00000	1.01000
93052524	MRI-2	-265.17999	-914.40002	23.20539	0.00000	11.88632	0.00000	0.00000	11.93812	0.00000	0.00000	8.96000
93052524	MRI-3	283.45999	448.06000	180.90852	133.88744	61.38578	67.37035	100.59399	62.27469	68.64533	102.64756	40.4300
93052524	MRI-4	384.04999	1319.77991	91.30374	80.29880	29.21541	33.96468	51.29271	28.76495	33.41859	50.60675	7.48000
93052524	MRI-5	-2310.38013	2590.80005	69.77829	39.99817	22.47569	25.74306	22.65804	22.11502	25.38313	22.29943	14.0200
93052524	MRI-6	-1554.47998	3496.06006	155.32382	83.87439	56.65787	58.30802	55.49966	55.84068	57.56400	54.77203	32.7600
93052524	HV-1	-3582.62012	656.83997	4.69011	0.00000	1.54525	0.00000	0.00000	1.50498	0.00000	0.00000	0.000000
93052524	HV-2	1272.54004	228.60001	3.89437	0.00000	1.55291	0.00000	0.00000	1.50000	0.00000	0.00000	26.5000
93052524	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.740000
93052724	MRI-1	-1249.67993	-3810.00000	15.11348	4.88084	7.82166	4.15095	2.87269	7.83806	4.07815	2.81880	12.2200
93052724	MRI-2	-265.17999	-914.40002	81.59758	53.07381	45.86966	42.59940	33.49108	47.62790	42.82749	33.89981	33.5100
93052724	MRI-3	283.45999	448.06000	106.09893	98.28339	39.45021	43.94169	64.75921	39.33109	44.11922	65.13264	26.3000
93052724	MRI-4	384.04999	1319.77991	41.42864	22.67587	16.56646	14.44114	14.88250	16.42819	14.57213	14.83941	10.8100
93052724	MRI-5	-2310.38013	2590.80005	20.30829	5.99365	9.15510	10.49391	5.00626	9.03891	10.43773	4.97540	13.5300
93052724	MRI-6	-1554.47998	3496.06006	4.09252	3.40375	1.56835	1.11420	2.01017	1.49979	1.07625	1.95290	38.1300
93052724	HV-1	-3582.62012	656.83997	18.82393	8.79917	7.09249	9.81211	4.69516	6.90937	9.59011	4.58054	10.4800
93052724	HV-2	1272.54004	228.60001	25.99801	19.74125	9.12412	8.75926	11.80001	8.98603	8.67318	11.61713	0.000000
93052724	HV-3	-664.46002	-5539.74023	27.66114	6.08800	13.07847	4.43799	3.17952	12.77568	4.34902	3.11192	3.33000
93052924	MRI-1	-1249.67993	-3810.00000	40.78033	5.35945	11.31630	2.36069	2.35206	11.18658	2.26661	2.25915	-99.0000
93052924	MRI-2	-265.17999	-914.40002	80.47884	23.41359	47.06801	17.47973	14.38386	48.84298	16.44538	13.40121	47.7000
93052924	MRI-3	283.45999	448.06000	237.45679	192.18352	110.68042	149.66058	139.15700	111.64379	152.17574	141.25311	62.3900
93052924	MRI-4	384.04999	1319.77991	157.48094	91.65002	77.09321	74.97649	65.46597	75.54774	73.27763	64.48973	22.0500
93052924	MRI-5	-2310.38013	2590.80005	13.37820	9.55229	4.10742	3.51533	5.96187	4.02450	3.44785	5.80885	-99.9900
93052924	MRI-6	-1554.47998	3496.06006	69.21869	50.52282	24.74547	26.32401	33.80244	24.46980	26.10330	33.39324	31.3600
93052924	HV-1	-3582.62012	656.83997	1.92451	2.21513	0.54802	0.52522	0.99953	0.53938	0.52053	0.99062	10.9800
93052924	HV-2	1272.54004	228.60001	51.64061	39.21859	24.50960	29.39229	24.49869	23.90225	28.74469	23.93450	-99.0000
93052924	HV-3	-664.46002	-5539.74023	25.22841	1.94886	8.52406	1.05687	0.92309	8.48803	1.04156	0.90794	9.98000
93053124	MRI-1	-1249.67993	-3810.00000	55.98442	0.00000	24.01199	0.00000	0.00000	23.83692	0.00000	0.00000	-99.0000
93053124	MRI-2	-265.17999	-914.40002	0.30276	0.00000	0.10941	0.00000	0.00000	0.07189	0.00000	0.00000	9.10000
93053124	MRI-3	283.45999	448.06000	72.42560	42.31960	18.54376	21.35765	31.43676	18.64381	21.43024	31.54015	23.1900
93053124	MRI-4	384.04999	1319.77991	29.57106	6.95297	2.96589	3.40681	4.43451	2.66548	3.05001	3.89886	4.08000
93053124	MRI-5	-2310.38013	2590.80005	70.58539	29.00562	27.58371	24.29910	18.89342	27.16454	24.06046	18.67062	14.5800
93053124	MRI-6	-1554.47998	3496.06006	124.46821	53.84740	50.79067	49.12815	40.05577	50.11816	48.74839	39.76881	22.3400
93053124	HV-1	-3582.62012	656.83997	4.58208	0.20471	1.83775	0.13929	0.13347	1.78146	0.13241	0.12689	2.96000
93053124	HV-2	1272.54004	228.60001	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.55000

C.2 Modeled and Monitored TSP Concentrations for the Cordero Mine Model Evaluation Study

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NHV	HHV	NLA	NHA	HHA	MONITORED
93053124	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93060224	MRI-1	-1249.67993	-3810.00000	18.58995	3.18779	8.12681	2.62876	1.79555	7.90467	2.28498	1.25376	3.76000
93060224	MRI-2	-265.17999	-914.40002	79.50805	9.96590	39.59581	6.93869	7.56674	40.48161	6.96076	8.08049	11.6700
93060224	MRI-3	283.45999	448.06000	116.21326	3.88586	46.57257	6.04772	-2.32433	46.66828	5.94627	2.27792	8.50000
93060224	MRI-4	384.04999	1319.77991	101.48950	3.44083	45.17945	4.41132	2.11868	45.87597	4.26355	2.06836	4.01000
93060224	MRI-5	-2310.38013	2590.80005	12.15374	1.87740	3.66129	0.76469	0.95512	3.56411	0.74277	0.92605	7.18000
93060224	MRI-6	-1554.47998	3496.06006	10.21890	3.44028	3.38817	1.19290	1.89304	3.28769	1.14714	1.81570	10.6000
93060224	HV-1	-3582.62012	656.83997	13.22671	0.98328	4.57978	0.64520	0.53168	4.52122	0.63255	0.51863	1.95000
93060224	HV-2	1272.54004	228.60001	69.80437	1.64532	25.09856	2.51276	0.94761	24.45399	2.42659	0.92094	0.410000
93060224	HV-3	-664.46002	-5539.74023	20.86749	33.91060	8.19391	13.76510	21.15849	8.11543	14.00473	21.54116	3.81000
93060424	MRI-1	-1249.67993	-3810.00000	58.06999	0.00000	14.85734	0.00000	0.00000	14.73116	0.00000	0.00000	3.73000
93060424	MRI-2	-265.17999	-914.40002	2.41474	0.00000	0.79560	0.00000	0.00000	0.74386	0.00000	0.00000	8.97000
93060424	MRI-3	283.45999	448.06000	98.66030	100.63290	21.33119	35.30116	74.21453	21.05989	34.86051	73.28895	-99.9900
93060424	MRI-4	384.04999	1319.77991	29.98518	22.02353	4.14410	6.62652	13.15613	3.83426	6.11416	11.90565	3.27000
93060424	MRI-5	-2310.38013	2590.80005	6.24841	0.14740	2.04553	0.33475	0.09271	1.94352	0.27268	0.07666	4.80000
93060424	MRI-6	-1554.47998	3496.06006	96.16931	93.73443	37.52253	58.79377	64.26551	36.95515	58.00162	63.24321	25.8200
93060424	HV-1	-3582.62012	656.83997	1.37032	0.00000	0.31811	0.00000	0.00000	0.31024	0.00000	0.00000	0.000000
93060424	HV-2	1272.54004	228.60001	0.18766	0.00000	0.05606	0.00000	0.00000	0.05315	0.00000	0.00000	0.710000
93060424	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.56000
93060624	MRI-1	-1249.67993	-3810.00000	54.28189	11.74236	23.69718	2.35955	5.22484	23.89246	2.30780	5.11547	3.80000
93060624	MRI-2	-265.17999	-914.40002	65.73192	42.40091	19.84438	11.48999	25.93591	19.51767	11.11432	25.00386	5.11000
93060624	MRI-3	283.45999	448.06000	48.10947	13.78328	27.53120	5.82634	9.90089	28.76955	6.00792	10.12807	-99.9900
93060624	MRI-4	384.04999	1319.77991	42.96939	12.67498	16.63506	4.51321	8.19397	16.24320	4.45134	8.10649	5.16000
93060624	MRI-5	-2310.38013	2590.80005	55.79776	33.53101	25.57126	19.02717	23.83173	25.14850	18.68190	23.35577	6.84000
93060624	MRI-6	-1554.47998	3496.06006	44.78993	13.77259	19.26349	6.01536	8.43952	18.84129	5.87557	8.21921	12.0700
93060624	HV-1	-3582.62012	656.83997	74.22344	59.17408	27.47120	20.47164	31.38150	27.00127	20.02851	30.57201	6.80000
93060624	HV-2	1272.54004	228.60001	2.09363	0.00000	0.97397	0.00000	0.00000	0.94011	0.00000	0.00000	0,140000
93060624	HV-3	-664.46002	-5539.74023	5.14330	2.00029	1.21167	0.57865	0.95909	1.17450	0.55826	0.91236	0.400000
93060824	MRI-1	-1249.67993	-3810.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.150000
93060824	MRI-2	-265.17999	-914.40002	22.81866	0.00133	16.66352	0.00102	0.00067	18.71673	0.00045	0.00029	7.89000
93060824	MRI-3	283.45999	448.06000	114.33939	136.69046	52.56192	61.01799	94.42398	52.96245	61.54921	95.54757	16.6800
93060824	MRI-4	384.04999	1319.77991	117.95334	150.80600	64.71690	88.00174	100.11548	64.22719	87.65516	100.03101	13.7400
93060824	MRI-5	-2310.38013	2590.80005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.000000
93060824	MRI-6	-1554.47998	3496.06006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	7.35000
93060824	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.200000
93060824	HV-2	1272.54004	228.60001	72.51824	78.71084	30.68212	34.49758	44.66093	29.85503	33.43076	43.18687	9.45000
93060824	HV-3	-664.46002	-5539.74023	2.22742	0.00000	0.24099	0.00000	0.00000	0.24099	0.00000	0.00000	4.53000
93061024	MRI-1	-1249.67993	-3810.00000	86.77619	15.04464	21.27691	10.00660	10.73517	21.08711	10.00651	10.73505	3.35000
93061024	MRI-2	-265.17999	-914.40002	25.66908	67.13732	14.76379	18.22077	43.17672	15.26390	17.61245	41.65494	8.09000
93061024	MRI-3	283.45999	448.06000	251.35710	297.85126	77.58943	131.70963	220.38567	80.46633	136.74725	228.09209	32.8600
93061024	MRI-4	384.04999	1319.77991	90.84473	127.39440	29.00264	53.75175	81.56713	28.95396	54.06926	80.85950	13.2800
93061024	MRI-5	-2310.38013	2590.80005	8.94600	2.36814	3.35462	0.90772	1.24906	3.20609	0.88937	1.21641	4.49000
93061024	MRI-6	-1554.47998	3496.06006	137.98055	191.02032	58.63186	84.39500	120.03036	58.05129	83.66154	118.49441	17.4300
93061024	HV-1	-3582.62012	656.83997	2.45436	0.00005	0.50790	0.00004	0.00004	0.49319	0.00004	0.00004	0.000000
93061024	HV-2	1272.54004	228.60001	12.33416	11.26831	5.20970	8.22623	7.43414	5.19573	8.26302	7.43621	9.31000
93061024	HV-3	-664.46002	-5539.74023	1.97672	0.00000	0.63131	0.00000	0.00000	0.62790	0.00000	0.00000	0.630000
93061224	MRI-1	-1249.67993	-3810.00000	20.02494	4.25103	10.17101	2.67862	2.14461	10.35320	2.61380	2.08719	4.52000
93061224	MRI-2	-265.17999	-914.40002	68.27508	24.00352	43.58113	13.66480	16.29359	45.27821	13.12016	15.78608	18.9600
93061224	MRI-3	283.45999	448.06000	158.20911	315.67133	78.47930	142.91835	228.38924	80.08872	145.90410	234.70653	33.2800
93061224	MRI-4	384.04999	1319.77991	109.41565	216.78532	59.07724	103.96750	156.35497	59.50998	105.03478	158.45540	6.03000
93061224	MRI-5	-2310.38013	2590.80005	36.74611	63.51923	15.64336	29.04700	37.05912	14.93273	28.27622	36.06855	10.3600
93061224	MRI-6	-1554.47998	3496.06006	46.83751	82.28644	16.89099	46.96408	45.07899	17.91276	50.97692	47.83959	13.3500
93061224	HV-1	-3582.62012	656.83997	36.42176	40.30401	10.85030	15.19896	18.85372	10.64389	14.99261	18.58045	2.04000
93061224	HV-2	1272.54004	228.60001	71.68931	122.09906	31.33497	50.98131	72.39715	30.45546	49.66210	70.22332	-99.9900
93061224	HV-3	-664.46002	-5539.74023	12.43499	1.49799	4.22515	0.74393	0.67581	4.07859	0.70754	0.64390	0.000000
93061424	MRI-1	-1249.67993	-3810.00000	12.96540	0.62969	8.39903	0.62610	0.53793	8.67174	0.61195	0.52619	12.6400
93061424	MRI-2	-265.17999	-914.40002	36.15634	2.46241	21.66976	2.17294	1.92075	23.65873	2.50349	2.21760	12.3200
93061424	MRI-3	283.45999	448.06000	114.81877	240.35106	44.65458	84.29141	175.01601	47.06961	89.18607	180.50302	35.1100
93061424	MRI-4	384.04999	1319.77991	97.54366	206.35997	36.67289	70.70380	145.48203	38.01020	73.41133	148.11092	13.1100
93061424	MRI-5	-2310.38013	2590.80005	59.92999	22.54007	29.22062	18.21297	15.08463	28.73494	17.90516	14.85360	14.6000
93061424	MRI-6	-1554.47998	3496.06006	23.52792	139.35472	11.86513	58.55235	84.36834	11.67740	57.47435	82.75987	29.7500
93061424	HV-1	-3582.62012	656.83997	9.83223	2.38487	3.05040	0.81243	1.24895	2.91869	0.77441	1.18891	2.75000
93061424	HV-2	1272.54004	228.60001	52.01132	108.80489	14.63762	26.57009	64.09624	14.19166	25.74915	61.77157	-99.9900
93061424	HV-3	-664.46002	-5539.74023	0.56075	0.12778	0.34796	0.17826	0.15012	0.34449	0.17139	0.14454	0.000000

C.2 Modeled and Monitored TSP Concentrations for the Cordero Mine Model Evaluation Study (cont.)

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93061624	MRI-1	-1249.67993	-3810.00000	12.57518	3.36216	5.26618	1.95734	1.76528	5.15729	1.90178	1.71719	4.09000
93061624	MRI-2	-265.17999	-914.40002	99.31900	39.78376	49.74081	25.32377	24.97450	51.00441	24.60679	24.28097	9.80000
93061624	MRI-3	283.45999	448.06000	135.87015	116.18118	56.50356	54.24671	85.01112	56.38385	54.20040	85.35206	7.36000
93061624	MRI-4	384.04999	1319.77991	96.84690	83.71404	39.25657	45.72737	58.60189	38.46733	44.93433	58.02678	-99.0000
93061624	MRI-5	-2310.38013	2590.80005	2.63815	0.84580	0.99497	0.31975	0.48798	0.98262	0.31103	0.47258	4.60000
93061624	MRI-6	-1554.47998	3496.06006	4.14608	3.61733	1.37521	1.06753	2.03173	1.33285	1.03419	1.96827	8.04000
93061624	HV-1	-3582.62012	656.83997	1.90113	2.21399	0.75936	0.78291	1.07298	0.71573	0.74395	1.02579	4.08000
93061624	HV-2	1272.54004	228.60001	27.81270	22.41673	11.29771	11.22555	13.81261	11.02887	10.90864	13.40006	-99.0000
93061624	HV-3	-664.46002	-5539.74023	30.38126	16.57558	13.59341	8.84545	10.54427	13.42371	8.72904	10.40815	3.26000
93061824	MRI-1	-1249.67993	-3810.00000	110.88847	118.54952	35.19628	72.40718	90.76345	35.35385	72.73617	91.49921	0.390000
93061824	MRI-2	-265.17999	-914.40002	24.98470	23.53678	10.16547	10.58732	17.65082	10.65852	11.19547	18.75153	2.48000
93061824	MRI-3	283.45999	448.06000	306.40244	106.32844	59.83206	63.51279	77.46059	60.88955	63.76384	78.25577	2.43000
93061824	MRI-4	384.04999	1319.77991	52.24758	33.18018	16.38133	15.23668	21.18013	16.36898	15.18425	21.14120	0.450000
93061824	MRI-5	-2310.38013	2590.80005	69.19933	94.34583	28.31876	33.94986	50.42511	28.00877	33.29128	49.21618	0.500000
93061824	MRI-6	-1554.47998	3496.06006	202.77437	97.78642	87.09963	47.43375	55.02235	85.44198	46.33440	53.66861	0.000000
93061824	HV-1	-3582.62012	656.83997	7.84282	20.17129	2.81916	6.81413	10.92645	2.77113	6.70945	10.72998	0.400000
93061824	HV-2	1272.54004	228.60001	3.33012	1.37041	1.01745	0.60563	0.97002	0.94857	0.58520	0.93357	0.000000
93061824	HV-3	-664.46002	-5539.74023	3.33998	0.00000	2.01498	0.00000	0.00000	2.00912	0.00000	0.00000	0.390000
93062224	MRI-1	-1249.67993	-3810.00000	22.22111	15.83283	11.19240	12.65079	13.59332	11.16711	12.59404	13.52256	10.6200
93062224	MRI-2	-265.17999	-914.40002	75.00845	95.15334	42.61954	94.66626	72.34324	44.19061	100.19935	75.38840	40.0800
93062224	MRI-3	283.45999	448.06000	155.19383	143.97572	68.77792	59.81334	94.69279	71.76731	61.85732	99.11839	44.7300
93062224	MRI-4	384.04999	1319.77991	133.87291	126.29776	60.34316	46.20417	73.06427	61.05937	46.10083	73.12695	6.33000
93062224	MRI-5	-2310.38013	2590.80005	57.12482	34.34016	25.15015	16.87000	20.75434	25.28978	16.58606	20.32240	7.20000
93062224	MRI-6	-1554.47998	3496.06006	29.07947	12.10087	11.96875	3.93698	5.74381	11.64226	3.82830	5.55600	15.9400
93062224	HV-1	-3582.62012	656.83997	21.96653	22.52605	8.54524	8.47132	11.78016	8.28155	8.24795	11.45214	3.02000
93062224	HV-2	1272.54004	228.60001	21.27474	22.86291	10.68461	12.86169	14.69371	10.46874	12.49601	14.30186	8.82000
93062224	HV-3	-664.46002	-5539.74023	3.70742	3.76332	1.82410	4.64042	2.92885	1.77071	4.49056	2.84930	0.000000
93062424	MRI-1	-1249.67993	-3810.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.170000
93062424	MRI-2	-265.17999	-914.40002	48.84221	75.22948	33.44945	65.36104	63.34662	36.56138	71.49535	69.29198	-99.0000
93062424	MRI-3	283.45999	448.06000	219.05034	138.13063	104.15902	84.97799	104.72263	105.96479	86.28135	106.86562	74.5500
93062424	MRI-4	384.04999	1319.77991	255.31915	171.71265	138.64955	148.64516	120.83196	143.61124	153.53926	123.47730	34.5700
93062424	MRI-5	-2310.38013	2590.80005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.68000
93062424	MRI-6	-1554.47998	3496.06006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16.0100
93062424	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.440000
93062424	HV-2	1272.54004	228.60001	123.81138	71.78433	50.17768	48.44295	43.05424	48.78631	47.18052	41.83107	27.7900
93062424	HV-3	-664.46002	-5539.74023	1.62906	0.49310	0.20682	0.14514	0.11934	0.20681	0.14514	0.11934	0.000000
93062624	MRI-1	-1249.67993	-3810.00000	33.56145	121.06095	15.91196	82.47457	83.03851	15.71418	83.10004	84.05171	36.1100
93062624	MRI-2	-265.17999	-914.40002	41.13263	121.54559	23.02551	84.49253	95.45177	24.67632	92.43256	102.86961	38.3000
93062624	MRI-3	283.45999	448.06000	83.18665	56.25227	37.43835	19.47996	35.67009	43.27239	20.55304	35.76903	49.8400
93062624	MRI-4	384.04999	1319.77991	45.24720	31.97550	22.02403	9.45166	18.13473	23.62659	9.25017	17.68593	9.68000
93062624	MRI-5	-2310.38013	2590.80005	57.91761	18.62002	22.19704	6.47027	10.37535	22.14534	6.37764	10.18561	12.9200
93062624	MRI-6	-1554.47998	3496.06006	101.38165	19.78409	34.13441	5.83029	11.29156	33.62915	5.73352	11.07873	22.9800
93062624	HV-1	-3582.62012	656.83997	23.53390	16.51178	9.99665	7.57457	9.30253	9.77872	7.44286	9.14457	16.6500
93062624	HV-2	1272.54004	228.60001	7.91141	5.36341	3.96077	2.58118	3.18648	4.01831	2.61670	3.18517	6.42000
93062624	HV-3	-664.46002	-5539.74023	6.07836	12.84082	2.29555	6.89326	6.79024	2.20398	6.56078	6.49465	-99.0000
93062824	MRI-1	-1249.67993	-3810.00000	44.45123	42.88753	19.00939	37.81990	29.85007	19.00794	37.47507	29.65902	-99.0000
93062824	MRI-2	-265.17999	-914.40002	11.77192	20.66656	5.32855	16.43817	16.68752	5.52610	17.97813	18.18672	21.7100
93062824	MRI-3	283.45999	448.06000	110.78033	9.41031	26.16980	4.85532	5.97904	26.34490	4.67601	5.76744	57.1900
93062824	MRI-4	384.04999	1319.77991	30.37222	2.66097	9.37484	1.57078	2.03987	9.18688	1.52074	1.96925	-99.0000
93062824	MRI-5	-2310.38013	2590.80005	34.43671	29.24346	13.34147	14.88879	16.37287	12.98735	14.46294	15.92266	125.970
93062824	MRI-6	-1554.47998	3496.06006	94.29846	56.59857	38.48808	27.76305	35.58551	37.71086	27.23334	34.90787	114.340
93062824	HV-1	-3582.62012	656.83997	4.33577	10.11633	1.42697	5.37128	4.85193	1.38193	5.19835	4.69253	0.000000
93062824	HV-2	1272.54004	228.60001	3.65961	0.52507	1.54518	0.19266	0.29238	1.48016	0.19099	0.28921	6.45000
93062824	HV-3	-664.46002	-5539.74023	2.94189	4.16906	1.06661	5.46124	4.66795	1.03275	5.33033	4.58194	-99.0000
93063024	MRI-1	-1249.67993	-3810.00000	25.75871	7.35520	14.26703	4.73858	5.99285	14.57245	4.84830	6.14941	14.3100
93063024	MRI-2	-265.17999	-914.40002	32.34330	62.15913	18.28505	43.18260	54.79045	19.92986	47.09955	59.76065	34.8500
93063024	MRI-3	283.45999	448.06000	145.87483	96.83608	61.68503	71.23641	74.41457	67.60571	79.19305	81.68613	39.6100
93063024	MRI-4	384.04999	1319.77991	194.25368	89.50245	75.98867	62.32003	64.32856	78.26778	63.57100	65.92923	12.8500
93063024	MRI-5	-2310.38013	2590.80005	103.12618	59.11087	41.48893	58.98389	41.49662	40.84311	58.08362	40.86207	18.6200
93063024	MRI-6	-1554.47998	3496.06006	80.47748	40.19413	30.04303	35.90838	24.19798	29.69544	35.46070	23.90834	13.8300
93063024	HV-1	-3582.62012	656.83997	12.68713	6.73684	4.44000	3.67114	3.73405	4.25770	3.50349	3.57085	11.0600
93063024	HV-2	1272.54004	228.60001	62.64901	31.88159	16.73956	14.89109	18.07797	16.43139	14.64254	17.72860	11.6900
93063024	HV-3	-664.46002	-5539.74023	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	-99.0000
93070224	MRI-1	-1249.67993	-3810.00000	47.88781	130.26913	19.32490	64.26565	84.60895	19.57065	65.12257	84.96931	-99.0000

C.2 Modeled and Monitored TSP Concentrations for the Cordero Mine Model Evaluation Study (cont.)

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93070224	MRI-2	-265.17999	-914.40002	28.44784	66.24378	9.82840	48.19737	48.28209	9.61527	48.95601	48.21111	29.1600
93070224	MRI-3	283.45999	448.06000	57.07188	21.92194	17.08784	15.07535	14.35211	17.12715	14.71052	14.00266	39.6200
93070224	MRI-4	384.04999	1319.77991	20.47800	9.94674	9.84220	5.84688	5.47568	9.74000	5.68440	5.32383	10.0600
93070224	MRI-5	-2310.38013	2590.80005	64.00922	67.72634	27.15059	38.85902	44.73252	26.80714	38.23909	43.90583	48.5500
93070224	MRI-6	-1554.47998	3496.06006	141.97514	104.75779	47.39949	51.17315	55.85160	47.07967	50.81836	55.89325	45.7500
93070224	HV-1	-3582.62012	656.83997	9.59689	28.75858	2.80046	9.43502	14.87875	2.70784	9.14625	14.46251	7.68000
93070224	HV-2	1272.54004	228.60001	11.62582	9.28054	3.76948	5.41320	5.20936	3.72243	4.95025	4.76520	7.75000
93070224	HV-3	-664.46002	-5539.74023	4.70289	15.46593	2.14506	13.19684	10.14122	2.12331	13.12925	9.99981	0.000000
93070224	MRI-1	-1249.67993	-3810.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	1.36000
93070424	MRI-1	-1249.67993	-3810.00000	33.23319	49.96970	24.26369	36.27593	42.52520	26.95502	40.56465	47.59242	-99.0000
93070424	MRI-2	-265.17999	-914.40002	137.34853	57.23206	67.47411	37.06268	40.37857	68.62910	37.53125	40.99757	61.5700
93070424	MRI-3	283.45999	448.06000	205.29616	102.97632	105.75675	77.35217	67.33638	104.36959	76.52184	67.54408	50.3400
93070424	MRI-4	384.04999	1319.77991	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.85000
93070424	MRI-5	-2310.38013	2590.80005	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	2.95000
93070424	MRI-6	-1554.47998	3496.06006	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.980000
93070424	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	43.8600
93070424	HV-2	1272.54004	228.60001	81.96001	34.19482	34.49226	21.12497	19.93761	33.42843	20.50464	19.28449	0.000000
93070424	HV-3	-664.46002	-5539.74023	0.85294	0.16261	0.09962	0.05364	0.04422	0.09962	0.05364	0.04422	0.870000
93070624	MRI-1	-1249.67993	-3810.00000	17.39750	24.79198	7.45251	6.40927	13.55380	7.30748	6.23529	13.19779	16.8100
93070624	MRI-2	-265.17999	-914.40002	86.96140	40.90625	55.45219	15.52181	30.15602	59.58087	15.63795	30.18227	35.3100
93070624	MRI-3	283.45999	448.06000	225.63007	170.72351	102.13082	95.74346	126.93928	105.25765	98.20907	130.54355	25.8300
93070624	MRI-4	384.04999	1319.77991	306.18524	252.11540	140.77238	134.43356	175.63496	142.27431	135.54187	178.39732	8.54000
93070624	MRI-5	-2310.38013	2590.80005	1.65681	1.92913	0.56979	0.59523	1.13279	0.55381	0.57848	1.10090	10.2700
93070624	MRI-6	-1554.47998	3496.06006	0.56460	0.81007	0.22329	0.28777	0.54762	0.19732	0.26233	0.49922	4.55000
93070624	HV-1	-3582.62012	656.83997	0.73332	0.83695	0.23800	0.24676	0.46332	0.22903	0.23763	0.44592	24.1000
93070624	HV-2	1272.54004	228.60001	129.86319	77.38207	46.24470	34.47959	48.20017	45.29320	33.57985	46.81485	0.320000
93070624	HV-3	-664.46002	-5539.74023	7.39092	0.63537	2.38751	0.46472	0.41937	2.38857	0.45550	0.40438	9.85000
93070824	MRI-1	-1249.67993	-3810.00000	1.62621	0.72073	0.28984	0.27356	0.24676	0.28637	0.26894	0.24273	46.8600
93070824	MRI-2	-265.17999	-914.40002	96.58469	20.83121	57.69277	24.38337	14.46070	61.26282	25.07932	14.41505	167.810
93070824	MRI-3	283.45999	448.06000	345.76819	332.32196	158.97450	146.60918	222.98463	158.26547	145.75859	221.86333	15.2900
93070824	MRI-4	384.04999	1319.77991	204.43506	92.26797	102.01122	64.79435	59.64728	100.82422	65.35653	59.98386	32.4200
93070824	MRI-5	-2310.38013	2590.80005	0.00473	0.00406	0.00155	0.00118	0.00225	0.00089	0.00068	0.00130	53.5100
93070824	MRI-6	-1554.47998	3496.06006	2.09604	2.00526	0.72660	0.62061	1.18209	0.69410	0.58937	1.12260	0.000000
93070824	HV-1	-3582.62012	656.83997	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	16.2100
93070824	HV-2	1272.54004	228.60001	126.54050	101.57960	52.45891	46.97609	61.06372	51.31284	46.34109	60.14287	23.4900
93070824	HV-3	-664.46002	-5539.74023	48.66655	28.99224	16.37693	25.58566	21.40878	16.29779	25.04391	21.00778	12.3600
93071024	MRI-1	-1249.67993	-3810.00000	25.28488	4.79795	10.56527	2.84972	2.53823	10.26090	2.77817	2.47162	54.7400
93071024	MRI-2	-265.17999	-914.40002	125.17896	28.11933	65.11108	19.82816	19.16999	66.08355	20.59741	19.63056	9.25000
93071024	MRI-3	283.45999	448.06000	130.04909	123.23151	52.30339	41.01138	77.05277	51.09591	40.36608	75.83706	1.40000
93071024	MRI-4	384.04999	1319.77991	37.58880	13.30368	18.58100	6.39578	8.82830	18.48200	6.35130	8.74366	30.6500
93071024	MRI-5	-2310.38013	2590.80005	4.57970	6.96473	1.70815	1.90902	3.61134	1.67854	1.84761	3.49448	40.3100
93071024	MRI-6	-1554.47998	3496.06006	5.60487	12.53448	1.83778	3.65888	6.96250	1.74252	3.47170	6.60634	10.8100
93071024	HV-1	-3582.62012	656.83997	2.47369	4.21204	0.90151	1.02897	1.95787	0.87140	0.99972	1.90221	0.000000
93071024	HV-2	1272.54004	228.60001	18.98624	6.06232	6.92793	2.50796	3.42467	6.62655	2.46755	3.35229	-99.0000
93071024	HV-3	-664.46002	-5539.74023	43.59991	51.32749	17.34037	39.25968	31.41150	17.12036	39.07886	31.26172	16.7600
93071224	MRI-1	-1249.67993	-3810.00000	15.63369	1.35015	4.97642	0.65318	0.53083	4.89772	0.63493	0.51503	45.5200
93071224	MRI-2	-265.17999	-914.40002	56.54053	7.75676	32.73938	5.74781	3.98487	33.54955	5.60959	3.89067	72.0700
93071224	MRI-3	283.45999	448.06000	118.33249	51.43103	52.56614	40.47066	31.11117	52.05207	39.83882	30.25847	-99.0000
93071224	MRI-4	384.04999	1319.77991	45.74598	18.41250	23.11456	14.79103	10.42249	22.62909	14.25433	10.06503	33.8200
93071224	MRI-5	-2310.38013	2590.80005	5.96250	6.10534	2.23753	3.27677	5.07636	2.18749	3.21121	4.91542	53.0400
93071224	MRI-6	-1554.47998	3496.06006	45.68386	71.53044	14.82840	25.79113	42.07816	14.59406	25.29457	41.15267	7.82000
93071224	HV-1	-3582.62012	656.83997	0.80353	0.01613	0.20590	0.00380	0.00723	0.19994	0.00303	0.00578	12.5900
93071224	HV-2	1272.54004	228.60001	13.02496	6.62646	6.03178	4.36745	3.39882	5.94746	4.25550	3.31369	5.67000
93071224	HV-3	-664.46002	-5539.74023	26.07047	0.81699	11.19483	0.30629	0.30902	10.97114	0.29066	0.29539	68.6500
93071424	MRI-1	-1249.67993	-3810.00000	26.34342	34.97548	8.91958	23.93709	21.46726	8.91889	24.30016	21.67716	15.2200
93071424	MRI-2	-265.17999	-914.40002	24.19532	27.67165	10.58811	9.63272	16.62064	10.54903	9.47859	16.20366	38.0800
93071424	MRI-3	283.45999	448.06000	51.45560	27.58766	20.00647	10.08265	19.21269	20.34638	10.16939	19.45290	7.13000
93071424	MRI-4	384.04999	1319.77991	25.46147	17.63089	10.71934	5.00582	10.99099	10.62015	4.92357	10.90650	31.4700
93071424	MRI-5	-2310.38013	2590.80005	14.98737	14.14226	5.35311	5.68231	8.56180	5.25334	5.61091	8.41184	85.3200
93071424	MRI-6	-1554.47998	3496.06006	46.12574	44.84069	19.25284	16.89272	26.33172	18.78982	16.40081	25.48267	7.71000
93071424	HV-1	-3582.62012	656.83997	4.05624	4.48562	1.00580	1.30944	2.07414	0.97891	1.28152	2.03494	0.180000
93071424	HV-2	1272.54004	228.60001	8.51150	2.25023	3.28754	1.43249	1.13106	3.19310	1.37482	1.06417	3.88000
93071424	HV-3	-664.46002	-5539.74023	4.18410	7.58589	1.53024	3.75917	4.04572	1.51230	3.71169	3.99449	12.0000
93071624	MRI-1	-1249.67993	-3810.00000	26.88303	6.57129	8.56953	4.22910	2.87635	8.30263	4.08597	2.77176	22.3900
93071624	MRI-2	-265.17999	-914.40002	174.22050	34.41644	88.51654	24.38078	17.66726	91.86932	23.94543	17.39987	

C.2 Modeled and Monitored TSP Concentrations for the Cordero Mine Model Evaluation Study (cont.)

YYMMDDHH	MONITOR	X(meters)	Y(meters)	BASE	BHV	NLV	NMV	NHV	NLA	NMA	NHA	MONITORED
93071624	MRI-3	283.45999	448.06000	147.17336	34.46549	73.26186	43.20367	19.12818	72.06870	41.46487	18.31433	21.3500
93071624	MRI-4	384.04999	1319.77991	89.74371	103.11318	53.71379	162.76512	63.24182	54.04208	158.94362	61.47397	16.3200
93071624	MRI-5	-2310.38013	2590.80005	2.91209	0.00000	0.90017	0.00000	0.00000	0.86676	0.00000	0.00000	23.9400
93071624	MRI-6	-1554.47998	3496.06006	5.23853	0.00000	1.79955	0.00000	0.00000	1.72718	0.00000	0.00000	27.9700
93071624	HV-1	-3582.62012	656.83997	1.05286	0.00000	0.29042	0.00000	0.00000	0.27998	0.00000	0.00000	9.43000
93071624	HV-2	1272.54004	228.60001	44.98543	32.34143	21.62205	42.23247	17.24138	21.11017	40.01786	16.39906	10.8500
93071624	HV-3	-664.46002	-5539.74023	51.04829	9.03710	20.20070	4.99800	3.86712	19.66462	4.83310	3.74986	5.95000
93071824	MRI-1	-1249.67993	-3810.00000	39.74722	45.77471	12.77974	11.68424	23.15326	12.76086	11.63999	23.20351	18.1300
93071824	MRI-2	-265.17999	-914.40002	170.11287	144.32990	75.49560	66.24213	81.97871	78.12787	64.92545	80.37864	31.1900
93071824	MRI-3	283.45999	448.06000	198.91014	263.22314	95.60690	145.85825	177.81732	95.15594	145.92339	178.51695	22.2600
93071824	MRI-4	384.04999	1319.77991	122.81372	225.63435	56.76719	115.89176	151.10359	54.40597	110.68585	145.87529	17.3400
93071824	MRI-5	-2310.38013	2590.80005	24.83415	19.25276	6.58093	8.89983	11.57532	6.51864	8.86732	11.51368	31.0700
93071824	MRI-6	-1554.47998	3496.06006	7.63747	0.03787	2.56209	0.01033	0.01958	2.47114	0.00000	0.00000	35.1100
93071824	HV-1	-3582.62012	656.83997	31.26307	44.62699	6.85033	11.38528	22.27391	6.72022	11.25508	21.98908	16.9800
93071824	HV-2	1272.54004	228.60001	39.62632	72.66554	15.49434	30.88898	41.87272	15.08854	30.08182	40.78806	14.7900
93071824	HV-3	-664.46002	-5539.74023	56.73120	6.83777	23.40337	3.21050	3.18449	22.76247	3.11620	3.05925	13.1400

C.2 Modeled and Monitored TSP Concentrations for the Cordero Mine Model Evaluation Study (cont.)

APPENDIX D

SUMMARY OF MODEL RESULTS FOR THE CORDERO MINE MODEL EVALUATION STUDY

This appendix presents the summary tables of highest 24-hour average modeled concentrations that were generated for the Cordero Mine model evaluation study. The eight highest concentrations by receptor are presented for ALL sources combined, and for five addtional source groupings. The tables include the date (yymmddhh) and the receptor coordinates corresponding to the highest concentrations. The "HIGH 1ST HIGH" value is the overall highest value from the group of first highest values at each receptor, the "HIGH 2ND HIGH" value is the overall highest value from the group of second highest values at each receptor, and so on. Separate summary tables are provided for each combination of pollutant and model, with the PM_{10} results presented first, followed by the TSP results. The source groups are defined as follows:

Source Group	Activities Included
ALL	All the sources combined
ROADS	All road sources
NPIT	The north pit activities including ramps
SPIT	The south pit activities including ramps
ACTVTY	The gridded sources representing the roaming scraper and dragline activity
OTHERS	Coal and overburden loading and unloading sources

D.1

POLLUTANT : PM10
MODEL : BASE

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	131.23210c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	87.02097	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	73.28058	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	65.05108	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	61.63769	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	55.20713	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	46.10854	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	45.72052	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
ROADS	HIGH 1ST HIGH VALUE IS	55.84826	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	43.10444	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	39.37796	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	35.94854	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	32.50481	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	31.09219	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	29.36473	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	28.87614	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
NPIT	HIGH 1ST HIGH VALUE IS	24.37025c	ON 93061824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	19.71863	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	18.19145	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	17.35983	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	16.64043	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	12.98694	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	12.50695	ON 93062824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	12.35514c	ON 93062624: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
SPIT	HIGH 1ST HIGH VALUE IS	6.49247	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 2ND HIGH VALUE IS	5.67528c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 3RD HIGH VALUE IS	4.84669	ON 93052324: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	
	HIGH 4TH HIGH VALUE IS	4.50682	ON 93052524: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 5TH HIGH VALUE IS	4.06647	ON 93053124: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 6TH HIGH VALUE IS	3.37759	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 7TH HIGH VALUE IS	2.97521	ON 93052924: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 8TH HIGH VALUE IS	2.81998c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DEFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.03088	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	0.02881	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	0.02480	ON 93070424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	0.02272	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	0.01608	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	0.01381	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	0.01327	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	0.01320c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
OTHERS	HIGH 1ST HIGH VALUE IS	108.20156c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	57.49019	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	38.23848	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	32.70079	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	30.69360	ON 93062824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	29.21969	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	20.04112	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	18.46462	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	

D.2

POLLUTANT : PM10
MODEL : BHV

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*** MODELING OPTIONS USED:  CONC    RURAL  FLAT   FLGPOL DFAULT

                              *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                        ** CONC OF TSP       IN MICROGRAMS/M**3                                **

                                                  DATE                                                        NETWORK
GROUP ID                         AVERAGE CONC    (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL     HIGH  1ST HIGH VALUE IS     75.65441  ON 93070824: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  2ND HIGH VALUE IS     72.66840  ON 93061224: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  3RD HIGH VALUE IS     71.49789  ON 93061024: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  4TH HIGH VALUE IS     61.41028  ON 93071824: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  5TH HIGH VALUE IS     55.08602c ON 93061424: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  6TH HIGH VALUE IS     50.19354  ON 93052324: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  7TH HIGH VALUE IS     45.42616  ON 93052924: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  8TH HIGH VALUE IS     37.84953  ON 93070624: AT (    283.46,     448.06,     0.00,     3.50)  DC

ROADS   HIGH  1ST HIGH VALUE IS     68.05198  ON 93061224: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  2ND HIGH VALUE IS     67.44923  ON 93070824: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  3RD HIGH VALUE IS     62.65824  ON 93061024: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  4TH HIGH VALUE IS     54.99458c ON 93061424: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  5TH HIGH VALUE IS     51.39354  ON 93071824: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  6TH HIGH VALUE IS     39.73153  ON 93052324: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  7TH HIGH VALUE IS     38.94596  ON 93052924: AT (    283.46,     448.06,     0.00,     3.50)  DC
        HIGH  8TH HIGH VALUE IS     36.18080  ON 93070624: AT (    283.46,     448.06,     0.00,     3.50)  DC

NPIT    HIGH  1ST HIGH VALUE IS     17.87404  ON 93061024: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC
        HIGH  2ND HIGH VALUE IS     14.33207  ON 93060424: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC
        HIGH  3RD HIGH VALUE IS     11.97759  ON 93052524: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC
        HIGH  4TH HIGH VALUE IS     10.53116  ON 93070224: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC
        HIGH  5TH HIGH VALUE IS      9.83469  ON 93053124: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC
        HIGH  6TH HIGH VALUE IS      7.35902  ON 93051924: AT (    384.05,    1319.78,     0.00,     3.50)  DC
        HIGH  7TH HIGH VALUE IS      6.75618  ON 93052324: AT (    384.05,    1319.78,     0.00,     3.50)  DC
        HIGH  8TH HIGH VALUE IS      6.39619  ON 93052924: AT (    384.05,    1319.78,     0.00,     3.50)  DC

SPIT    HIGH  1ST HIGH VALUE IS     16.36967c ON 93061824: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  2ND HIGH VALUE IS     10.15257c ON 93062624: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  3RD HIGH VALUE IS      5.21840  ON 93070224: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  4TH HIGH VALUE IS      4.48306  ON 93062824: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  5TH HIGH VALUE IS      4.39164  ON 93061024: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  6TH HIGH VALUE IS      4.32988  ON 93062224: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  7TH HIGH VALUE IS      1.97123  ON 93071424: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC
        HIGH  8TH HIGH VALUE IS      0.05657  ON 93070624: AT (   -664.46,   -5539.74,     0.00,     4.60)  DC
```

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.10887	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	0.07759	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	0.04158	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	0.03349	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	0.02543c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	0.01645	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	0.01021	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	0.00892	ON 93061624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
OTHERS	HIGH 1ST HIGH VALUE IS	9.18936c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	8.01699	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	5.09938	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	2.82629	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	2.17857	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	2.05991	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	1.84525	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	1.79492	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	

D.3

POLLUTANT : PM10
MODEL : NLV

```
                                       *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                  ** CONC OF PM-10      IN MICROGRAMS/M**3                          **

                                                        DATE                                                              NETWORK
GROUP ID                                AVERAGE CONC   (YYMMDDHH)           RECEPTOR  (XR, YR, ZELEV, ZFLAG)      OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL       HIGH  1ST HIGH VALUE IS      59.71045  ON 93070824: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  2ND HIGH VALUE IS      50.11952  ON 93062424: AT (    384.05,     1319.78,      0.00,      3.50)  DC      NA
          HIGH  3RD HIGH VALUE IS      39.23918  ON 93070824: AT (    384.05,     1319.78,      0.00,      3.50)  DC      NA
          HIGH  4TH HIGH VALUE IS      36.79034  ON 93070424: AT (    384.05,     1319.78,      0.00,      3.50)  DC      NA
          HIGH  5TH HIGH VALUE IS      34.34835  ON 93052324: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  6TH HIGH VALUE IS      34.11878  ON 93070624: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  7TH HIGH VALUE IS      27.79841  ON 93061224: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  8TH HIGH VALUE IS      27.74436  ON 93061024: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA

ROADS     HIGH  1ST HIGH VALUE IS      50.08258  ON 93070824: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  2ND HIGH VALUE IS      38.93540  ON 93070624: AT (    384.05,     1319.78,      0.00,      3.50)  DC      NA
          HIGH  3RD HIGH VALUE IS      32.15712  ON 93070624: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  4TH HIGH VALUE IS      30.91733  ON 93062424: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  5TH HIGH VALUE IS      30.34654  ON 93071824: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  6TH HIGH VALUE IS      27.11722  ON 93052324: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  7TH HIGH VALUE IS      25.54174  ON 93062224: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA
          HIGH  8TH HIGH VALUE IS      25.09772  ON 93061224: AT (    283.46,      448.06,      0.00,      3.50)  DC      NA

NPIT      HIGH  1ST HIGH VALUE IS      17.83671c ON 93061824: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  2ND HIGH VALUE IS      13.82270  ON 93061024: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  3RD HIGH VALUE IS      12.95025  ON 93052524: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  4TH HIGH VALUE IS      11.34219  ON 93053124: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  5TH HIGH VALUE IS       8.18301  ON 93060424: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  6TH HIGH VALUE IS       7.62140  ON 93070224: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  7TH HIGH VALUE IS       7.58837c ON 93062624: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA
          HIGH  8TH HIGH VALUE IS       7.30666  ON 93062824: AT (  -1554.48,     3496.06,      0.00,      3.50)  DC      NA

SPIT      HIGH  1ST HIGH VALUE IS       4.47300  ON 93061024: AT (  -1249.68,    -3810.00,      0.00,      3.40)  DC      NA
          HIGH  2ND HIGH VALUE IS       3.80875  ON 93070824: AT (   -664.46,    -5539.74,      0.00,      4.60)  DC      NA
          HIGH  3RD HIGH VALUE IS       3.36587  ON 93052324: AT (   -664.46,    -5539.74,      0.00,      4.60)  DC      NA
          HIGH  4TH HIGH VALUE IS       2.77856  ON 93052524: AT (  -1249.68,    -3810.00,      0.00,      3.40)  DC      NA
          HIGH  5TH HIGH VALUE IS       2.74213  ON 93053124: AT (  -1249.68,    -3810.00,      0.00,      3.40)  DC      NA
          HIGH  6TH HIGH VALUE IS       2.11519  ON 93062824: AT (  -1249.68,    -3810.00,      0.00,      3.40)  DC      NA
          HIGH  7TH HIGH VALUE IS       2.00396  ON 93052924: AT (  -1249.68,    -3810.00,      0.00,      3.40)  DC      NA
          HIGH  8TH HIGH VALUE IS       1.67368  ON 93052124: AT (  -1249.68,    -3810.00,      0.00,      3.40)  DC      NA
```

**MODELOPTs: CONC   RURAL FLAT FLGPOL DEFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.12782c	ON 93062624: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.11478	ON 93063024: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	0.11160c	ON 93061824: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.10475c	ON 93061424: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.10397	ON 93070624: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.09712	ON 93061024: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.08198	ON 93061224: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.07757	ON 93052924: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	9.08379c	ON 93061824: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	4.82791	ON 93061024: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	2.93104	ON 93052124: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	2.47631	ON 93060424: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	2.46258	ON 93062824: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.42050	ON 93052524: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.66832	ON 93053124: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	1.51956	ON 93052924: AT (	283.46, 448.06, 0.00, 3.50)	DC	NA

D.4

POLLUTANT : PM10
MODEL : NMV

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                                         *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                  ** CONC OF PM-10    IN MICROGRAMS/M**3                                 **

                                                    DATE                                                                 NETWORK
GROUP ID                             AVERAGE CONC   (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZFLAG)       OF TYPE   GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH  1ST HIGH VALUE IS      58.19127  ON 93071624: AT (    384.05,    1319.78,      0.00,      3.50)  DC       NA
         HIGH  2ND HIGH VALUE IS      52.51459  ON 93062424: AT (    384.05,    1319.78,      0.00,      3.50)  DC       NA
         HIGH  3RD HIGH VALUE IS      52.50409  ON 93070624: AT (    384.05,    1319.78,      0.00,      3.50)  DC       NA
         HIGH  4TH HIGH VALUE IS      50.51308  ON 93052924: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  5TH HIGH VALUE IS      47.31764  ON 93061024: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  6TH HIGH VALUE IS      38.12275  ON 93052124: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  7TH HIGH VALUE IS      34.68933  ON 93052324: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  8TH HIGH VALUE IS      32.90059  ON 93070624: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA

ROADS    HIGH  1ST HIGH VALUE IS      56.24977  ON 93071624: AT (    384.05,    1319.78,      0.00,      3.50)  DC       NA
         HIGH  2ND HIGH VALUE IS      45.56934  ON 93070824: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  3RD HIGH VALUE IS      42.63991  ON 93052924: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  4TH HIGH VALUE IS      41.58284  ON 93071824: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  5TH HIGH VALUE IS      38.21041  ON 93061024: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  6TH HIGH VALUE IS      31.86478  ON 93052124: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  7TH HIGH VALUE IS      30.21712  ON 93070624: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA
         HIGH  8TH HIGH VALUE IS      27.44224c ON 93061424: AT (    283.46,     448.06,      0.00,      3.50)  DC       NA

NPIT     HIGH  1ST HIGH VALUE IS      22.08934  ON 93061024: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA
         HIGH  2ND HIGH VALUE IS      15.68723  ON 93052524: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA
         HIGH  3RD HIGH VALUE IS      14.68776  ON 93060424: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA
         HIGH  4TH HIGH VALUE IS      13.51776  ON 93053124: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA
         HIGH  5TH HIGH VALUE IS       8.78565  ON 93071824: AT (    384.05,    1319.78,      0.00,      3.50)  DC       NA
         HIGH  6TH HIGH VALUE IS       6.96523  ON 93063024: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA
         HIGH  7TH HIGH VALUE IS       6.70886c ON 93061824: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA
         HIGH  8TH HIGH VALUE IS       6.60845  ON 93052924: AT (  -1554.48,    3496.06,      0.00,      3.50)  DC       NA

SPIT     HIGH  1ST HIGH VALUE IS      16.15594c ON 93061824: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  2ND HIGH VALUE IS       7.78067c ON 93062624: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  3RD HIGH VALUE IS       4.51013  ON 93062224: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  4TH HIGH VALUE IS       4.37583  ON 93062824: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  5TH HIGH VALUE IS       3.89286  ON 93061024: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  6TH HIGH VALUE IS       3.60686  ON 93070224: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  7TH HIGH VALUE IS       1.38966  ON 93071424: AT (  -1249.68,   -3810.00,      0.00,      3.40)  DC       NA
         HIGH  8TH HIGH VALUE IS       0.04646  ON 93062424: AT (   -664.46,   -5539.74,      0.00,      4.60)  DC       NA
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DRYDPL

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.46601	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.30202	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	0.29316	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.12884	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.11265	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.10627	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.08142	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.04317c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	9.30103c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	8.11025	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	4.64821	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	2.81597	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	2.02207	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.02165	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.80280	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	1.67686	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.5

POLLUTANT : PM10
MODEL : NHV

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	75.83303	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	71.67773	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	71.40161	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	58.63308	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	54.87252c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	45.67403	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	44.01143	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	37.71682	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH 1ST HIGH VALUE IS	67.12725	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	67.00295	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	62.73791	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	54.77874c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	49.12894	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	37.95440	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	36.00036	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	35.82159	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH 1ST HIGH VALUE IS	21.29560	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	14.66912	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	13.35917	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	10.84259	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	7.84423	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	6.41584	ON 93052924: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	6.20644	ON 93060824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	5.55675	ON 93052324: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
SPIT	HIGH 1ST HIGH VALUE IS	16.60656c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 2ND HIGH VALUE IS	8.04563c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 3RD HIGH VALUE IS	4.71654	ON 93062224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.07108	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.77666	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.99479	ON 93070224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.40236	ON 93071424: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.03751	ON 93070624: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG) OF TYPE		NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.46601	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.30202	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	0.29316	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.12884	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.11265	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.10627	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.08142	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.04317c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	9.30103c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	8.11025	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	4.64821	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	2.81597	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	2.02207	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.02165	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.80280	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	1.67686	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.6

POLLUTANT : PM10
MODEL : NLA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	61.50222	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	53.49097	ON 93062424: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	39.97314	ON 93070824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	37.31019	ON 93070424: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	36.42078	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	34.58105	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	29.53510	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	29.27602	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH 1ST HIGH VALUE IS	51.87432	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	41.03972	ON 93070624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	34.45909	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	32.65441	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	31.34342	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	27.49205	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	27.34991	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	26.57532	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH 1ST HIGH VALUE IS	17.83671c	ON 93061824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.82270	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	12.95025	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	11.34219	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	8.18301	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	7.62140	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	7.58837c	ON 93062624: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	7.30666	ON 93062824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
SPIT	HIGH 1ST HIGH VALUE IS	4.47300	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 2ND HIGH VALUE IS	3.80875	ON 93070824: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA
	HIGH 3RD HIGH VALUE IS	3.36587	ON 93052324: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA
	HIGH 4TH HIGH VALUE IS	2.77856	ON 93052524: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 5TH HIGH VALUE IS	2.74213	ON 93053124: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.11519	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 7TH HIGH VALUE IS	2.00396	ON 93052924: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 8TH HIGH VALUE IS	1.67368	ON 93052124: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH	1ST HIGH VALUE IS	0.12782c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	0.11478	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	0.11160c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	0.10475c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	0.10397	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	0.09712	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	0.08198	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	0.07757	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH	1ST HIGH VALUE IS	9.08379c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	4.82791	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	2.93104	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	2.47631	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	2.46258	ON 93062824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	2.42050	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	1.66832	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	1.51956	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.7

POLLUTANT : PM10
MODEL : NMA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	59.14372	ON 93071624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	55.90050	ON 93062424: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	54.61916	ON 93070624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	53.07267	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	50.35248	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	39.62284	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	34.85926	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	34.72757	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH 1ST HIGH VALUE IS	57.20221	ON 93071624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	47.15632	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	45.19952	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	43.23831	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	41.24526	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	33.36487	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	32.17579	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	30.25186c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH 1ST HIGH VALUE IS	22.08934	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	15.68723	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	14.68776	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	13.51776	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	8.78565	ON 93071824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	6.96523	ON 93063024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	6.70886c	ON 93061824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	6.60845	ON 93052924: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
SPIT	HIGH 1ST HIGH VALUE IS	16.15594c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 2ND HIGH VALUE IS	7.78067c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 3RD HIGH VALUE IS	4.51013	ON 93062224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.37583	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.89286	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 6TH HIGH VALUE IS	3.60686	ON 93070224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.38966	ON 93071424: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.04646	ON 93062424: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH	1ST HIGH VALUE IS	0.46601	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	0.30202	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	0.29316	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	0.12884	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	0.11265	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	0.10627	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	0.08142	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	0.04317c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH	1ST HIGH VALUE IS	9.30103c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	8.11025	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	4.64821	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	2.81597	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	2.02207	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	2.02165	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	1.80280	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	1.67686	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.8

POLLUTANT : PM10
MODEL : NHA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	78.22327	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	76.35210	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	75.90720	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	60.82732	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	59.28115c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	46.20849	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	45.85421	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	40.14361	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH 1ST HIGH VALUE IS	71.63285	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	69.39319	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	67.41228	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	59.18737c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	51.32312	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	40.15143	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	38.24838	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	36.68198	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH 1ST HIGH VALUE IS	21.29560	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	14.66912	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	13.35917	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	10.84259	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	7.84423	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	6.41584	ON 93052924: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	6.20644	ON 93060824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	5.55675	ON 93052324: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
SPIT	HIGH 1ST HIGH VALUE IS	16.60656c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 2ND HIGH VALUE IS	8.04563c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 3RD HIGH VALUE IS	4.71654	ON 93062224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.07108	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.77666	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.99479	ON 93070224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.40236	ON 93071424: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.03751	ON 93070624: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF PM-10 IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.46601	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	0.30202	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	0.29316	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.12884	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.11265	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.10627	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.08142	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.04317c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	9.30103c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	8.11025	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	4.64821	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	2.81597	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	2.02207	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	2.02165	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	1.80280	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	1.67686	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.9

POLLUTANT : TSP
MODEL : BASE

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	345.76819	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	306.40244c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	251.35710	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	237.45679	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	225.63007	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	219.05034	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	211.94279	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	198.91014	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
ROADS	HIGH 1ST HIGH VALUE IS	272.67496	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	213.82141	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	194.45067	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	171.99707	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	154.18639	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	150.97070	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	143.55983	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	142.38225	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
NPIT	HIGH 1ST HIGH VALUE IS	108.59084c	ON 93061824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	86.67692	ON 93070624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	81.07944	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	78.72999	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	64.58579	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	59.05925	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	56.60550	ON 93062824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	49.31943c	ON 93062624: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
SPIT	HIGH 1ST HIGH VALUE IS	28.61375	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 2ND HIGH VALUE IS	25.51268c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 3RD HIGH VALUE IS	21.49448	ON 93052324: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	
	HIGH 4TH HIGH VALUE IS	19.24940	ON 93052524: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 5TH HIGH VALUE IS	17.58820	ON 93053124: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 6TH HIGH VALUE IS	14.58579	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 7TH HIGH VALUE IS	12.85194	ON 93052924: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 8TH HIGH VALUE IS	11.24261c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH	1ST HIGH VALUE IS	0.15585	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	2ND HIGH VALUE IS	0.14575	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	3RD HIGH VALUE IS	0.12507	ON 93070424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	4TH HIGH VALUE IS	0.11420	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	5TH HIGH VALUE IS	0.08100	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	6TH HIGH VALUE IS	0.06965	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	7TH HIGH VALUE IS	0.06658c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	8TH HIGH VALUE IS	0.06633	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
OTHERS	HIGH	1ST HIGH VALUE IS	197.54005c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	2ND HIGH VALUE IS	104.91428	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	3RD HIGH VALUE IS	69.82158	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	4TH HIGH VALUE IS	59.70770	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	5TH HIGH VALUE IS	56.05391	ON 93062824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	6TH HIGH VALUE IS	53.11513	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	7TH HIGH VALUE IS	36.63515	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	8TH HIGH VALUE IS	33.64308	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	

D.10

POLLUTANT : TSP
MODEL : BHV

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	332.32196	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	315.67133	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	297.85126	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	263.22314	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	240.35106c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	218.88509	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	192.18352	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	170.72351	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
ROADS	HIGH 1ST HIGH VALUE IS	302.18768	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	301.64777	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	279.62332	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	240.12233c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	226.47252	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	179.40161	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	172.76802	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	164.58589	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
NPIT	HIGH 1ST HIGH VALUE IS	66.23820	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 2ND HIGH VALUE IS	52.99583	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 3RD HIGH VALUE IS	41.59466	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 4TH HIGH VALUE IS	35.93027	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 5TH HIGH VALUE IS	32.63596	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	
	HIGH 6TH HIGH VALUE IS	24.83633	ON 93052324: AT (	384.05,	1319.78,	0.00,	3.50)	DC	
	HIGH 7TH HIGH VALUE IS	22.46573	ON 93060824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	
	HIGH 8TH HIGH VALUE IS	21.89055	ON 93052924: AT (	384.05,	1319.78,	0.00,	3.50)	DC	
SPIT	HIGH 1ST HIGH VALUE IS	56.64508c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 2ND HIGH VALUE IS	33.29254c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 3RD HIGH VALUE IS	16.80380	ON 93070224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 4TH HIGH VALUE IS	15.04447	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 5TH HIGH VALUE IS	14.89684	ON 93062224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 6TH HIGH VALUE IS	14.55712	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 7TH HIGH VALUE IS	5.36254	ON 93071424: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	
	HIGH 8TH HIGH VALUE IS	0.17878	ON 93070624: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	

*** MODELING OPTIONS USED: CONC RURAL FLAT FLGPOL DFAULT

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH	1ST HIGH VALUE IS	0.54853	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	2ND HIGH VALUE IS	0.39555	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	3RD HIGH VALUE IS	0.20886	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	4TH HIGH VALUE IS	0.16936	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	5TH HIGH VALUE IS	0.12770c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	6TH HIGH VALUE IS	0.07812	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	7TH HIGH VALUE IS	0.05133	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	8TH HIGH VALUE IS	0.04487	ON 93061624: AT (	283.46,	448.06,	0.00,	3.50)	DC	
OTHERS	HIGH	1ST HIGH VALUE IS	17.70827c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	2ND HIGH VALUE IS	15.43760	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	3RD HIGH VALUE IS	9.82278	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	4TH HIGH VALUE IS	5.42342	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	5TH HIGH VALUE IS	4.19671	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	6TH HIGH VALUE IS	3.96163	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	7TH HIGH VALUE IS	3.60174	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	
	HIGH	8TH HIGH VALUE IS	3.45913	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	

D.11

POLLUTANT : TSP
MODEL : NLV

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP   IN MICROGRAMS/M**3   **

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                                                   DATE                                                       NETWORK
GROUP ID                          AVERAGE CONC   (YYMMDDHH)        RECEPTOR  (XR, YR, ZELEV, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH  1ST HIGH VALUE IS    155.91185  ON 93070824: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  2ND HIGH VALUE IS    136.60132  ON 93062424: AT (    384.05,    1319.78,     0.00,     3.50)  DC     NA
         HIGH  3RD HIGH VALUE IS    103.99551  ON 93070424: AT (    384.05,    1319.78,     0.00,     3.50)  DC     NA
         HIGH  4TH HIGH VALUE IS    100.39617  ON 93070624: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  5TH HIGH VALUE IS     93.90530  ON 93071824: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  6TH HIGH VALUE IS     89.73948  ON 93052324: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  7TH HIGH VALUE IS     76.57002  ON 93061224: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  8TH HIGH VALUE IS     76.24741  ON 93061024: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA

ROADS    HIGH  1ST HIGH VALUE IS    131.95946  ON 93070824: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  2ND HIGH VALUE IS    107.56522  ON 93070624: AT (    384.05,    1319.78,     0.00,     3.50)  DC     NA
         HIGH  3RD HIGH VALUE IS     94.46652  ON 93052924: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  4TH HIGH VALUE IS     92.00580  ON 93062424: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  5TH HIGH VALUE IS     79.36854  ON 93071824: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  6TH HIGH VALUE IS     70.92384  ON 93052324: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  7TH HIGH VALUE IS     70.70376  ON 93061224: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA
         HIGH  8TH HIGH VALUE IS     66.88013  ON 93061024: AT (    283.46,     448.06,     0.00,     3.50)  DC     NA

NPIT     HIGH  1ST HIGH VALUE IS     45.77815c ON 93061824: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  2ND HIGH VALUE IS     34.72445  ON 93061024: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  3RD HIGH VALUE IS     31.82932  ON 93052524: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  4TH HIGH VALUE IS     30.17740  ON 93053124: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  5TH HIGH VALUE IS     23.84967  ON 93060424: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  6TH HIGH VALUE IS     21.14290  ON 93062824: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  7TH HIGH VALUE IS     18.20013  ON 93070224: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA
         HIGH  8TH HIGH VALUE IS     16.70963c ON 93062624: AT (  -1554.48,    3496.06,     0.00,     3.50)  DC     NA

SPIT     HIGH  1ST HIGH VALUE IS     11.19748  ON 93061024: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC     NA
         HIGH  2ND HIGH VALUE IS     10.39925  ON 93070824: AT (   -664.46,   -5539.74,     0.00,     4.60)  DC     NA
         HIGH  3RD HIGH VALUE IS      9.63866  ON 93052324: AT (   -664.46,   -5539.74,     0.00,     4.60)  DC     NA
         HIGH  4TH HIGH VALUE IS      7.62818  ON 93071624: AT (   -664.46,   -5539.74,     0.00,     4.60)  DC     NA
         HIGH  5TH HIGH VALUE IS      6.76979  ON 93052524: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC     NA
         HIGH  6TH HIGH VALUE IS      5.87364  ON 93062824: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC     NA
         HIGH  7TH HIGH VALUE IS      5.18602  ON 93052924: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC     NA
         HIGH  8TH HIGH VALUE IS      4.77314  ON 93052124: AT (  -1249.68,   -3810.00,     0.00,     3.40)  DC     NA
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**MODELOPTs: CONC RURAL FLAT FLGPOL DFAULT DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID			AVERAGE CONC		DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH	1ST HIGH VALUE IS	0.55667c	ON	93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	0.48947c	ON	93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	0.48513	ON	93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	0.45446c	ON	93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	0.42912	ON	93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	0.41877	ON	93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	0.32586	ON	93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	0.32330	ON	93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH	1ST HIGH VALUE IS	15.27090c	ON	93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	7.84096	ON	93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	4.96419	ON	93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	4.24757	ON	93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	4.23358	ON	93062824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	3.88203	ON	93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	2.65522	ON	93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	2.42592	ON	93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.12

POLLUTANT : TSP
MODEL : NMV

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*** ISCST3 - VERSION 95146 ***   ***  SURFACE COAL MINE MODEL EVALUATION: CORDERO MINE, TSP              ***     06/18/95
                                 ***  ISCSTM: SET2 - shift emiss - Roads as Volume Srcs, w/ depletion    ***     22:05:07
                                                                                                                 PAGE 280
**MODELOPTs: CONC                     RURAL  FLAT   FLGPOL DFAULT                                      DRYDPL

                                          *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                                     ** CONC OF TSP      IN MICROGRAMS/M**3                            **

                                                        DATE                                                         NETWORK
GROUP ID                                 AVERAGE CONC   (YYMMDDHH)          RECEPTOR  (XR, YR, ZELEV, ZFLAG)   OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH  1ST HIGH VALUE IS     159.29102  ON 93071624: AT (     384.05,    1319.78,      0.00,     3.50)  DC      NA
         HIGH  2ND HIGH VALUE IS     144.56969  ON 93062424: AT (     384.05,    1319.78,      0.00,     3.50)  DC      NA
         HIGH  3RD HIGH VALUE IS     144.25851  ON 93071824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  4TH HIGH VALUE IS     141.29485  ON 93061224: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  5TH HIGH VALUE IS     129.69801  ON 93061024: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  6TH HIGH VALUE IS     102.85251  ON 93052124: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  7TH HIGH VALUE IS      94.16519  ON 93052324: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  8TH HIGH VALUE IS      92.74215  ON 93070624: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA

ROADS    HIGH  1ST HIGH VALUE IS     157.06224  ON 93071624: AT (     384.05,    1319.78,      0.00,     3.50)  DC      NA
         HIGH  2ND HIGH VALUE IS     125.38617  ON 93052924: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  3RD HIGH VALUE IS     123.31095  ON 93070824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  4TH HIGH VALUE IS     116.48199  ON 93071824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  5TH HIGH VALUE IS     114.20749  ON 93061024: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  6TH HIGH VALUE IS      88.52045  ON 93052124: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  7TH HIGH VALUE IS      85.55187  ON 93070624: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  8TH HIGH VALUE IS      82.60360c ON 93061424: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA

NPIT     HIGH  1ST HIGH VALUE IS      55.59312  ON 93061024: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  2ND HIGH VALUE IS      42.44516  ON 93060424: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  3RD HIGH VALUE IS      39.47153  ON 93052524: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  4TH HIGH VALUE IS      36.38380  ON 93053124: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  5TH HIGH VALUE IS      24.37166  ON 93070824: AT (     384.05,    1319.78,      0.00,     3.50)  DC      NA
         HIGH  6TH HIGH VALUE IS      17.97294  ON 93052924: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  7TH HIGH VALUE IS      17.88724  ON 93063024: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  8TH HIGH VALUE IS      15.71910  ON 93052324: AT (     384.05,    1319.78,      0.00,     3.50)  DC      NA

SPIT     HIGH  1ST HIGH VALUE IS      41.64918c ON 93061824: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  2ND HIGH VALUE IS      17.23928c ON 93062624: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  3RD HIGH VALUE IS      12.85655  ON 93062824: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  4TH HIGH VALUE IS      12.19072  ON 93062224: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  5TH HIGH VALUE IS      10.16543  ON 93070224: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  6TH HIGH VALUE IS      10.00650  ON 93061024: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  7TH HIGH VALUE IS       3.38001  ON 93071424: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  8TH HIGH VALUE IS       0.09918  ON 93070624: AT (    -664.46,   -5539.74,      0.00,     4.60)  DC      NA
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**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	2.07312	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	1.40077	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	1.33534	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.48220	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.44572	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.36826	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.30620	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.16409c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	15.67622c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.17295	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	7.98123	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.51815	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.42170	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	3.27721	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	2.86936	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	2.54374	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.13

POLLUTANT : TSP
MODEL : NHV

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP   IN MICROGRAMS/M**3   **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	228.35805	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	222.92450	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	220.47058	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	177.83357	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	175.07521c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	139.18527	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	138.91028	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	126.96134	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH 1ST HIGH VALUE IS	219.10512	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	205.40910	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	199.16679	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	174.89034c	ON 93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	152.35176	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	125.03249	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	121.77175	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	111.61387	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH 1ST HIGH VALUE IS	57.82059	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	44.67302	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	33.44529	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	29.65982	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	18.65715	ON 93062824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	18.55680	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	16.91110	ON 93052924: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	16.04799	ON 93060824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
SPIT	HIGH 1ST HIGH VALUE IS	44.97808c	ON 93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 2ND HIGH VALUE IS	18.20830c	ON 93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 3RD HIGH VALUE IS	13.07802	ON 93062224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 4TH HIGH VALUE IS	10.81557	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 5TH HIGH VALUE IS	10.73503	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 6TH HIGH VALUE IS	8.21131	ON 93070224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 7TH HIGH VALUE IS	3.47052	ON 93071424: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.09918	ON 93070624: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DEFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	2.07312	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	1.40077	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	1.33534	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.48220	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.44572	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.36826	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.30620	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.16409c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	15.67622c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.17295	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	7.98123	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.51815	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.42170	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	3.27721	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	2.86936	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	2.54374	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.14

POLLUTANT : TSP
MODEL : NLA

**MODELOPTs: CONC RURAL FLAT FLGPOL DFAULT DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ALL	HIGH 1ST HIGH VALUE IS	155.20811	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	140.59315	ON 93070624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	103.76984	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	103.47193	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	93.47263	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	87.60735	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	79.06322	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	78.13076	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH 1ST HIGH VALUE IS	131.25565	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	109.03706	ON 93070624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	95.39388	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	93.77195	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	78.93587	ON 93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	72.26450	ON 93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	69.69592	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	68.79182	ON 93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH 1ST HIGH VALUE IS	45.77815c	ON 93061824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	34.72445	ON 93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	31.82932	ON 93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	30.17740	ON 93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	23.84967	ON 93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	21.14290	ON 93062824: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	18.20013	ON 93070224: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	16.70963c	ON 93062624: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
SPIT	HIGH 1ST HIGH VALUE IS	11.19748	ON 93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 2ND HIGH VALUE IS	10.39925	ON 93070824: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA
	HIGH 3RD HIGH VALUE IS	9.63866	ON 93052324: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA
	HIGH 4TH HIGH VALUE IS	7.62818	ON 93071624: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA
	HIGH 5TH HIGH VALUE IS	6.76979	ON 93052524: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 6TH HIGH VALUE IS	5.87364	ON 93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 7TH HIGH VALUE IS	5.18602	ON 93052924: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH 8TH HIGH VALUE IS	4.77314	ON 93052124: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG) OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	0.55667c	ON 93062624: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 2ND HIGH VALUE IS	0.48947c	ON 93061824: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 3RD HIGH VALUE IS	0.48513	ON 93063024: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 4TH HIGH VALUE IS	0.45446c	ON 93061424: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 5TH HIGH VALUE IS	0.42912	ON 93070624: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 6TH HIGH VALUE IS	0.41877	ON 93061024: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 7TH HIGH VALUE IS	0.32586	ON 93061224: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 8TH HIGH VALUE IS	0.32330	ON 93052924: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	15.27090c	ON 93061824: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 2ND HIGH VALUE IS	7.84096	ON 93061024: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 3RD HIGH VALUE IS	4.96419	ON 93052124: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 4TH HIGH VALUE IS	4.24757	ON 93060424: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 5TH HIGH VALUE IS	4.23358	ON 93062824: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 6TH HIGH VALUE IS	3.88203	ON 93052524: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 7TH HIGH VALUE IS	2.65522	ON 93053124: AT (	283.46, 448.06, 0.00, 3.50) DC	NA
	HIGH 8TH HIGH VALUE IS	2.42592	ON 93052924: AT (	283.46, 448.06, 0.00, 3.50)	NA

D.15

POLLUTANT : TSP
MODEL : NMA

**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP   IN MICROGRAMS/M**3   **

GROUP ID			AVERAGE CONC		DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ALL	HIGH	1ST HIGH VALUE IS	155.56163	ON	93071624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	149.29651	ON	93062424: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	144.24808	ON	93061224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	143.84605	ON	93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	134.64510	ON	93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	103.75764	ON	93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	95.11407	ON	93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	91.61723	ON	93052324: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
ROADS	HIGH	1ST HIGH VALUE IS	153.33286	ON	93071624: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	127.81280	ON	93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	122.44779	ON	93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	119.15458	ON	93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	116.55000	ON	93071824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	89.42554	ON	93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	87.92377	ON	93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	87.24132c	ON	93061424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
NPIT	HIGH	1ST HIGH VALUE IS	55.59312	ON	93061024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH	2ND HIGH VALUE IS	42.44516	ON	93060424: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH	3RD HIGH VALUE IS	39.47153	ON	93052524: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH	4TH HIGH VALUE IS	36.38380	ON	93053124: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH	5TH HIGH VALUE IS	24.37166	ON	93070824: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
	HIGH	6TH HIGH VALUE IS	17.97294	ON	93052924: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH	7TH HIGH VALUE IS	17.88724	ON	93063024: AT (	-1554.48,	3496.06,	0.00,	3.50)	DC	NA
	HIGH	8TH HIGH VALUE IS	15.71910	ON	93052324: AT (	384.05,	1319.78,	0.00,	3.50)	DC	NA
SPIT	HIGH	1ST HIGH VALUE IS	41.64918c	ON	93061824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	2ND HIGH VALUE IS	17.23928c	ON	93062624: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	3RD HIGH VALUE IS	12.85655	ON	93062824: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	4TH HIGH VALUE IS	12.19072	ON	93062224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	5TH HIGH VALUE IS	10.16543	ON	93070224: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	6TH HIGH VALUE IS	10.00650	ON	93061024: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	7TH HIGH VALUE IS	3.38001	ON	93071424: AT (	-1249.68,	-3810.00,	0.00,	3.40)	DC	NA
	HIGH	8TH HIGH VALUE IS	0.09918	ON	93070624: AT (	-664.46,	-5539.74,	0.00,	4.60)	DC	NA

**MODELOPTs: CONC RURAL FLAT FLGPOL DFAULT DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP IN MICROGRAMS/M**3 **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR, YR, ZELEV, ZFLAG)				OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	2.07312	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	1.40077	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	1.33534	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.48220	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.44572	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.36826	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.30620	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.16409c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	15.67622c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.17295	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	7.98123	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.51815	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.42170	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	3.27721	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	2.86936	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	2.54374	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

D.16

POLLUTANT : TSP
MODEL : NHA

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                                 *** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

                          ** CONC OF TSP       IN MICROGRAMS/M**3                              **

                                                  DATE                                                             NETWORK
GROUP ID                          AVERAGE CONC   (YYMMDDHH)            RECEPTOR  (XR, YR, ZELEV, ZFLAG)    OF TYPE  GRID-ID
- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

ALL      HIGH  1ST HIGH VALUE IS   234.66847  ON 93061224: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  2ND HIGH VALUE IS   228.20276  ON 93061024: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  3RD HIGH VALUE IS   221.79999  ON 93070824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  4TH HIGH VALUE IS   180.57835c ON 93061424: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  5TH HIGH VALUE IS   178.53455  ON 93071824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  6TH HIGH VALUE IS   141.28383  ON 93052924: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  7TH HIGH VALUE IS   135.03824  ON 93052324: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  8TH HIGH VALUE IS   130.57239  ON 93070624: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA

ROADS    HIGH  1ST HIGH VALUE IS   225.41559  ON 93061224: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  2ND HIGH VALUE IS   213.14130  ON 93061024: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  3RD HIGH VALUE IS   198.04219  ON 93070824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  4TH HIGH VALUE IS   180.39349c ON 93061424: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  5TH HIGH VALUE IS   153.05283  ON 93071824: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  6TH HIGH VALUE IS   127.13110  ON 93052924: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  7TH HIGH VALUE IS   125.38277  ON 93070624: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA
         HIGH  8TH HIGH VALUE IS   107.74171  ON 93052324: AT (     283.46,     448.06,      0.00,     3.50)  DC      NA

NPIT     HIGH  1ST HIGH VALUE IS    57.82059  ON 93061024: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  2ND HIGH VALUE IS    44.67302  ON 93060424: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  3RD HIGH VALUE IS    33.44529  ON 93052524: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  4TH HIGH VALUE IS    29.65982  ON 93053124: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  5TH HIGH VALUE IS    18.65715  ON 93062824: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  6TH HIGH VALUE IS    18.55680  ON 93070224: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  7TH HIGH VALUE IS    16.91110  ON 93052924: AT (   -1554.48,    3496.06,      0.00,     3.50)  DC      NA
         HIGH  8TH HIGH VALUE IS    16.04799  ON 93060824: AT (     384.05,    1319.78,      0.00,     3.50)  DC      NA

SPIT     HIGH  1ST HIGH VALUE IS    44.97808c ON 93061824: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  2ND HIGH VALUE IS    18.20830c ON 93062624: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  3RD HIGH VALUE IS    13.07802  ON 93062224: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  4TH HIGH VALUE IS    10.81557  ON 93062824: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  5TH HIGH VALUE IS    10.73503  ON 93061024: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  6TH HIGH VALUE IS     8.21131  ON 93070224: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  7TH HIGH VALUE IS     3.47052  ON 93071424: AT (   -1249.68,   -3810.00,      0.00,     3.40)  DC      NA
         HIGH  8TH HIGH VALUE IS     0.09918  ON 93070624: AT (    -664.46,   -5539.74,      0.00,     4.60)  DC      NA
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**MODELOPTs: CONC   RURAL FLAT FLGPOL DFAULT   DRYDPL

*** THE SUMMARY OF HIGHEST 24-HR RESULTS ***

** CONC OF TSP   IN MICROGRAMS/M**3   **

GROUP ID		AVERAGE CONC	DATE (YYMMDDHH)	RECEPTOR (XR,	YR,	ZELEV,	ZFLAG)	OF TYPE	NETWORK GRID-ID
ACTVTY	HIGH 1ST HIGH VALUE IS	2.07312	ON 93070824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	1.40077	ON 93071024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	1.33534	ON 93062424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	0.48220	ON 93062224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	0.44572	ON 93070624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	0.36826	ON 93063024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	0.30620	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	0.16409c	ON 93062624: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
OTHERS	HIGH 1ST HIGH VALUE IS	15.67622c	ON 93061824: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 2ND HIGH VALUE IS	13.17295	ON 93061024: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 3RD HIGH VALUE IS	7.98123	ON 93060424: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 4TH HIGH VALUE IS	4.51815	ON 93052524: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 5TH HIGH VALUE IS	3.42170	ON 93052124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 6TH HIGH VALUE IS	3.27721	ON 93052924: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 7TH HIGH VALUE IS	2.86936	ON 93053124: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA
	HIGH 8TH HIGH VALUE IS	2.54374	ON 93071224: AT (	283.46,	448.06,	0.00,	3.50)	DC	NA

APPENDIX E

CORDERO MINE ON-SITE METEOROLOGICAL DATA

This appendix presents the on-site hourly meteorological data that were used in the Cordero Mine model evaluation study. The listing includes annotations identifying when missing data occurred and what data substitutions were made.

Column Description
A Julian Day
B Hour of Day
C Wind Speed (mph)
D Wind Direction (deg)
E Sigma Theta (deg)
F Air Temperature (deg F)
G Precipitation (in)

Note: The following data is for the year 1993.
* Indicates that the information (in the columns indicated in the parenthesis) came from the Caballo Rojo met station.
** Indicates that the σ_θ information came from the Coal Creek Mine's met station.
*** Indicates that the σ_θ information came from the Black Thunder Mine's met station.

A	B	C	D	E	F	G
139	1	5.5	297	8	45.9	0.00
139	2	7.8	304	3	45.9	0.00
139	3	7.3	311	3	44.5	0.00
139	4	7.8	331	2	41.5	0.00
139	5	7.3	323	5	39.3	0.00
139	6	5.9	295	5	42.2	0.00
139	7	4.9	325	9	48.1	0.00
139	8	6.9	347	14	51.6	0.00
139	9	8.9	353	18	54.1	0.00
139	10	9.4	16	21	55.7	0.00
139	11	9.8	356	25	57.2	0.00
139	12	10.5	339	17	58.7	0.00
139	13	9.9	5	25	59.7	0.00
139	14	10.7	349	19	60.8	0.00
139	15	12.6	12	20	61.0	0.00
139	16	11.6	15	20	60.8	0.00
139	17	10.3	23	15	59.2	0.00
139	18	11.6	31	10	58.1	0.00
139	19	11.5	41	7	55.5	0.00
139	20	8.3	56	6	51.6	0.00
139	21	5.6	76	8	48.3	0.00
139	22	5.7	98	8	45.1	0.00
139	23	7.2	137	4	44.0	0.00
139	24	7.4	144	4	43.4	0.00
140	1	10.5	180	6	42.7	0.00
140	2	10.5	165	4	42.0	0.00
140	3	10.5	162	3	41.4	0.00
140	4	10.3	150	4	42.1	0.00
140	5	11.1	150	5	42.4	0.00
140	6	14.4	153	4	44.4	0.00
140	7	14.3	155	5	46.3	0.00
140	8	15.2	153	6	48.9	0.00
140	9	15.0	158	8	52.0	0.00
140	10	15.5	159	9	55.7	0.00
140	11	12.9	159	12	58.8	0.00
140	12	10.5	146	15	61.1	0.00
140	13	9.9	147	16	63.6	0.00
140	14	7.3	138	22	65.8	0.00
140	15	7.0	228	23	67.3	0.00
140	16	6.1	125	25	68.3	0.00
140	17	4.2	163	24	68.3	0.00
140	18	5.7	141	15	67.4	0.00
140	19	8.3	133	5	63.5	0.00
140	20	8.6	147	3	58.7	0.00
140	21	7.7	156	8	56.9	0.00
140	22	9.7	159	6	56.7	0.00
140	23	14.7	193	7	57.6	0.00
140	24	13.4	174	4	56.8	0.00
141	1	14.7	162	4	55.5	0.00
141	2	11.5	165	5	54.1	0.00
141	3	13.2	158	4	51.2	0.00
141	4	13.7	158	4	48.6	0.00
141	5	15.3	169	4	47.6	0.00
141	6	16.5	164	3	49.4	0.00
141	7	16.5	164	4	51.8	0.00

141	8	17.7	168	5	55.7	0.00
141	9	19.2	168	5	58.0	0.00
141	10	17.9	166	4	60.3	0.00
141	11	15.6	155	6	65.1	0.00
141	12	13.7	217	17	74.1	0.00
141	13	14.0	272	12	77.0	0.00
141	14	15.5	280	12	77.8	0.00
141	15	16.1	267	10	77.9	0.00
141	16	12.8	256	12	77.6	0.00
141	17	10.4	335	22	77.3	0.00
141	18	13.1	344	11	73.2	0.00
141	19	13.5	325	16	68.4	0.00
141	20	25.6	246	6	53.9	0.54
141	21	5.0	211	27	55.1	0.00
141	22	8.1	304	11	54.6	0.00
141	23	11.6	319	3	54.2	0.00
141	24	9.2	308	4	52.5	0.00
142	1	9.2	310	4	52.9	0.00
142	2	7.3	318	4	52.2	0.01
142	3	5.7	311	5	52.0	0.00
142	4	5.5	294	9	52.5	0.00
142	5	8.6	292	5	52.7	0.00
142	6	12.1	312	3	52.8	0.01
142	7	13.7	325	5	53.8	0.00
142	8	15.0	325	4	53.4	0.00
142	9	18.6	334	4	56.5	0.00
142	10	18.5	331	5	56.4	0.00
142	11	18.3	331	6	55.3	0.00
142	12	18.6	335	3	53.3	0.00
142	13	13.0	346	6	51.8	0.01
142	14	12.3	349	11	55.2	0.01
142	15	15.5	334	5	55.2	0.00
142	16	14.9	333	5	53.7	0.00
142	17	13.0	333	5	53.3	0.00
142	18	11.1	326	4	52.1	0.00
142	19	9.5	307	4	52.2	0.00
142	20	9.0	297	6	50.7	0.00
142	21	5.8	307	9	46.6	0.00
142	22	6.1	273	4	44.4	0.00
142	23	10.0	289	3	44.0	0.00
142	24	10.0	303	5	42.9	0.00
143	1	11.0	328	7	44.7	0.00
143	2	10.2	309	5	44.5	0.00
143	3	9.4	315	4	44.3	0.00
143	4	11.2	310	3	43.8	0.00
143	5	10.4	318	3	43.9	0.00
143	6	12.6	311	4	44.4	0.00
143	7	15.9	318	3	44.8	0.00
143	8	18.2	325	4	46.5	0.00
143	9	22.7	328	5	50.5	0.00
143	10	25.9	329	5	51.6	0.00
143	11	24.4	328	5	51.3	0.00
143	12	27.3	331	5	52.5	0.00
143	13	23.5	338	6	53.6	0.00
143	14	18.0	339	10	55.4	0.00
143	15	19.2	336	8	55.4	0.00
143	16	20.7	345	12	54.6	0.00
143	17	17.0	346	10	52.7	0.00
143	18	19.2	342	10	51.7	0.00
143	19	18.3	345	10	50.0	0.00
143	20	14.7	336	5	46.5	0.00
143	21	10.1	337	3	43.8	0.00
143	22	8.8	343	7	42.2	0.00
143	23	10.2	5	7	40.8	0.00
143	24	7.2	348	6	39.0	0.00
144	1	5.4	307	12	36.8	0.00
144	2	5.2	306	5	36.5	0.00
144	3	4.7	295	10	35.5	0.00
144	4	4.9	282	5	37.2	0.00
144	5	5.5	272	6	37.8	0.00
144	6	6.1	303	5	39.8	0.00
144	7	9.1	309	7	42.0	0.00
144	8	9.9	332	9	43.6	0.00
144	9	10.3	324	8	45.0	0.00
144	10	10.1	334	11	46.9	0.00

144	11	8.8	339	14	48.6	0.00
144	12	9.1	350	18	50.8	0.00
144	13	10.3	340	20	52.5	0.00
144	14	9.8	340	18	53.0	0.00
144	15	9.4	349	22	53.2	0.00
144	16	8.2	337	18	54.0	0.00
144	17	8.1	328	18	55.0	0.00
144	18	6.0	310	17	54.8	0.00
144	19	4.7	319	19	53.3	0.00
144	20	4.0	251	10	47.9	0.00
144	21	5.6	235	5	46.5	0.00
144	22	5.2	183	17	45.7	0.00
144	23	4.5	247	18	44.6	0.00
144	24	1.9	288	43	41.0	0.00
145	1	3.8	228	29	37.8	0.00
145	2	4.8	193	7	36.5	0.00
145	3	4.2	182	9	36.4	0.00
145	4	3.2	174	16	36.1	0.00
145	5	2.7	155	10	35.6	0.00
145	6	3.0	137	21	38.4	0.00
145	7	4.5	174	13	44.1	0.00
145	8	9.4	214	8	52.5	0.00
145	9	10.2	222	10	57.5	0.00
145	10	9.6	214	17	59.8	0.00
145	11	8.6	194	21	61.9	0.00
145	12	8.7	194	22	62.8	0.00
145	13	7.2	174	28	65.3	0.00
145	14	8.7	185	29	67.3	0.00
145	15	9.2	184	27	68.2	0.00
145	16	9.0	175	18	68.3	0.00
145	17	9.6	169	15	68.4	0.00
145	18	10.2	166	10	67.7	0.00
145	19	9.9	149	4	64.3	0.00
145	20	10.4	133	3	57.8	0.00
145	21	8.4	126	5	54.6	0.00
145	22	8.5	136	4	53.9	0.00
145	23	10.6	150	3	55.1	0.00
145	24	12.2	156	3	54.2	0.00
146	1	10.0	169	3	51.5	0.00
146	2	10.6	172	3	50.4	0.00
146	3	7.9	160	5	49.0	0.00
146	4	10.3	154	3	49.5	0.00
146	5	12.2	170	5	49.9	0.00
146	6	13.8	166	4	51.0	0.00
146	7	9.9	199	12	54.4	0.00
146	8	10.1	183	9	58.0	0.00
146	9	10.8	230	10	67.0	0.00
146	10	14.1	266	14	73.4	0.00
146	11	18.7	247	10	77.3	0.00
146	12	22.6	249	7	78.9	0.00
146	13	19.7	257	10	79.6	0.00
146	14	22.9	261	9	80.1	0.00
146	15	23.5	278	7	80.5	0.00
146	16	19.7	262	7	79.4	0.00
146	17	18.0	255	5	78.7	0.00
146	18	14.9	260	4	77.0	0.00
146	19	10.6	261	3	72.9	0.00
146	20	10.8	260	2	66.0	0.00
146	21	11.6	356	18	65.3	0.00
146	22	15.8	337	8	62.9	0.00
146	23	18.2	345	8	61.6	0.00
146	24	13.8	339	6	58.4	0.00
147	1	12.0	337	3	55.0	0.00
147	2	13.2	335	2	53.5	0.00
147	3	12.9	331	3	52.2	0.00
147	4	9.2	321	3	47.6	0.00
147	5	6.9	321	3	46.6	0.00
147	6	6.3	311	5	50.0	0.00
147	7	9.5	329	6	54.1	0.00
147	8	13.5	1	13	56.8	0.00
147	9	11.3	5	17	58.8	0.00
147	10	10.8	5	20	60.8	0.00
147	11	8.9	4	22	62.4	0.00
147	12	7.2	14	25	64.3	0.00
147	13	7.3	11	25	66.3	0.00

147	14	5.8	44	32	67.1	0.00
147	15	5.8	275	29	67.2	0.00
147	16	6.2	93	21	66.8	0.00
147	17	9.3	101	9	65.9	0.00
147	18	11.5	94	7	65.3	0.00
147	19	9.2	87	6	63.6	0.00
147	20	7.2	73	8	60.7	0.00
147	21	9.7	49	8	60.0	0.01
147	22	16.1	343	8	55.5	0.12
147	23	14.5	354	13	52.2	0.26
147	24	15.6	63	13	53.1	0.32
148	1	13.4	109	5	53.1	0.02
148	2	10.5	89	6	53.0	0.00
148	3	9.2	165	7	52.7	0.00
148	4	8.6	165	5	52.6	0.00
148	5	3.9	133	9	51.8	0.00
148	6	3.1	70	13	53.8	0.00
148	7	8.3	138	9	55.9	0.00
148	8	9.1	154	8	56.9	0.00
148	9	7.4	153	8	58.1	0.00
148	10	6.2	152	16	60.4	0.01
148	11	5.3	129	26	62.8	0.02
148	12	5.1	156	28	66.0	0.00
148	13	6.7	155	31	68.9	0.00
148	14	9.2	144	21	70.1	0.00
148	15	11.0	152	15	72.0	0.00
148	16	14.6	145	9	72.2	0.00
148	17	17.3	146	6	70.0	0.00
148	18	20.4	140	5	65.9	0.00
148	19	25.1	143	4	62.8	0.00
148	20	25.5	146	8	59.7	0.01
148	21	12.4	116	12	57.4	0.22
148	22	9.1	20	21	56.6	0.06
148	23	10.0	4	7	56.3	0.00
148	24	12.8	142	4	55.7	0.00
149	1	6.6	156	23	54.1	0.00
149	2	7.1	177	7	52.5	0.00
149	3	6.6	226	13	51.6	0.00
149	4	6.5	145	14	50.2	0.01
149	5	10.5	139	7	51.2	0.00
149	6	12.1	164	6	51.7	0.00
149	7	11.5	164	5	53.0	0.00
149	8	11.8	180	6	55.8	0.00
149	9	9.9	184	7	58.8	0.00
149	10	3.8	175	27	62.7	0.00
149	11	2.9	268	51	66.9	0.00
149	12	10.4	309	15	68.4	0.00
149	13	12.8	316	10	70.9	0.00
149	14	10.4	322	9	70.3	0.00
149	15	9.6	313	14	72.2	0.00
149	16	10.6	302	13	71.6	0.00
149	17	14.1	325	8	69.8	0.00
149	18	19.7	318	8	58.2	0.00
149	19	15.5	339	11	61.1	0.00
149	20	11.8	345	9	58.0	0.00
149	21	6.7	355	8	54.7	0.00
149	22	8.7	18	4	53.3	0.00
149	23	5.0	333	6	51.0	0.00
149	24	3.7	290	14	50.5	0.00
150	1	6.6	309	5	49.8	0.00
150	2	6.3	311	6	47.9	0.00
150	3	8.4	294	5	47.1	0.00
150	4	10.6	288	3	47.1	0.00
150	5	11.5	289	2	47.7	0.00
150	6	8.5	316	6	48.9	0.00
150	7	8.3	329	6	52.1	0.00
150	8	13.5	351	11	54.8	0.00
150	9	13.7	350	15	56.4	0.00
150	10	12.3	340	11	59.1	0.00
150	11	13.3	355	17	61.4	0.00
150	12	11.0	354	21	62.8	0.00
150	13	10.1	44	19	62.5	0.00
150	14	8.8	281	16	62.7	0.00
150	15	7.5	52	15	62.5	0.00
150	16	3.3	24	43	63.5	0.00

150	17	5.8	57	19	63.1	0.00
150	18	5.9	101	15	63.0	0.00
150	19	6.7	98	6	61.5	0.00
150	20	4.4	108	6	56.7	0.00
150	21	6.2	222	10	54.1	0.00
150	22	5.1	150	8	52.2	0.00
150	23	10.4	152	6	51.0	0.00
150	24	10.2	155	5	49.9	0.00
151	1	10.0	168	5	48.7	0.00
151	2	11.4	181	3	47.6	0.00
151	3	10.4	181	3	46.8	0.00
151	4	8.2	173	5	46.2	0.00
151	5	8.3	176	3	45.7	0.00
151	6	7.9	177	6	47.9	0.00
151	7	9.5	178	7	51.6	0.00
151	8	6.8	177	10	56.2	0.00
151	9	4.1	154	22	60.8	0.00
151	10	4.7	126	23	64.9	0.00
151	11	5.8	125	20	68.1	0.00
151	12	7.3	110	21	70.5	0.00
151	13	8.2	158	17	71.4	0.00
151	14	7.5	148	24	72.9	0.00
151	15	9.1	140	19	72.7	0.00
151	16	10.8	134	14	73.0	0.00
151	17	12.6	136	7	71.8	0.00
151	18	11.2	128	4	69.3	0.00
151	19	10.8	127	3	66.8	0.00
151	20	12.2	135	3	65.1	0.00
151	21	17.0	130	5	63.3	0.00
151	22	20.3	137	5	60.9	0.00
151	23	19.7	150	4	58.9	0.00
151	24	15.9	154	5	58.3	0.00
152	1	15.5	155	8	58.4	0.00
152	2	13.5	215	18	55.0	0.18
152	3	5.2	106	22	53.4	0.00
152	4	7.6	160	9	51.7	0.00
152	5	9.9	186	5	52.4	0.00
152	6	8.0	182	6	55.1	0.00
152	7	9.8	193	9	56.9	0.00
152	8	10.9	238	7	61.5	0.00
152	9	9.0	270	12	65.9	0.00
152	10	13.3	286	7	67.7	0.00
152	11	15.5	323	9	70.8	0.00
152	12	11.3	337	15	66.0	0.08
152	13	13.1	56	10	68.6	0.00
152	14	11.4	65	14	68.7	0.01
152	15	12.6	20	11	62.6	0.04
152	16	8.6	70	9	64.2	0.00
152	17	7.5	7	15	61.5	0.10
152	18	14.2	220	29	56.4	0.03
152	19	20.8	339	7	52.5	0.02
152	20	13.5	336	8	52.0	0.00
152	21	9.2	325	6	51.7	0.00
152	22	6.2	312	5	50.4	0.01
152	23	7.4	287	6	48.4	0.00
152	24	11.4	305	4	49.9	0.00
153	1	10.2	314	4	50.7	0.00
153	2	10.1	308	5	50.1	0.00
153	3	7.8	299	4	49.5	0.00
153	4	7.3	283	5	48.1	0.00
153	5	9.6	314	5	47.4	0.00
153	6	15.0	311	5	48.4	0.00
153	7	16.8	307	5	48.4	0.00
153	8	16.2	311	6	49.8	0.00
153	9	15.9	317	5	51.2	0.00
153	10	17.9	319	6	55.0	0.00
153	11	16.4	317	8	56.1	0.00
153	12	15.4	344	14	57.8	0.00
153	13	16.8	353	19	58.1	0.00
153	14	16.7	356	16	59.0	0.00
153	15	17.5	8	13	57.6	0.00
153	16	17.0	16	10	56.9	0.00
153	17	13.9	17	14	55.1	0.00
153	18	12.4	31	9	53.4	0.00
153	19	11.8	36	7	52.9	0.00

153	20	12.6	37	6	49.8	0.00
153	21	11.4	48	8	47.4	0.00
153	22	8.9	50	8	47.0	0.00
153	23	8.8	60	11	46.6	0.00
153	24	10.8	132	13	47.4	0.00
154	1	8.1	134	10	46.7	0.00
154	2	11.0	129	8	46.8	0.00
154	3	11.5	139	6	47.1	0.00
154	4	14.6	130	7	46.7	0.00
154	5	12.6	142	5	46.3	0.08
154	6	9.6	140	6	46.5	0.04
154	7	14.5	139	5	46.5	0.04
154	8	16.6	136	6	45.6	0.03
154	9	19.5	135	5	46.1	0.02
154	10	22.1	126	6	44.5	0.01
154	11	21.2	131	5	43.3	0.04
154	12	20.2	127	6	43.5	0.02
154	13	20.6	145	7	42.9	0.04
154	14	19.7	144	7	44.0	0.02
154	15	17.3	134	8	43.7	0.02
154	16	16.9	129	9	43.6	0.00
154	17	12.9	120	8	43.7	0.01
154	18	9.7	122	8	43.0	0.01
154	19	9.3	145	8	42.6	0.00
154	20	11.0	160	7	42.0	0.00
154	21	9.4	167	6	41.3	0.00
154	22	11.8	161	5	41.3	0.00
154	23	11.2	175	5	40.8	0.00
154	24	10.7	194	6	39.9	0.00
155	1	9.9	200	4	39.2	0.00
155	2	8.0	180	4	37.7	0.00
155	3	9.1	174	4	38.2	0.00
155	4	11.2	159	5	39.9	0.00
155	5	11.2	159	4	40.1	0.00
155	6	14.4	163	4	40.4	0.00
155	7	15.6	162	5	41.1	0.00
155	8	16.6	172	7	43.1	0.00
155	9	20.4	167	7	45.6	0.00
155	10	22.7	173	7	47.4	0.00
155	11	22.0	174	8	50.8	0.00
155	12	22.1	176	9	54.5	0.00
155	13	21.2	179	8	56.4	0.00
155	14	20.4	181	10	58.7	0.00
155	15	19.6	177	10	60.2	0.00
155	16	21.2	174	8	60.5	0.00
155	17	22.0	159	5	59.2	0.00
155	18	23.7	159	4	57.3	0.00
155	19	22.6	159	4	55.9	0.00
155	20	22.8	158	4	53.6	0.00
155	21	21.9	157	5	51.8	0.00
155	22	20.8	157	4	51.2	0.00
155	23	19.5	161	3	50.0	0.00
155	24	18.6	158	4	48.6	0.00
156	1	17.4	157	4	47.5	0.00
156	2	14.6	166	5	46.1	0.00
156	3	14.2	171	4	45.3	0.00
156	4	12.4	171	4	44.5	0.00
156	5	13.7	177	3	44.5	0.00
156	6	12.0	167	4	47.2	0.00
156	7	11.1	161	6	49.7	0.00
156	8	10.5	184	8	53.7	0.00
156	9	8.2	189	12	57.4	0.00
156	10	5.8	225	27	62.0	0.00
156	11	5.4	219	41	64.6	0.00
156	12	6.6	266	24	65.7	0.00
156	13	7.0	254	42	65.3	0.00
156	14	10.7	254	44	57.8	0.04
156	15	8.2	152	28	60.5	0.01
156	16	9.9	112	14	62.5	0.00
156	17	6.4	203	37	61.4	0.01
156	18	5.7	37	16	58.1	0.00
156	19	12.9	13	6	56.1	0.02
156	20	13.1	21	5	53.8	0.00
156	21	12.0	14	4	52.9	0.00
156	22	10.8	360	7	52.5	0.00

156	23	11.9	352	10	51.7	0.00	
156	24	11.0	18	7	50.9	0.00	
157	1	10.6	28	4	50.5	0.00	
157	2	10.7	25	9	49.6	0.00	
157	3	11.5	359	9	49.6	0.00	
157	4	9.7	13	4	48.7	0.00	
157	5	9.6	21	3	48.2	0.00	
157	6	7.3	40	7	48.7	0.00	
157	7	9.7	40	6	50.0	0.00	
157	8	9.3	63	9	52.4	0.00	
157	9	11.7	83	6	52.5	0.00	
157	10	6.6	83	7	52.2	0.00	
157	11	5.9	63	11	54.0	0.00	
157	12	6.5	89	13	56.5	0.00	
157	13	7.2	94	7	57.0	0.00	
157	14	9.1	117	8	58.8	0.00	
157	15	18.3	224	6	60.0	0.00	
157	16	18.9	152	5	58.3	0.00	
157	17	17.6	151	5	55.6	0.00	
157	18	16.9	143	6	52.6	0.18	
157	19	13.9	146	6	51.5	0.07	
157	20	8.3	179	11	51.3	0.16	
157	21	6.7	181	14	51.0	0.19	
157	22	5.0	213	29	50.4	0.01	
157	23	4.5	59	16	50.4	0.00	
157	24	7.4	97	6	50.8	0.00	
158	1	6.5	214	15	50.7	0.01	
158	2	2.9	157	10	50.1	0.01	
158	3	6.6	245	30	50.2	0.01	
158	4	5.8	285	16	49.7	0.00	
158	5	9.3	226	10	49.1	0.03	
158	6	6.3	200	12	47.5	0.07	
158	7	7.3	273	11	47.0	0.09	
158	8	10.8	275	6	46.5	0.14	
158	9	12.6	264	4	46.3	0.07	
158	10	12.0	270	5	46.4	0.11	
158	11	12.9	283	7	46.3	0.09	
158	12	21.7	276	5	45.4	0.09	
158	13	27.2	266	4	43.6	0.11	
158	14	27.5	266	4	44.2	0.13	
158	15	30.5	283	4	45.3	0.06	
158	16	29.1	289	4	45.4	0.09	
158	17	32.8	293	3	45.8	0.02	
158	18	30.8	300	3	44.8	0.01	
158	19	29.5	299	3	43.7	0.02	
158	20	28.6	301	3	42.8	0.04	
158	21	31.3	297	3	43.1	0.01	
158	22	32.8	304	3	43.1	0.00	
158	23	33.1	304	3	42.6	0.01	
158	24	35.0	306	3	41.5	0.01	
159	1	34.0	309	3	41.6	0.00	
159	2	31.1	306	3	41.8	0.00	
159	3	26.6	304	3	41.9	0.01	
159	4	27.3	311	4	42.4	0.01	
159	5	27.6	314	5	42.7	0.01	
159	6	28.6	321	3	42.6	0.00	
159	7	28.9	315	4	43.6	0.00	
159	8	26.9	312	4	45.6	0.00	
159	9	29.4	308	6	46.4	0.00	* (C,D,F,G) **
159	10	34.3	309	7	47.8	0.00	* (C,D,F,G) **
159	11	32.3	305	7	50.1	0.00	
159	12	32.8	301	5	51.7	0.00	
159	13	29.1	306	5	53.8	0.00	
159	14	29.7	313	6	56.3	0.00	
159	15	30.4	313	6	56.5	0.00	
159	16	26.7	309	6	56.3	0.00	
159	17	24.3	310	4	55.5	0.00	
159	18	23.6	312	4	54.7	0.00	
159	19	20.6	317	4	53.7	0.00	
159	20	19.4	315	3	51.7	0.00	
159	21	16.0	301	3	50.6	0.00	
159	22	15.0	297	3	49.8	0.00	
159	23	10.3	289	3	46.8	0.00	
159	24	12.3	287	2	46.0	0.00	
160	1	15.3	284	2	46.1	0.00	

160	2	14.2	285	2	46.0	0.00
160	3	12.8	291	2	46.7	0.00
160	4	12.4	297	3	47.8	0.00
160	5	11.1	294	3	47.4	0.00
160	6	13.5	309	3	49.5	0.00
160	7	17.4	304	4	52.7	0.00
160	8	15.7	307	6	54.8	0.00
160	9	14.9	318	8	57.2	0.00
160	10	14.1	317	9	59.5	0.00
160	11	13.5	315	11	61.4	0.00
160	12	12.9	311	10	62.6	0.00
160	13	11.0	307	15	63.1	0.00
160	14	8.3	290	13	63.9	0.00
160	15	6.5	297	32	65.3	0.00
160	16	4.4	221	27	65.5	0.00
160	17	3.1	249	53	67.0	0.00
160	18	3.6	191	36	66.7	0.00
160	19	4.6	116	11	64.8	0.00
160	20	6.1	120	3	59.2	0.00
160	21	6.6	132	4	55.3	0.00
160	22	8.1	150	5	53.8	0.00
160	23	5.3	180	9	51.7	0.00
160	24	7.2	181	3	49.7	0.00
161	1	7.3	194	8	48.6	0.00
161	2	6.2	175	9	47.8	0.00
161	3	5.4	185	10	46.7	0.00
161	4	4.0	201	13	47.1	0.00
161	5	5.3	186	6	44.7	0.00
161	6	5.3	170	11	47.1	0.00
161	7	4.6	176	6	51.4	0.00
161	8	4.9	172	9	56.8	0.00
161	9	4.7	231	27	63.5	0.00
161	10	6.1	324	16	66.3	0.00
161	11	3.9	256	35	68.6	0.00
161	12	3.5	214	39	70.4	0.00
161	13	4.3	255	42	71.2	0.00
161	14	5.3	193	30	71.9	0.00
161	15	5.6	194	31	72.1	0.00
161	16	6.1	165	15	72.0	0.00
161	17	8.5	169	15	73.4	0.00
161	18	9.5	182	11	72.5	0.00
161	19	5.7	183	7	68.9	0.00
161	20	6.7	158	3	63.2	0.00
161	21	9.1	157	2	59.2	0.00
161	22	8.9	159	2	57.4	0.00
161	23	8.7	157	2	56.8	0.00
161	24	7.6	166	4	55.9	0.00
162	1	10.7	164	6	57.1	0.00
162	2	10.2	206	12	55.5	0.00
162	3	6.6	237	23	55.4	0.00
162	4	5.1	307	10	51.4	0.00
162	5	3.0	275	21	51.2	0.00
162	6	7.8	237	7	52.8	0.00
162	7	4.3	230	25	55.1	0.00
162	8	5.7	172	14	58.1	0.00
162	9	8.2	189	10	64.0	0.00
162	10	14.0	217	9	69.7	0.00
162	11	18.2	217	8	72.9	0.00
162	12	22.8	220	7	73.5	0.00
162	13	21.0	231	7	74.0	0.00
162	14	19.9	234	10	75.2	0.00
162	15	19.0	237	8	75.8	0.00
162	16	15.0	247	7	75.3	0.00
162	17	7.5	243	6	72.5	0.00
162	18	10.2	208	7	69.6	0.00
162	19	14.3	212	4	67.2	0.00
162	20	13.9	210	4	64.1	0.00
162	21	11.3	191	4	61.3	0.00
162	22	11.5	184	4	60.0	0.00
162	23	12.9	184	4	58.2	0.00
162	24	13.1	182	4	58.1	0.00
163	1	13.3	175	4	59.4	0.00
163	2	12.5	161	7	58.2	0.00
163	3	9.9	229	35	57.6	0.00
163	4	6.7	159	17	54.1	0.00

163	5	6.8	183	19	52.2	0.00	
163	6	6.2	195	19	54.3	0.00	
163	7	5.2	258	17	54.9	0.00	
163	8	6.7	270	6	57.4	0.00	
163	9	11.0	267	5	61.0	0.00	
163	10	12.9	262	5	64.4	0.00	
163	11	13.5	264	5	67.6	0.00	
163	12	15.1	259	5	67.9	0.00	
163	13	14.8	258	5	67.8	0.00	
163	14	16.1	314	19	65.2	0.00	
163	15	16.7	9	24	61.1	0.00	
163	16	10.7	15	29	63.1	0.00	
163	17	9.9	33	25	62.8	0.00	
163	18	9.2	62	19	61.3	0.00	
163	19	8.8	69	6	58.7	0.00	
163	20	5.1	64	5	54.8	0.00	* (D) ***
163	21	2.4	109	29	51.8	0.00	* (D) ***
163	22	4.1	343	17	48.0	0.00	
163	23	6.2	273	3	46.0	0.00	
163	24	6.7	273	3	44.2	0.00	
164	1	5.8	269	3	43.4	0.00	
164	2	6.7	272	4	41.1	0.00	
164	3	7.1	268	2	40.7	0.00	
164	4	2.7	257	4	40.1	0.00	* (D) **
164	5	4.6	234	20	38.0	0.00	
164	6	6.1	201	10	42.0	0.00	
164	7	3.8	259	12	50.8	0.00	
164	8	7.7	278	6	54.8	0.00	
164	9	13.7	281	6	57.4	0.00	
164	10	12.3	281	7	58.8	0.00	
164	11	10.4	278	8	60.2	0.00	
164	12	9.4	275	15	61.8	0.00	
164	13	6.8	249	31	62.8	0.00	
164	14	5.3	274	43	64.8	0.00	
164	15	6.1	294	45	66.7	0.00	
164	16	8.6	326	39	67.0	0.00	
164	17	10.7	307	25	66.6	0.00	
164	18	13.0	310	15	65.2	0.00	
164	19	10.9	314	14	62.8	0.00	
164	20	8.9	314	6	57.4	0.00	
164	21	7.9	309	5	52.1	0.00	
164	22	7.8	294	3	48.4	0.00	
164	23	9.2	304	3	47.6	0.00	
164	24	3.9	22	22	47.1	0.00	* (D) ***
165	1	1.2	344	24	45.7	0.00	* (D) ***
165	2	1.7	255	3	44.0	0.00	* (D) **
165	3	2.5	270	16	43.4	0.00	
165	4	3.8	274	5	42.1	0.00	
165	5	4.3	262	6	40.5	0.00	
165	6	3.2	237	42	44.4	0.00	* (D) **
165	7	3.1	216	59	50.8	0.00	* (D) **
165	8	2.8	315	50	56.6	0.00	* (D) **
165	9	3.6	16	24	58.9	0.00	* (D) **
165	10	4.2	25	30	60.8	0.00	* (D) **
165	11	4.2	288	31	62.8	0.00	* (D) **
165	12	3.7	257	63	65.0	0.00	* (D) **
165	13	5.4	99	52	66.6	0.00	* (D) **
165	14	7.5	148	36	68.2	0.00	* (D) **
165	15	7.8	123	30	69.8	0.00	* (D) **
165	16	9.8	136	16	70.3	0.00	* (D) **
165	17	11.2	114	12	70.5	0.00	
165	18	11.9	107	8	70.1	0.00	
165	19	12.7	104	4	67.9	0.00	
165	20	12.7	101	2	63.8	0.00	
165	21	12.8	103	3	61.3	0.00	
165	22	15.2	110	5	60.4	0.00	
165	23	16.6	111	5	58.2	0.00	
165	24	19.4	110	5	56.4	0.00	
166	1	25.7	109	4	55.9	0.00	
166	2	25.0	109	4	54.8	0.00	
166	3	24.4	111	5	54.0	0.00	
166	4	21.2	116	6	53.3	0.00	
166	5	18.5	149	20	53.2	0.00	
166	6	15.8	138	11	52.3	0.00	
166	7	14.8	157	20	53.8	0.00	

166	8	12.6	104	5	58.1	0.00	
166	9	10.5	96	4	63.1	0.00	
166	10	9.1	104	9	66.6	0.00	
166	11	11.1	161	22	70.4	0.00	
166	12	6.6	185	38	73.4	0.00	
166	13	5.1	225	44	76.7	0.00	
166	14	5.9	259	20	78.7	0.00	
166	15	6.9	299	36	79.1	0.00	
166	16	18.9	6	25	68.8	0.37	
166	17	27.1	11	37	62.6	0.21	* (C,D,F) ***
166	18	29.1	21	15	58.1	0.11	* (C,D,F,G) **
166	19	20.9	47	7	59.0	0.00	* (C,D,F,G) **
166	20	15.3	86	4	58.6	0.00	* (C,D,F,G) **
166	21	6.70	279	32	57.4	0.00	* (C,D,F,G) **
166	22	12.6	281	4	54.8	0.00	
166	23	12.8	280	2	54.3	0.00	
166	24	12.8	324	15	55.5	0.00	
167	1	4.5	328	33	54.5	0.00	
167	2	5.3	235	36	54.2	0.00	
167	3	6.4	227	22	54.3	0.00	
167	4	8.3	315	21	54.9	0.00	
167	5	7.4	280	15	54.3	0.02	
167	6	8.6	43	21	54.4	0.04	
167	7	9.1	317	26	54.2	0.01	
167	8	11.2	291	12	54.9	0.00	
167	9	11.6	331	25	57.2	0.00	
167	10	9.6	358	29	56.9	0.00	
167	11	9.6	9	30	58.9	0.00	
167	12	10.9	312	20	59.0	0.00	
167	13	19.6	353	17	59.5	0.02	
167	14	16.2	31	16	59.1	0.00	
167	15	17.6	346	19	55.1	0.00	
167	16	20.1	78	6	54.1	0.02	
167	17	10.6	40	20	54.5	0.01	
167	18	12.7	331	16	53.7	0.10	
167	19	12.6	48	12	53.2	0.12	
167	20	14.4	39	10	51.3	0.01	
167	21	12.3	352	21	50.6	0.01	
167	22	18.4	5	16	49.9	0.02	
167	23	21.5	24	13	47.8	0.01	
167	24	20.4	359	18	47.1	0.02	
168	1	17.9	30	11	46.5	0.02	
168	2	14.3	13	15	46.5	0.00	
168	3	15.9	14	16	46.0	0.02	
168	4	16.9	356	16	45.5	0.05	
168	5	17.2	349	14	45.2	0.03	
168	6	16.7	346	15	45.2	0.02	
168	7	13.9	19	13	45.5	0.07	
168	8	13.0	50	10	47.4	0.05	
168	9	11.9	51	11	48.7	0.00	
168	10	10.7	60	12	49.4	0.00	
168	11	9.0	23	23	49.4	0.00	
168	12	9.7	4	25	49.4	0.03	
168	13	12.6	344	20	49.1	0.02	
168	14	13.9	19	18	49.4	0.00	
168	15	13.3	47	10	50.2	0.00	
168	16	13.0	52	9	49.3	0.00	
168	17	11.9	62	7	48.2	0.00	
168	18	9.7	53	10	47.9	0.00	
168	19	9.3	58	6	47.6	0.00	
168	20	8.9	52	10	47.4	0.00	
168	21	8.6	67	5	46.9	0.00	
168	22	7.2	46	9	46.8	0.00	
168	23	5.3	15	21	46.5	0.00	
168	24	2.5	79	13	46.3	0.01	
169	1	2.0	96	8	46.2	0.02	
169	2	2.5	112	8	46.0	0.00	
169	3	3.1	338	10	46.1	0.01	
169	4	2.7	234	14	46.4	0.00	
169	5	1.9	257	13	46.7	0.00	
169	6	1.3	231	25	47.1	0.00	
169	7	1.8	157	21	47.6	0.00	
169	8	4.4	199	21	48.4	0.03	
169	9	2.9	188	30	49.5	0.02	
169	10	3.1	149	33	50.2	0.00	

169	11	4.5	127	20	51.0	0.00
169	12	2.6	201	43	52.2	0.00
169	13	2.2	110	19	52.2	0.00
169	14	3.1	104	18	52.7	0.01
169	15	4.7	130	14	53.2	0.00
169	16	8.5	164	6	52.4	0.00
169	17	5.7	163	8	52.4	0.01
169	18	6.2	159	6	52.6	0.02
169	19	6.7	160	4	52.8	0.01
169	20	7.5	150	4	52.1	0.00
169	21	6.6	152	4	50.3	0.00
169	22	5.9	167	5	48.2	0.00
169	23	7.0	168	4	47.5	0.00
169	24	7.2	174	4	47.2	0.00
170	1	7.8	171	3	46.3	0.00
170	2	9.3	168	3	45.6	0.00
170	3	8.5	175	3	44.5	0.00
170	4	4.7	163	12	43.9	0.00
170	5	6.0	166	10	44.4	0.00
170	6	4.2	166	8	44.3	0.00
170	7	2.5	164	18	48.8	0.00
170	8	2.1	280	39	56.1	0.00
170	9	5.6	292	15	61.2	0.00
170	10	8.3	313	12	65.3	0.00
170	11	6.8	318	15	67.5	0.00
170	12	6.1	313	24	69.0	0.00
170	13	6.7	310	21	70.5	0.00
170	14	6.5	305	21	72.0	0.00
170	15	7.1	290	20	72.6	0.00
170	16	6.7	305	15	73.9	0.00
170	17	7.7	311	12	74.4	0.00
170	18	5.9	304	13	74.1	0.00
170	19	4.0	252	10	71.9	0.00
170	20	3.5	221	5	68.3	0.00
170	21	4.8	195	4	63.9	0.00
170	22	5.7	180	4	59.8	0.00
170	23	4.8	173	9	56.8	0.00
170	24	6.2	174	10	54.8	0.00
171	1	7.2	175	4	53.9	0.00
171	2	5.4	169	4	52.6	0.00
171	3	5.5	170	12	53.0	0.00
171	4	7.1	186	4	51.5	0.00
171	5	5.9	217	23	51.9	0.00
171	6	4.2	128	26	54.8	0.00
171	7	4.3	175	15	59.4	0.00
171	8	6.0	177	7	65.3	0.00
171	9	4.6	156	13	70.6	0.00
171	10	3.8	112	14	74.6	0.00
171	11	4.5	102	14	76.7	0.00
171	12	4.9	98	17	78.5	0.00
171	13	6.0	110	21	80.0	0.00
171	14	6.9	157	18	80.3	0.00
171	15	6.5	151	15	81.3	0.00
171	16	6.7	149	18	81.9	0.00
171	17	8.4	147	11	81.3	0.00
171	18	7.4	140	8	80.4	0.00
171	19	6.8	128	3	76.7	0.00
171	20	6.5	120	5	70.8	0.00
171	21	7.3	132	7	66.6	0.00
171	22	7.0	132	7	64.7	0.00
171	23	10.5	349	5	64.1	0.00
171	24	13.2	259	4	63.5	0.00
172	1	10.7	154	3	61.5	0.00
172	2	9.9	146	5	60.7	0.00
172	3	12.5	154	3	60.2	0.00
172	4	10.2	155	4	59.2	0.00
172	5	6.8	167	10	58.2	0.00
172	6	10.1	151	6	62.4	0.00
172	7	6.0	154	11	65.8	0.00
172	8	12.6	150	6	69.0	0.00
172	9	15.2	140	6	72.0	0.00
172	10	16.8	132	7	75.3	0.00
172	11	16.3	147	8	75.6	0.00
172	12	19.5	151	7	77.9	0.00
172	13	20.7	162	7	80.4	0.00

172	14	20.1	153	7	81.8	0.00
172	15	19.3	202	9	82.6	0.00
172	16	22.7	150	8	75.6	0.00
172	17	23.6	156	6	69.0	0.00
172	18	17.8	263	7	70.2	0.00
172	19	16.6	34	11	68.7	0.00
172	20	21.0	150	9	65.2	0.00
172	21	21.5	147	4	62.8	0.00
172	22	21.8	166	6	61.3	0.00
172	23	18.1	161	4	59.6	0.00
172	24	15.5	159	4	57.5	0.00
173	1	13.1	167	4	56.3	0.00
173	2	12.3	169	6	56.1	0.00
173	3	11.1	175	6	54.9	0.00
173	4	10.4	177	6	53.8	0.00
173	5	12.9	181	4	53.5	0.00
173	6	12.1	181	4	57.6	0.00
173	7	11.3	196	4	62.1	0.00
173	8	12.4	215	7	68.1	0.00
173	9	12.9	242	9	70.9	0.00
173	10	9.2	297	15	72.4	0.00
173	11	8.2	309	19	73.1	0.00
173	12	5.9	328	29	73.2	0.00
173	13	8.2	335	20	68.4	0.07
173	14	2.9	283	39	66.6	0.17
173	15	19.0	310	20	56.6	0.23
173	16	14.0	5	13	61.0	0.06
173	17	11.6	41	9	61.1	0.00
173	18	10.5	65	9	60.8	0.00
173	19	6.8	94	7	59.9	0.00
173	20	4.2	114	6	56.6	0.00
173	21	3.2	75	12	54.9	0.00
173	22	3.9	27	15	53.1	0.00
173	23	2.5	213	30	52.2	0.00
173	24	6.1	284	15	50.9	0.00
174	1	5.1	302	10	49.9	0.00
174	2	9.3	331	6	50.8	0.00
174	3	7.1	337	9	50.4	0.00
174	4	7.0	325	4	49.0	0.00
174	5	6.1	316	5	48.0	0.00
174	6	7.9	304	5	48.9	0.00
174	7	7.9	295	6	49.9	0.00
174	8	8.0	277	10	51.3	0.00
174	9	9.2	268	9	52.8	0.00
174	10	11.2	281	11	55.6	0.00
174	11	10.9	288	9	57.6	0.00
174	12	13.1	319	11	58.6	0.00
174	13	21.2	332	7	54.5	0.00
174	14	28.7	332	4	48.1	0.00
174	15	28.0	329	4	44.3	0.00
174	16	14.5	332	8	49.4	0.00
174	17	22.1	320	6	52.5	0.00
174	18	25.1	321	5	52.3	0.00
174	19	20.3	317	3	48.7	0.00
174	20	8.9	296	4	44.0	0.00
174	21	9.8	281	3	41.7	0.00
174	22	8.6	272	3	40.3	0.00
174	23	7.0	252	5	39.6	0.00
174	24	9.5	241	3	40.6	0.00
175	1	5.9	286	14	37.5	0.00
175	2	4.9	197	15	35.3	0.00
175	3	8.6	227	6	37.9	0.00
175	4	14.2	250	3	42.2	0.00
175	5	13.5	260	3	43.9	0.00
175	6	12.4	268	3	44.7	0.00
175	7	12.7	262	4	46.9	0.00
175	8	13.1	273	4	49.8	0.00
175	9	14.3	284	5	52.0	0.00
175	10	12.6	283	8	55.3	0.00
175	11	12.1	276	13	57.9	0.00
175	12	14.9	280	11	59.0	0.00
175	13	16.6	299	9	58.9	0.00
175	14	19.4	312	8	60.0	0.00
175	15	20.4	312	7	58.7	0.00
175	16	20.4	310	6	57.8	0.00

175	17	20.0	307	5	58.1	0.00
175	18	19.4	315	5	57.8	0.00
175	19	15.7	321	4	55.9	0.00
175	20	12.4	313	4	53.0	0.00
175	21	9.7	305	4	51.4	0.00
175	22	7.1	300	6	50.9	0.00
175	23	7.6	299	5	49.9	0.00
175	24	7.3	279	6	49.0	0.00
176	1	9.3	274	5	49.3	0.00
176	2	12.2	300	3	49.8	0.00
176	3	9.4	285	4	48.3	0.00
176	4	8.9	278	3	46.4	0.00
176	5	8.2	284	3	44.4	0.00
176	6	7.4	280	3	46.7	0.00
176	7	10.5	286	4	50.6	0.00
176	8	11.9	301	6	54.0	0.00
176	9	15.4	306	9	57.9	0.00
176	10	17.2	311	7	59.3	0.00
176	11	17.0	303	11	61.2	0.00
176	12	14.1	301	13	62.6	0.00
176	13	11.7	285	14	63.2	0.00
176	14	10.4	286	13	64.8	0.00
176	15	7.7	290	21	66.1	0.00
176	16	8.2	287	19	67.0	0.00
176	17	7.4	291	18	67.5	0.00
176	18	6.6	310	14	67.7	0.00
176	19	6.0	330	7	66.3	0.00
176	20	5.1	335	5	60.8	0.00
176	21	2.6	246	19	57.8	0.00
176	22	2.7	223	13	55.6	0.00
176	23	5.7	210	4	53.8	0.00
176	24	6.7	198	13	50.2	0.00
177	1	9.5	203	7	49.7	0.00
177	2	7.5	194	6	49.8	0.00
177	3	3.9	173	19	47.1	0.00
177	4	3.6	150	12	44.6	0.00
177	5	3.1	157	26	45.2	0.00
177	6	2.2	218	30	49.4	0.00
177	7	2.9	57	16	54.6	0.00
177	8	3.2	78	17	59.3	0.00
177	9	2.3	279	35	65.0	0.00
177	10	2.5	179	35	69.8	0.00
177	11	3.8	244	43	71.9	0.00
177	12	4.6	201	47	74.3	0.00
177	13	4.6	222	41	76.1	0.00
177	14	5.0	212	37	77.5	0.00
177	15	4.5	202	44	78.7	0.00
177	16	3.5	180	37	79.6	0.00
177	17	2.9	264	48	80.5	0.00
177	18	2.9	286	41	80.4	0.00
177	19	11.5	73	6	73.8	0.00
177	20	8.1	74	4	68.1	0.00
177	21	4.6	91	6	63.8	0.00
177	22	6.1	138	18	61.4	0.00
177	23	13.6	3	15	63.7	0.00
177	24	11.7	87	8	60.6	0.00
178	1	7.7	117	8	58.3	0.00
178	2	6.7	164	7	56.5	0.00
178	3	8.2	158	3	55.4	0.00
178	4	10.4	153	3	55.9	0.00
178	5	9.6	153	4	56.4	0.00
178	6	11.1	167	4	59.0	0.00
178	7	11.5	166	5	61.8	0.00
178	8	9.3	169	6	63.5	0.00
178	9	8.1	200	12	69.2	0.00
178	10	8.9	285	14	73.4	0.00
178	11	7.4	250	15	74.2	0.00
178	12	9.1	230	13	76.3	0.00
178	13	6.9	229	12	78.2	0.00
178	14	5.3	252	12	78.3	0.00
178	15	3.5	335	17	79.5	0.00
178	16	3.7	32	23	81.7	0.00
178	17	3.5	188	26	80.4	0.00
178	18	5.6	86	10	78.7	0.00
178	19	5.4	91	5	75.0	0.00

178	20	4.7	113	7	72.0	0.00
178	21	6.3	197	13	70.0	0.00
178	22	3.6	173	22	67.1	0.00
178	23	2.8	198	33	66.4	0.00
178	24	6.6	139	16	59.3	0.00
179	1	5.9	164	19	59.5	0.00
179	2	5.7	191	17	58.5	0.00
179	3	6.6	184	10	55.9	0.00
179	4	9.0	175	10	55.5	0.00
179	5	9.7	164	8	53.5	0.00
179	6	10.5	181	9	58.4	0.00
179	7	18.1	163	5	59.9	0.00
179	8	19.0	156	5	62.2	0.00
179	9	18.8	158	6	64.9	0.00
179	10	20.7	157	7	68.2	0.00
179	11	19.8	156	6	69.7	0.00
179	12	15.3	160	9	73.5	0.00
179	13	14.2	150	11	77.1	0.00
179	14	15.3	141	11	79.4	0.00
179	15	17.9	144	9	80.1	0.00
179	16	20.1	137	7	81.4	0.00
179	17	23.8	127	6	81.2	0.00
179	18	27.2	130	5	80.1	0.00
179	19	26.6	129	4	77.2	0.00
179	20	26.1	171	4	73.0	0.00
179	21	25.4	135	4	70.6	0.00
179	22	22.8	331	12	70.2	0.00
179	23	14.9	275	20	67.9	0.00
179	24	13.3	343	22	62.9	0.00
180	1	14.1	32	14	63.3	0.00
180	2	5.7	22	13	57.6	0.00
180	3	4.4	80	14	55.4	0.00
180	4	4.2	311	17	52.2	0.00
180	5	8.8	293	7	51.2	0.00
180	6	16.3	314	5	54.3	0.00
180	7	21.4	334	5	55.9	0.00
180	8	18.9	334	4	57.3	0.00
180	9	22.8	303	18	53.4	0.20
180	10	21.4	321	10	49.9	0.03
180	11	18.4	325	5	56.5	0.02
180	12	15.3	324	8	61.6	0.00
180	13	14.6	312	11	63.3	0.00
180	14	12.5	329	11	63.6	0.00
180	15	15.3	349	15	63.1	0.00
180	16	13.1	23	13	63.1	0.00
180	17	11.4	31	13	63.3	0.00
180	18	13.4	36	10	62.1	0.00
180	19	11.7	26	5	60.0	0.00
180	20	7.4	32	9	56.8	0.00
180	21	5.0	2	25	56.3	0.00
180	22	6.6	360	12	55.1	0.00
180	23	5.7	4	14	53.2	0.00
180	24	4.6	295	16	52.5	0.00
181	1	5.1	297	18	53.2	0.00
181	2	4.2	275	38	53.1	0.04
181	3	4.9	281	38	53.4	0.01
181	4	5.0	132	9	53.3	0.00
181	5	5.9	278	17	51.8	0.00
181	6	5.3	284	6	51.8	0.00
181	7	3.0	224	20	53.8	0.00
181	8	3.4	108	14	56.7	0.01
181	9	5.7	155	16	60.5	0.00
181	10	5.2	208	26	62.0	0.00
181	11	4.6	205	25	64.5	0.00
181	12	5.0	195	29	66.7	0.00
181	13	5.0	210	37	68.3	0.00
181	14	4.9	228	44	70.5	0.00
181	15	3.5	254	46	70.9	0.00
181	16	4.2	196	39	70.9	0.00
181	17	4.8	237	33	71.9	0.00
181	18	5.8	110	20	71.7	0.00
181	19	8.1	91	4	67.9	0.00
181	20	8.3	97	2	63.0	0.00
181	21	7.2	105	4	61.8	0.00
181	22	6.6	127	6	61.5	0.00

181	23	8.4	135	4	60.2	0.00
181	24	10.9	146	5	60.0	0.00
182	1	18.1	147	4	59.0	0.00
182	2	12.9	152	5	57.6	0.00
182	3	10.2	209	12	55.5	0.00
182	4	7.6	285	17	56.1	0.00
182	5	8.5	320	8	51.7	0.00
182	6	10.9	324	5	52.3	0.00
182	7	11.6	338	5	55.2	0.00
182	8	9.9	338	10	58.7	0.00
182	9	13.7	336	7	61.8	0.00
182	10	11.4	342	12	63.8	0.00
182	11	8.7	326	12	65.7	0.00
182	12	6.2	335	25	67.0	0.00
182	13	4.4	342	43	68.4	0.00
182	14	3.1	259	52	70.5	0.00
182	15	3.4	265	45	71.4	0.00
182	16	4.7	239	34	72.2	0.00
182	17	3.0	217	36	73.1	0.00
182	18	6.0	48	27	72.0	0.00
182	19	9.1	80	5	69.2	0.00
182	20	8.6	71	6	64.9	0.00
182	21	6.5	87	4	60.7	0.00
182	22	6.0	51	9	58.9	0.00
182	23	9.8	118	9	59.3	0.00
182	24	5.0	43	17	57.7	0.00
183	1	2.8	146	20	57.3	0.00
183	2	5.2	143	12	54.4	0.00
183	3	5.5	38	12	53.6	0.00
183	4	5.6	90	9	52.1	0.00
183	5	2.6	113	6	52.4	0.00
183	6	2.9	46	11	57.4	0.00
183	7	10.5	167	8	59.9	0.00
183	8	15.2	164	6	63.4	0.00
183	9	12.8	152	6	62.1	0.00
183	10	18.2	155	7	69.4	0.00
183	11	20.8	148	7	70.8	0.00
183	12	22.3	149	7	72.4	0.00
183	13	21.7	147	6	74.0	0.00
183	14	20.8	255	8	75.6	0.00
183	15	19.9	257	10	76.8	0.00
183	16	21.4	128	7	76.2	0.00
183	17	23.5	124	5	75.7	0.00
183	18	19.8	108	5	73.9	0.00
183	19	19.0	191	11	75.9	0.00
183	20	19.3	352	18	71.0	0.00
183	21	13.2	213	16	67.6	0.00
183	22	17.0	235	10	65.1	0.00
183	23	18.5	139	6	64.0	0.00
183	24	15.9	349	7	62.9	0.00
184	1	8.4	188	12	61.0	0.00
184	2	7.5	175	11	60.8	0.00
184	3	5.2	160	11	61.3	0.00
184	4	3.3	132	31	62.3	0.00
184	5	6.1	169	14	62.7	0.00
184	6	15.6	313	18	56.4	0.00
184	7	18.7	311	5	55.0	0.00
184	8	21.1	312	4	55.0	0.00
184	9	17.7	313	5	55.5	0.00
184	10	12.0	292	7	54.4	0.00
184	11	6.6	334	17	57.2	0.00
184	12	11.2	232	21	61.0	0.00
184	13	24.8	216	13	65.1	0.00
184	14	28.4	250	8	65.6	0.00
184	15	31.0	260	8	64.7	0.00
184	16	29.4	265	7	63.6	0.00
184	17	28.4	263	7	62.7	0.00
184	18	20.5	297	9	59.9	0.00
184	19	13.7	326	5	54.0	0.00
184	20	8.8	300	5	50.0	0.00
184	21	13.3	297	4	50.3	0.00
184	22	18.7	295	4	51.0	0.00
184	23	26.5	289	4	49.5	0.00
184	24	21.5	289	4	47.6	0.00
185	1	24.0	295	4	48.5	0.00

185	2	25.0	295	4	49.6	0.00
185	3	22.5	292	4	49.6	0.00
185	4	21.3	299	4	50.3	0.00
185	5	23.2	295	4	51.4	0.00
185	6	18.7	291	4	52.0	0.00
185	7	20.1	289	4	52.5	0.00
185	8	22.6	292	5	55.7	0.00
185	9	26.8	295	6	58.7	0.00
185	10	24.4	289	6	58.4	0.00
185	11	19.8	282	6	56.9	0.00
185	12	18.1	288	6	59.8	0.01
185	13	22.2	307	9	63.0	0.00
185	14	27.4	309	7	63.8	0.00
185	15	21.5	296	6	60.2	0.01
185	16	22.1	312	7	63.8	0.00
185	17	21.4	313	5	63.0	0.00
185	18	16.6	309	5	61.0	0.00
185	19	19.5	319	5	57.6	0.00
185	20	15.6	305	3	55.9	0.00
185	21	9.0	295	3	52.8	0.00
185	22	7.7	280	5	48.7	0.00
185	23	10.7	289	3	47.5	0.00
185	24	9.6	275	3	47.9	0.00
186	1	8.7	274	3	48.1	0.00
186	2	8.8	276	3	46.5	0.00
186	3	8.2	276	2	45.4	0.00
186	4	9.4	282	2	44.6	0.00
186	5	9.1	276	3	44.9	0.00
186	6	8.4	282	5	49.8	0.00
186	7	12.7	292	8	54.7	0.00
186	8	20.5	308	5	58.0	0.00
186	9	18.9	305	6	59.9	0.00
186	10	14.5	307	8	61.5	0.00
186	11	17.4	296	8	61.2	0.00
186	12	14.9	303	10	63.1	0.00
186	13	16.4	308	10	63.1	0.00
186	14	11.9	289	12	65.8	0.00
186	15	13.3	301	11	66.5	0.00
186	16	14.4	310	9	67.3	0.00
186	17	17.9	336	10	63.3	0.00
186	18	16.0	330	5	62.4	0.00
186	19	13.9	331	5	58.8	0.00
186	20	7.7	309	9	55.7	0.00
186	21	5.2	276	9	52.8	0.00
186	22	13.9	282	5	54.0	0.00
186	23	14.0	305	5	51.3	0.03
186	24	10.5	289	4	50.6	0.01
187	1	9.2	286	4	48.4	0.00
187	2	7.1	283	3	47.1	0.00
187	3	3.8	264	20	46.3	0.00
187	4	4.3	277	14	47.2	0.00
187	5	4.1	285	18	47.2	0.00
187	6	4.2	266	13	47.9	0.00
187	7	6.2	291	7	55.0	0.00
187	8	7.6	284	10	58.0	0.00
187	9	5.6	309	22	60.5	0.00
187	10	5.5	320	27	62.4	0.00
187	11	4.2	323	35	64.3	0.00
187	12	5.3	331	47	65.9	0.00
187	13	4.9	34	31	67.1	0.00
187	14	4.5	258	42	68.8	0.00
187	15	4.7	14	45	69.7	0.00
187	16	15.9	359	24	61.4	0.00
187	17	16.6	323	12	53.0	0.02
187	18	14.3	317	10	51.2	0.00
187	19	11.1	323	8	51.0	0.00
187	20	4.4	16	22	50.1	0.00
187	21	7.8	283	8	49.6	0.00
187	22	10.8	299	3	49.6	0.00
187	23	7.7	292	5	49.4	0.00
187	24	6.2	284	5	50.0	0.00
188	1	5.0	276	7	48.9	0.01
188	2	6.4	246	8	47.4	0.00
188	3	6.8	271	6	46.2	0.00
188	4	8.0	258	4	47.1	0.00

188	5	3.6	271	19	46.9	0.00
188	6	3.3	227	26	48.9	0.00
188	7	1.6	299	36	54.4	0.00
188	8	3.3	250	31	58.5	0.00
188	9	4.7	178	29	60.7	0.00
188	10	8.8	196	22	62.8	0.00
188	11	8.9	195	16	64.7	0.00
188	12	7.8	202	21	67.1	0.00
188	13	9.3	213	23	69.6	0.00
188	14	10.0	216	20	72.0	0.00
188	15	11.5	220	23	73.6	0.00
188	16	17.7	260	9	74.1	0.00
188	17	15.4	282	9	73.8	0.00
188	18	11.3	302	7	73.4	0.00
188	19	7.3	341	12	70.6	0.00
188	20	14.0	358	9	59.4	0.00
188	21	17.4	349	9	55.2	0.00
188	22	12.5	359	10	53.3	0.00
188	23	11.9	337	5	51.7	0.00
188	24	10.1	359	12	51.3	0.00
189	1	9.3	328	4	47.7	0.00
189	2	8.8	329	9	46.4	0.00
189	3	7.9	319	4	44.1	0.00
189	4	7.4	312	4	44.7	0.00
189	5	7.9	314	5	47.6	0.00
189	6	8.7	315	6	49.6	0.00
189	7	10.4	326	4	53.7	0.00
189	8	13.6	333	5	57.2	0.00
189	9	14.4	336	7	59.9	0.00
189	10	13.0	335	8	61.7	0.00
189	11	12.3	337	11	63.1	0.00
189	12	11.5	344	16	64.8	0.00
189	13	11.8	328	13	64.8	0.00
189	14	14.0	320	11	62.7	0.00
189	15	5.8	280	31	62.4	0.00
189	16	10.3	320	15	65.8	0.00
189	17	10.3	307	9	65.4	0.00
189	18	9.4	315	8	65.4	0.00
189	19	7.2	323	6	63.9	0.00
189	20	7.6	336	2	58.4	0.00
189	21	9.0	329	7	54.1	0.00
189	22	6.6	355	9	50.4	0.00
189	23	5.8	295	17	49.8	0.00
189	24	3.5	259	13	47.2	0.00
190	1	5.1	243	16	45.7	0.00
190	2	7.0	194	14	44.5	0.00
190	3	5.9	172	8	42.8	0.00
190	4	6.1	178	15	43.0	0.00
190	5	4.6	156	18	42.4	0.00
190	6	4.8	169	12	46.9	0.00
190	7	7.0	186	7	54.2	0.00
190	8	9.1	171	10	61.4	0.00
190	9	12.4	167	8	65.7	0.00
190	10	14.4	171	10	68.2	0.00
190	11	13.9	161	10	69.6	0.00
190	12	12.6	161	12	71.7	0.00
190	13	12.3	330	19	72.7	0.00
190	14	9.5	306	26	73.9	0.00
190	15	10.8	219	20	77.2	0.00
190	16	9.6	236	16	77.6	0.00
190	17	6.6	208	18	77.8	0.00
190	18	6.5	231	14	77.6	0.00
190	19	7.6	251	5	73.9	0.00
190	20	2.8	277	14	68.5	0.00
190	21	3.8	265	18	63.8	0.00
190	22	7.0	309	15	59.3	0.00
190	23	13.1	310	33	58.7	0.00
190	24	14.8	341	10	54.3	0.00
191	1	12.0	335	6	51.2	0.00
191	2	11.0	322	3	49.9	0.00
191	3	12.5	325	4	49.9	0.00
191	4	12.7	337	7	50.3	0.00
191	5	13.6	343	8	50.3	0.00
191	6	13.2	349	12	51.0	0.00
191	7	15.9	334	6	51.6	0.00

191	8	14.8	341	10	52.9	0.00
191	9	13.4	20	11	54.7	0.00
191	10	9.9	81	13	57.4	0.00
191	11	9.4	25	21	61.9	0.00
191	12	9.1	25	20	63.7	0.00
191	13	11.9	7	17	64.7	0.00
191	14	16.6	352	15	63.6	0.00
191	15	18.6	16	11	62.8	0.00
191	16	19.2	20	9	61.5	0.00
191	17	20.0	21	7	60.5	0.00
191	18	19.4	9	8	57.2	0.00
191	19	19.5	358	11	53.7	0.00
191	20	15.6	3	9	52.2	0.00
191	21	10.3	354	12	52.1	0.00
191	22	9.0	338	6	50.8	0.00
191	23	9.6	341	9	49.3	0.00
191	24	9.2	317	5	46.2	0.00
192	1	5.1	279	13	44.1	0.00
192	2	4.4	290	11	43.6	0.00
192	3	4.2	264	15	43.2	0.00
192	4	4.5	223	12	42.3	0.00
192	5	1.6	322	25	42.2	0.00
192	6	2.9	214	22	44.0	0.00
192	7	3.1	158	16	49.4	0.00
192	8	5.3	136	19	53.9	0.00
192	9	6.8	146	15	57.3	0.00
192	10	9.6	140	13	60.4	0.00
192	11	11.0	151	14	61.6	0.00
192	12	12.4	322	18	63.2	0.00
192	13	12.8	21	17	64.5	0.00
192	14	12.8	34	20	66.9	0.00
192	15	13.1	104	17	69.3	0.00
192	16	11.9	38	21	70.7	0.00
192	17	13.0	123	13	71.6	0.00
192	18	16.3	118	6	70.2	0.00
192	19	16.5	119	5	67.5	0.00
192	20	14.4	113	4	63.9	0.00
192	21	11.6	108	4	61.3	0.00
192	22	13.2	113	3	59.9	0.00
192	23	14.0	127	4	58.5	0.00
192	24	14.3	98	6	57.5	0.00
193	1	18.0	142	6	56.9	0.00
193	2	16.8	147	5	55.9	0.00
193	3	12.8	150	5	55.3	0.00
193	4	13.9	146	4	55.9	0.00
193	5	14.2	157	4	57.7	0.00
193	6	12.6	170	5	58.8	0.00
193	7	12.2	166	5	61.1	0.00
193	8	11.7	191	9	64.2	0.00
193	9	12.7	173	11	68.5	0.00
193	10	11.3	191	13	74.0	0.00
193	11	6.4	257	18	77.9	0.00
193	12	6.8	288	25	79.6	0.00
193	13	13.4	320	8	75.3	0.00
193	14	16.4	333	10	76.9	0.00
193	15	16.1	336	10	76.2	0.00
193	16	16.0	347	13	74.5	0.00
193	17	17.6	10	13	71.2	0.00
193	18	18.0	357	12	67.1	0.00
193	19	19.1	352	12	64.2	0.00
193	20	17.6	347	11	60.8	0.00
193	21	21.0	330	4	59.1	0.00
193	22	18.0	332	4	57.2	0.00
193	23	19.1	331	4	55.4	0.00
193	24	18.7	332	3	53.6	0.00
194	1	15.3	330	3	53.1	0.00
194	2	13.4	313	6	50.8	0.00
194	3	14.1	327	4	49.9	0.00
194	4	12.5	325	4	49.4	0.00
194	5	11.1	327	5	49.6	0.00
194	6	14.3	332	5	50.4	0.00
194	7	12.9	342	8	51.3	0.00
194	8	10.5	7	15	50.3	0.00
194	9	8.8	6	17	50.8	0.00
194	10	7.4	7	20	51.5	0.00

194	11	7.9	16	18	52.9	0.00
194	12	9.3	27	20	54.4	0.00
194	13	12.3	11	18	56.6	0.00
194	14	12.2	21	16	57.1	0.00
194	15	11.8	23	17	59.4	0.00
194	16	11.5	25	16	60.0	0.00
194	17	11.6	24	17	60.9	0.00
194	18	11.9	49	10	58.5	0.00
194	19	10.2	56	8	57.8	0.00
194	20	7.9	42	6	55.1	0.00
194	21	6.6	40	5	52.0	0.00
194	22	6.9	64	6	52.0	0.00
194	23	5.9	79	5	50.9	0.00
194	24	5.7	96	9	52.9	0.00
195	1	12.1	23	6	53.8	0.00
195	2	15.2	141	6	52.5	0.00
195	3	18.9	140	5	50.8	0.00
195	4	19.9	6	6	51.0	0.00
195	5	20.0	99	7	50.9	0.00
195	6	24.1	222	8	51.1	0.00
195	7	23.6	243	9	50.8	0.00
195	8	24.7	182	11	50.6	0.00
195	9	23.2	159	6	52.3	0.01
195	10	26.3	187	10	53.5	0.00
195	11	34.0	351	13	59.2	0.00
195	12	29.7	231	13	61.7	0.00
195	13	29.1	241	15	62.9	0.00
195	14	22.6	259	12	62.4	0.00
195	15	22.4	143	9	64.8	0.00
195	16	21.8	170	8	64.7	0.00
195	17	21.6	150	7	62.5	0.00
195	18	25.0	206	12	63.6	0.00
195	19	23.3	243	11	62.9	0.00
195	20	22.9	170	9	60.0	0.00
195	21	18.8	187	8	57.5	0.00
195	22	21.6	158	7	57.3	0.00
195	23	21.3	151	5	58.6	0.00
195	24	19.7	152	5	60.0	0.00
196	1	17.3	173	11	61.0	0.00
196	2	14.0	217	8	60.6	0.00
196	3	6.4	340	18	59.9	0.00
196	4	10.0	118	6	59.6	0.00
196	5	6.6	122	8	59.7	0.00
196	6	7.6	357	12	60.4	0.00
196	7	9.1	124	8	61.6	0.00
196	8	9.3	139	8	63.4	0.00
196	9	13.3	165	8	67.0	0.00
196	10	8.2	159	14	67.2	0.00
196	11	5.5	176	17	68.5	0.00
196	12	4.3	181	30	72.0	0.00
196	13	6.1	195	34	75.6	0.00
196	14	4.9	224	31	77.5	0.00
196	15	4.7	330	46	79.3	0.00
196	16	10.5	19	24	78.8	0.00
196	17	17.8	16	8	75.2	0.00
196	18	22.2	354	11	69.0	0.00
196	19	22.4	352	12	63.4	0.00
196	20	22.4	346	12	62.0	0.00
196	21	20.6	14	8	59.8	0.01
196	22	17.1	335	12	59.2	0.03
196	23	16.1	8	9	59.2	0.00
196	24	14.4	16	7	59.0	0.00
197	1	11.5	27	6	58.3	0.00
197	2	10.0	10	8	58.3	0.00
197	3	10.4	4	10	58.2	0.00
197	4	9.8	340	10	57.6	0.00
197	5	9.6	338	8	57.3	0.00
197	6	12.0	335	8	56.4	0.00
197	7	11.8	337	6	55.7	0.00
197	8	12.0	344	12	55.9	0.01
197	9	11.0	324	6	55.3	0.00
197	10	11.7	324	5	55.8	0.00
197	11	7.3	324	10	57.5	0.00
197	12	7.1	311	10	59.3	0.00
197	13	7.1	298	12	62.4	0.00

197	14	5.9	309	18	66.2	0.00
197	15	5.8	5	25	67.2	0.00
197	16	10.3	342	16	68.6	0.00
197	17	16.3	334	4	66.4	0.00
197	18	18.2	341	10	62.3	0.00
197	19	14.7	7	12	57.0	0.00
197	20	12.1	24	11	54.6	0.00
197	21	11.5	19	7	53.4	0.00
197	22	11.4	1	13	53.9	0.00
197	23	8.1	28	20	52.4	0.00
197	24	8.6	359	15	51.8	0.00
198	1	8.4	339	8	51.0	0.00
198	2	10.4	330	6	51.0	0.00
198	3	11.1	357	19	52.3	0.00
198	4	9.9	61	15	51.6	0.04
198	5	8.4	85	5	51.0	0.01
198	6	4.5	290	17	51.8	0.00
198	7	5.4	249	15	55.2	0.00
198	8	6.1	203	16	58.2	0.00
198	9	7.5	167	17	61.0	0.00
198	10	7.3	197	19	63.7	0.00
198	11	9.3	189	20	66.2	0.00
198	12	9.9	315	22	68.3	0.00
198	13	11.6	299	17	69.2	0.00
198	14	12.8	203	18	71.1	0.00
198	15	14.0	305	16	71.5	0.00
198	16	15.7	16	15	71.8	0.00
198	17	14.7	245	13	67.1	0.00
198	18	13.6	358	16	62.7	0.10
198	19	11.1	108	7	64.8	0.02
198	20	8.7	137	7	61.8	0.00
198	21	9.8	129	7	60.8	0.00
198	22	8.5	331	13	59.5	0.00
198	23	10.8	85	21	60.9	0.00
198	24	8.8	74	8	57.3	0.00
199	1	4.3	63	8	57.0	0.00
199	2	2.7	31	24	57.2	0.00
199	3	5.3	296	19	58.2	0.00
199	4	3.8	98	18	58.3	0.00
199	5	2.5	13	31	58.1	0.00
199	6	3.1	337	20	57.7	0.00
199	7	8.9	284	17	59.6	0.00
199	8	14.5	310	6	60.8	0.00
199	9	16.9	319	8	61.0	0.00
199	10	17.7	326	7	62.7	0.00
199	11	15.1	332	9	64.1	0.00
199	12	12.8	331	12	65.5	0.00
199	13	11.7	334	16	66.9	0.00
199	14	11.9	333	14	68.0	0.00
199	15	12.8	336	12	69.2	0.00
199	16	14.9	340	13	69.3	0.00
199	17	15.9	347	13	68.9	0.00
199	18	15.5	360	14	67.6	0.00
199	19	14.6	11	7	64.9	0.00
199	20	9.3	353	10	60.2	0.00
199	21	4.2	335	11	55.6	0.00
199	22	4.4	349	13	53.1	0.00
199	23	5.1	48	14	52.5	0.00
199	24	6.2	45	8	50.6	0.00

APPENDIX F

COPY OF U.S. EPA/A&WMA CONFERENCE PAPER

This appendix includes a copy of a paper presented at the International Symposium on Measurements of Toxic and Related Air Pollutants, cosponsored by the U.S. EPA and the Air and Waste Management Association (A&WMA), held in Research Triangle Park, North Carolina in May 1995. The paper presents an overview of application of the ISC model to surface coal mining operations, and also presents a comparison of total emissions by source category from the Cordero Mine data base used in this evaluation.

Improvements to the Industrial Source Complex Model: Application to Surface Coal Mining Operations

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ABSTRACT

As mandated by the Clean Air Act Amendments, the Environmental Protection Agency (EPA) has been reviewing and improving the accuracy of the Industrial Source Complex (ISC2) model. Three significant modifications have been incorporated into the recently released beta version of ISCST2 model, called ISCSTDFT - a new area source algorithm, a new pit retention algorithm and dry and wet deposition algorithms. EPA has also collected emissions, meteorological and ambient air concentration data from an open pit surface coal mine. Currently, a study is being carried out to evaluate the performance of the existing and the new versions of the ISCST2 model for modeling fugitive dust emissions from a surface coal mine operation.

This paper briefly discusses the new features of the ISCSTDFT model and also describes the procedures being used for the model evaluation study. A status report along with some preliminary results has been included as well.

INTRODUCTION

The Clean Air Act Amendments, Section 234(a), require the Environmental Protection Agency (EPA) to analyze the accuracy of the Industrial Source Complex (ISC2) air quality dispersion model[1] and Compilation of Air Pollutant Emission Factors, AP-42[2] to determine the effect on the air quality of fugitive dust emissions from surface coal mines. Fugitive dust emissions from surface coal mine operations include emissions from bulldozing (coal and overburden), dragline, graders, haul trucks and other vehicles traveling on unpaved haul roads, loading and unloading of coal and overburden, scraper activity, and wind erosion at various parts of a coal mine.

The EPA's Office of Air Quality Planning and Standards (OAQPS) has also collected a comprehensive data base containing the following information: (a) 24-hour ambient air quality data for TSP (particles captured by the standard high-volume air samples) and PM-10 (particles no greater than 10 micrometers in aerodynamic diameter) from a nine-station monitoring network distributed in and around the Cordero mine in Wyoming during the period May-July 1993; (b) on-site meteorological data (including temperature, precipitation, wind speed, and wind direction) during the monitoring period; (c) time-resolved information about mine operations (source activity) during the monitoring period; (d) estimation of time-varying emission rates for all significant sources (i.e., traffic on haul roads and equipment operations associated with topsoil, overburden, and coal removal) operating during the monitoring period[3]. In addition, a statistical model evaluation protocol describing the models and data bases to be used for testing has also been published[4].

The ongoing activities in this arena include:

1. Model implementation: The Industrial Source Complex Short Term (ISCST2) model has been revised to incorporate a mine pit retention algorithm, an improved area source algorithm, new dry deposition and wet deposition algorithms. This revised model is referred to as ISCSTDFT. The model has also been modified to incorporate an hourly emissions file option for the purpose of this model evaluation study. The ISCSTDFT model is placed on the Technology Transfer Network (TTN) bulletin board for beta testing.
2. Developing improved source characterizations: A method for characterizing the source activity data in the appropriate formats for the existing and new ISCST2 models is being developed. The models will be run using those specified source activity methods.
3. Statistical model evaluation protocol: The statistical model evaluation protocol describes the modeling systems, observational data bases, statistical measures for determining model performance and evaluating model overprediction. The statistical analysis of model performance will be performed using a model evaluation software[5] that implements the statistical measures for determining model performance and evaluating model overprediction[6]. The basic test statistic is a robust estimate of the highest concentration (RHC), based on the largest concentrations within a data set. The software calculates a composite performance measure (CPM), based on the absolute fractional bias of the RHC values from the predicted and observed data sets. Differences in the CPM values between different models provide a measure of the relative performance of the models on a given data set.
4. Model evaluation: The existing ISCST2 model as well as the ISCSTDFT models will be evaluated as specified in the model evaluation protocol. The input data to the model evaluation will include the model predictions based on the source activity methods and the observed concentrations from the ambient monitoring network.

NEW COMPONENTS OF THE ISCSTDFT MODEL

Dry and Wet Deposition Algorithms

One of the new features in the ISCSTDFT model is the capability to estimate deposition of particles larger than 0.1 micrometers in diameter. The new deposition algorithm was selected as a result of a study designed to identify dry deposition models suitable for routine use. Reviews were conducted of methods for computing dry deposition velocity, plume depletion, and certain micrometeorological parameters from routinely-available observations. Several observational data bases were identified from the scientific literature and used in testing and evaluating several particle deposition velocity models. Recommendations for computing particle deposition velocity, plume depletion, and micrometeorological variables have been documented by the EPA[7].

Improved Area Source Algorithm

Another feature of the ISCSTDFT model is an improved method for estimating ground-level concentrations from area sources that are characterized by low-level releases with little buoyancy due to either momentum or temperature. The algorithm selection process included model performance evaluation studies, wind tunnel data collection and statistical comparisons[8]. As a result of this effort a numerically efficient area-source algorithm was selected[9]. This algorithm, which is based on a numerical integration of the Gaussian point source plume function over the area, provides improved treatment of source-receptor geometry and allows placement of receptors within the area source. The user can define the area source as a rotated rectangle. Another new feature incorporated in ISCSTDFT for this model evaluation study was an option to specify an initial vertical dispersion parameter (σ_{z0}) for an area source. This was done to study the differences in modeling roadways as volume sources, as traditional area sources with no initial vertical mixing ($\sigma_{z0}=0$) and as area sources with some initial vertical mixing.

Pit Retention Algorithm

A third feature of the ISCSTDFT model is the ability to account for emissions from large open pits such as those at surface coal mines. The new algorithm was developed by the EPA[10] to properly model those emissions that remain inside an open surface coal mine (i.e. pit retention). The algorithm was based *on a wind tunnel* experiment to study the dispersion of particulate matter from surface coal mines. The wind tunnel experiments demonstated the following:

1. The mass distribution of the particles escaping the top surface of an open pit is different from what is actually emitted inside the pit. The heavier particles tend to get trapped within the pit, thereby shifting the mass distribution of the emissions escaping the pit towards the smaller particle sizes.
2. The emissions from a pit show a tendency to be emitted primarily from an upwind sub-area of the pit opening. Figure 1 depicts this concept graphically. Emissions from a rectangular open pit of length L and width W will be released out of the pit from an effective sub area of length AL and width AW which are calculated as a function of the wind direction θ and the dimensions of the pit. Note that the user can define the pit source as a rotated rectangle.
3. The high level of turbulence in the pit causes the emitted particles to be initially mixed prior to exiting the pit. This was found to be particularly important for estimating impacts at receptors close to the pit.

Perry et. al.[10] defined a set of equations to account for these observations. The pit is essentially modeled as an area source (using the new area source algorithm), whose size is smaller than the actual size of the pit area. This "effective" pit is always on the upwind side of the actual pit and its size and shape is a function of the size of the pit, the depth of the pit, the wind speed and wind direction. The emission rate for each particle size category is adjusted based on an "escape fraction". The escape fraction reflects the fraction of the particle emissions for a given size category escaping the pit and is a function of the particle settling velocity and the approach wind speed. A higher settling velocity results in a lower escape fraction and therefore a lower adjusted emission rate. An initial σ_z proportional to the effective pit depth is determined. This is later factored into the standard ISCST2 σ_z calculations. The user can specify an open pit of rectangular shape of arbitrary orientation.

CHARACTERIZING EMISSIONS FROM AN OPEN PIT MINE

As mentioned earlier, particulate emissions from a mine can be caused by many types of activities. One of the most challenging tasks of modeling a mining operation is the characterization of these emissions. How does one translate the emission information that is generally collected and reported by activity type (bulldozing, scraping, shoveling etc.) and by vehicle travel on roads into inputs that can be input into ISCSTDFT? How should the emissions be distributed if two or more sources overlap spatially (for example, vehicles traversing on part of a road which is inside the pit)? Moreover, the emissions might be reported by shifts and the start and end times of the shifts may vary from day to day.

A mine emissions pre-processor has been developed to translate all this information into inputs to ISCSTDFT. The program, called MINEMISS, reads inputs such as locations and dimensions of pits, roads and other area and volume source type activities (dumping and loading of trucks). Files listing the emission rates by shift for the entire modeling period are also read for each activity type (scraper, dragline etc.). A file defining the shift times is also supplied along with inputs in an options file.

MINEMISS performs two main tasks. First, it creates source input data in an ISC2 format for the various activities for which the information is provided. The user has the option to characterize roads as elongated area sources or as equally spaced volume sources. Each road segment is divided into these areas or volume sources with a unique name assigned to each source. The dimensions, location and orientation of these sources are calculated automatically from the primitive information provided to the program. The area sources for roadways are restricted in their dimensions to a 10:1 aspect ratio due to the reported limitations of the area source algorithm beyond this ratio. The number of area sources is determined using the aspect ratio calculated for the segment. If, for example, the ratio exceeds 10:1, but is less than 21:1, two area sources will be assigned to model this segment. Furthermore, MINEMISS uses a unique grid methodology for emission sources which move about covering different areas during different time periods (such as the draglines and the scrapers). A grid of numerous area sources is created which covers the domain of these moving sources. Each gridded area source is then assigned an appropriate emission rate for those hours when the sources are active in the particular grid cell.

Second, after creating the sources, MINEMISS processes emission rates reported by shift and allocates them to the appropriate pit, area or volume sources. There is a large amount of book-keeping involved in this process. For example, if a road segment happens to be inside a pit, the emissions from that segment are added to the pit emissions instead of assigning them to the road area or volume sources. Emissions may be output either by shift or averaged by shift over the entire modeling period.

The program creates an ISC2-formatted source pathway output file containing all the sources. It also produces an hourly emissions file corresponding to the source file. These outputs can then be directly incorporated into an ISC runstream.

For the Cordero model evaluation study, the two active pits were modeled as open pit sources for ISCSTDFT and as rectangular area sources for ISCST2. Roads were modeled as area and volume sources as discussed above. Figure 2 shows the relative locations of the various sources and receptors for this study. The emission rates were based on three different sets of emission factors. The first set was based on the emission factors found in Section 8.24 of AP-42 for all sources. This is, currently, the most commonly used method of estimating emissions from surface coal mines. The other two sets were enhancements to the Set 1 method. Set 2 was based on a new equation for heavy vehicles, emission factors contained in Section 8.24 for bulldozing, graders and scrapers and Section 11.2 factors for all other sources. This new equation for heavy vehicles was based on an emissions testing program at the Cordero Mine[11]. Set 3 was similar to Set 2 except that it comprised of hourly emission factors for heavy and light vehicle traffic. These factors were derived from direct representative on-site emission measurements. For set 2, an emission control factor was applied based on haul roads silt and soil moisture content which reflects the effects of road watering. For set 3, the adjustments to emission rates were made for mitigation due to hourly rainfall or shift-resolved watering activity.

OBSERVATIONS AND CONCLUSIONS

The process of characterizing mine emissions of the Cordero database uncovered several interesting observations. Most importantly, it was found that the TSP and PM_{10} emissions from vehicle travel on the unpaved mine roads are much higher than from any other source at this surface coal mine (Figure 3). Depending on the emission set, the roads can account for as much as 75% of the emissions and the north pit for about 20%. Even though the emissions from the other sources are small, they are not insignificant because the ambient air monitors are located quite close to the sources. The emissions from the various sources differ by shift. In general it was observed that the mid-day shift had more emissions attributed to it than any other shift. Note that in the figures, shift 0 spans hours between midnight to 6 or 7 AM, shift 1 is the entire 10-12 hour day shift and shift 3 spans the hours between 4 or 7 PM through midnight. Figure 4 shows that there are significant differences between emission rates calculated using the three different sets of emission factors for the roads. Figure 5 shows similar differences for the north pit. Note that all the emissions have been shown as annualized emissions in tons per year to give a better perspective on the relative magnitude of particulate emissions from the mine. This was based on an assumption that the emissions during the study period are representative of emissions over the entire year. It is important for the user to note that there was a significant difference in the number of sources required to model the roads as area sources versus roads as volume sources. For the Cordero study, 67 area sources were required to model all the roads. On the other hand, 510 volume sources were needed to model the same as volume sources.

Preliminary model comparison results show that the predicted concentrations from roads modeled as volume sources are quite similar to those from roads modeled as area sources with an initial vertical dispersion parameter. A test was performed to examine the sensitivity of the predicted concentrations to the width of a road segment. A 150 meter long road segment was modeled as an area source using four different widths - 15, 30, 45 and 60 meters. A string of receptors were placed perpendicular to the road starting at the median of the road up to 200 meters from the median. A single stable hour of meteorology was modeled with the wind blowing toward the receptors. The emission rates for the various road widths were specified such that the total emission from the entire road segment was always 1.0 grams/second. As seen in Figure 6, it was observed that the predicted concentrations did not vary significantly for the receptors located beyond the periphery of the road. For the receptors that are inside the road segment, the concentrations were higher for the narrower road segments than the wider road segments due to a higher emission rate per unit area.

The model results are currently being analyzed and compared with observed data following the model evaluation protocol[4]. A model evaluation report will be prepared upon completion of the project documenting the results of the study.

DISCLAIMER

This paper has been reviewed in accordance with the U.S. Environmental Protection Agency's peer and administrative review policies and approved for presentation and publication. Mention of trade names or commercial products does not constitute endorsement or recommendation for use.

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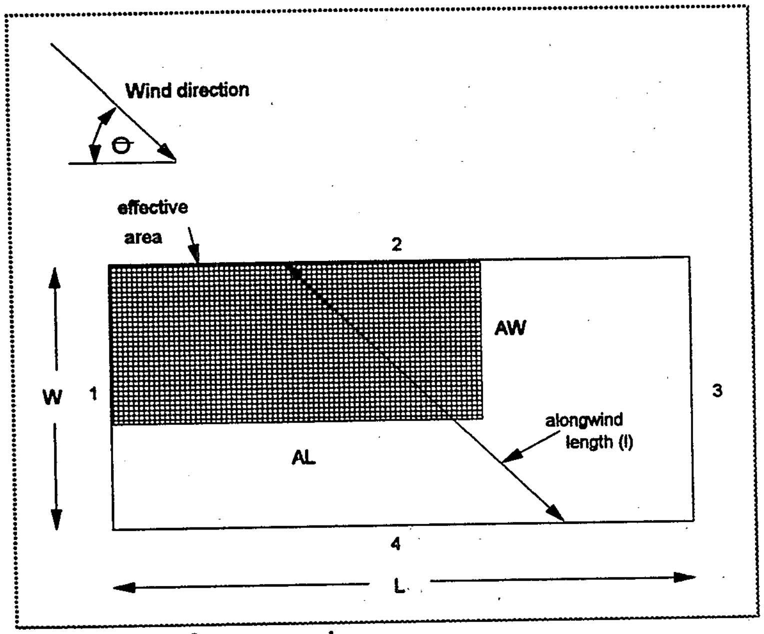

Figure 1: Graphical representation of an open pit source

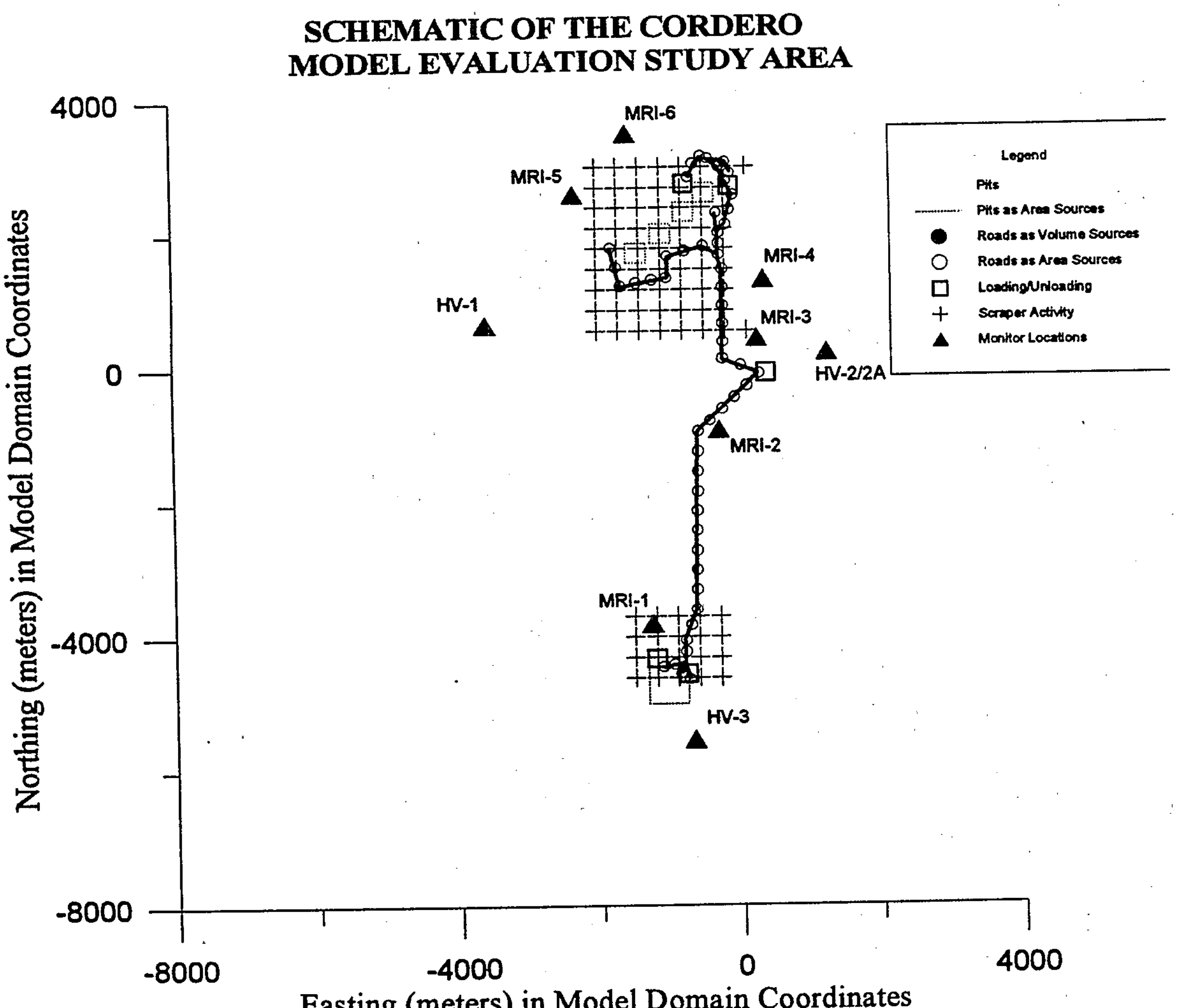

Figure 2: Sources and receptors for the Cordero model evaluation study

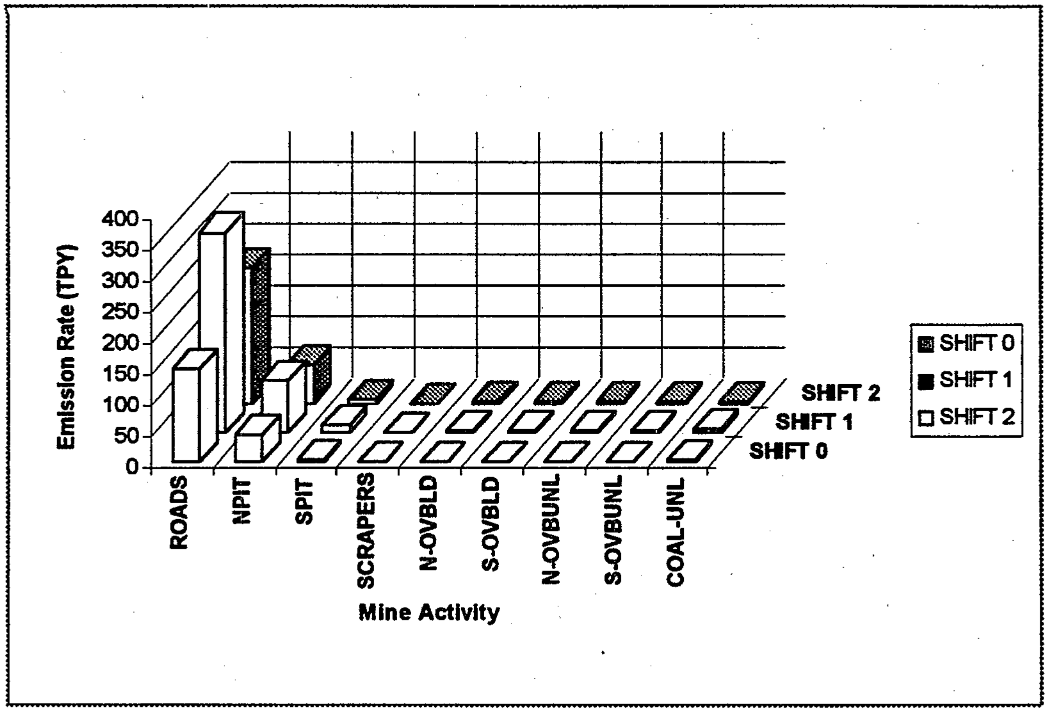

Figure 3: Distribution of emission rates by source type at the Cordero mine

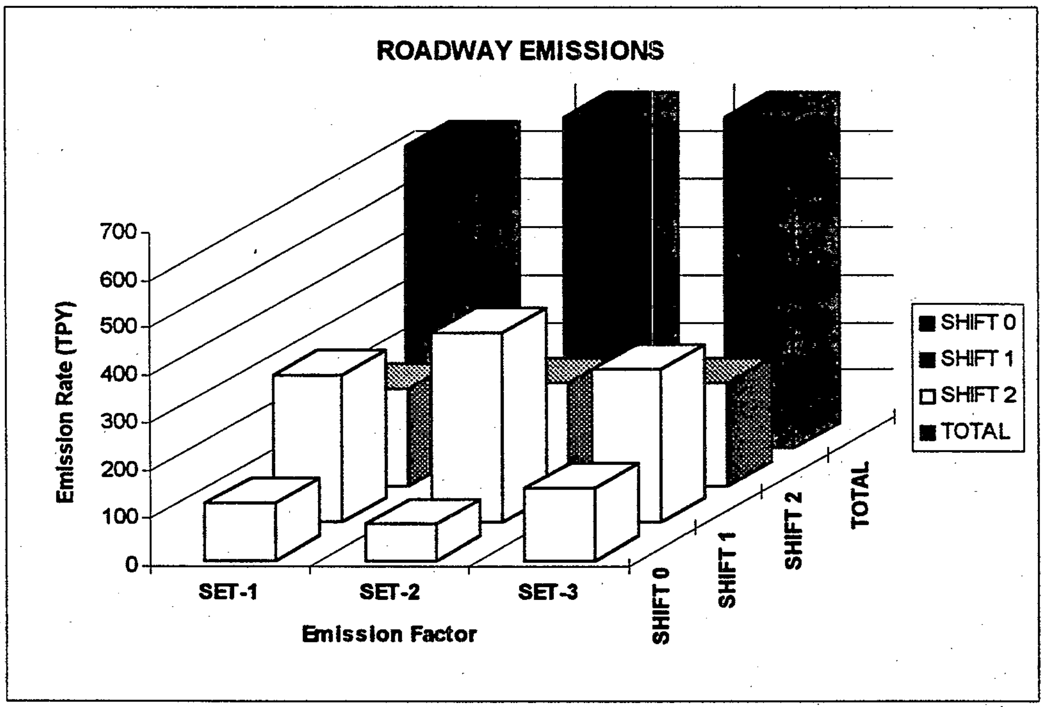

Figure 4: Variation in the roadway emissions by shift for three different sets of emission factors.

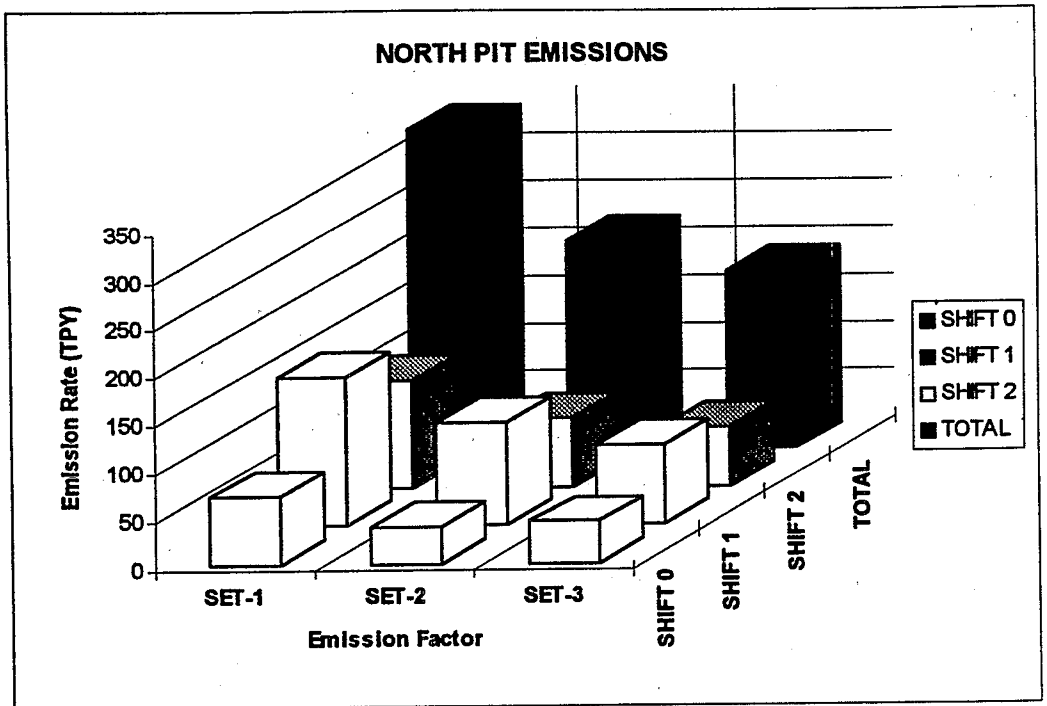

Figure 5: Variation in the north pit emissions by shift for three different sets of emission factors.

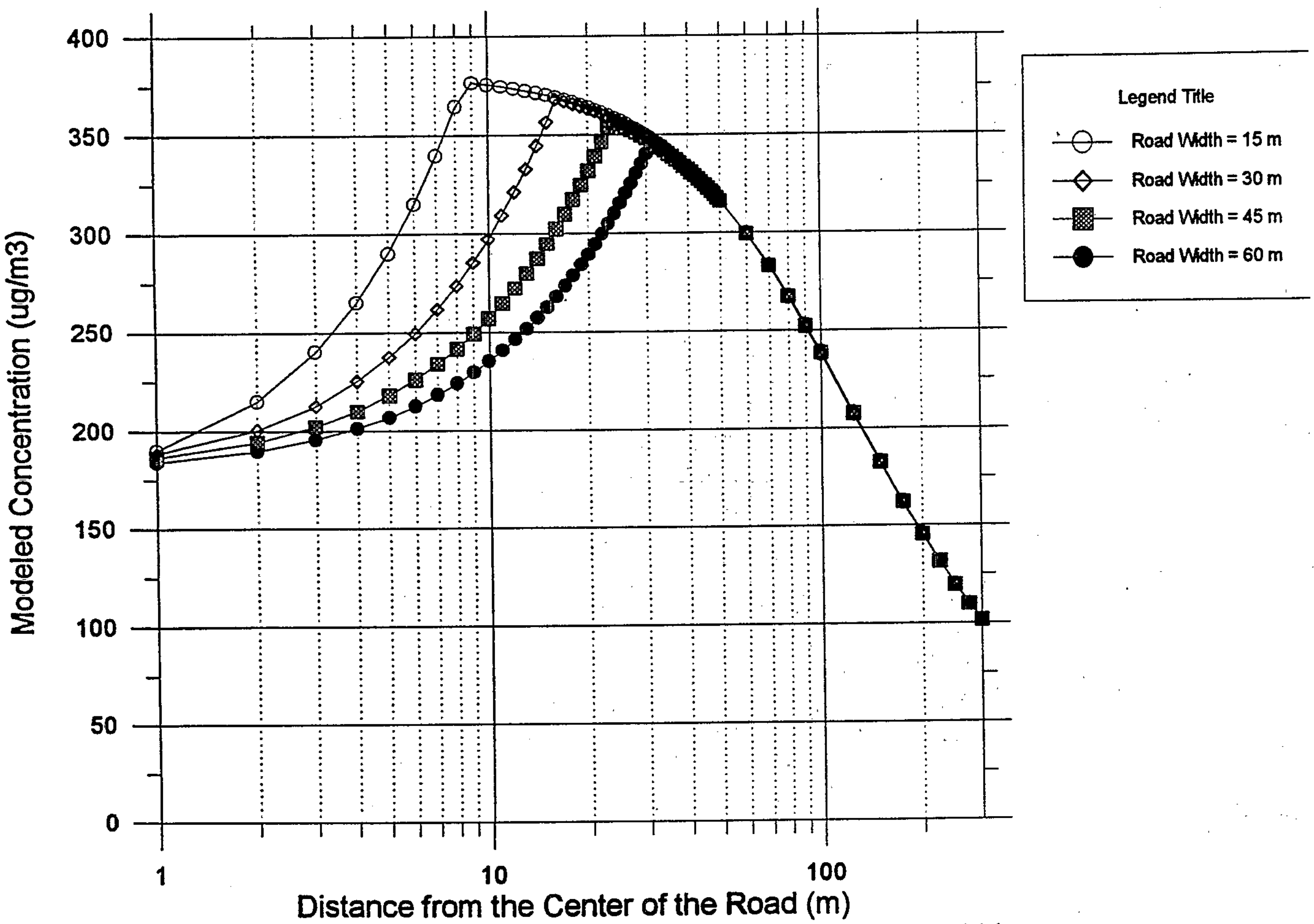

Figure 6: Variation in modeled downwind concentrations for different road widths

APPENDIX G

GUIDE TO THE EMISSIONS AND MODELING DATA BASE

This appendix is intended to serve as a guide to the data base provided for the surface coal mine emissions inventory, dispersion modeling, and model evaluation results. The data base contains all of the data needed to duplicate the analysis, including the inputs to the mine emissions preprocessor program (MINEMISS), the inputs to the dispersion models (ISCST3 and ISCST2), and the inputs to the statistical model evaluation software (EPAMEM and OVERMEM). Figure G-1 provides a flow chart showing the inputs and outputs for the three stages of the analysis: 1) emissions preprocessing; 2) dispersion modeling; and 3) statistical evaluation. The inputs to MINEMISS include the physical source locations and emissions data prepared by MRI for each of the sets of emission factors and the various source categories. The MINEMISS program generates the source parameters and hourly emissions file for input to the dispersion model. The MINEMISS program also generates the source location coordinates for the roadway sources based on whether volume or area sources are being used. The input files for the ISC models provided with the data base already include the source parameter data generated by MINEMISS. These input files, together with the meteorological data and the MINEMISS-generated hourly emissions files, are sufficient to run the dispersion models. The dispersion models produce POSTFILE outputs of predicted concentrations that are used as input to the model evaluation software (EPAMEM), along with the observed concentration data and the EPAMEM input options file. The daily average meteorology file (CORDERO.AVG) is needed for the diagnostic evaluation component of EPAMEM to work properly, even though the diagnostic evaluation component is given a weight of zero in this analysis. A separate program called OVERMEM (not shown in Figure G-1) is used to perform the analysis of model overprediction. The OVERMEM program uses the basic inputs as the EPAMEM program.

All of the data indentified on this flow chart are contained in compressed files on two 3.5" diskettes, except for the hourly emission files (*.EMI) produced by MINEMISS. The hourly emission files are not included due to their size, however, they can be easily generated from the data provided. When uncompressed, the sixteen hourly emission files (one for each model and pollutant combination) would occupy almost 250 Mb of disk storage. The contents of each of the files is described below.

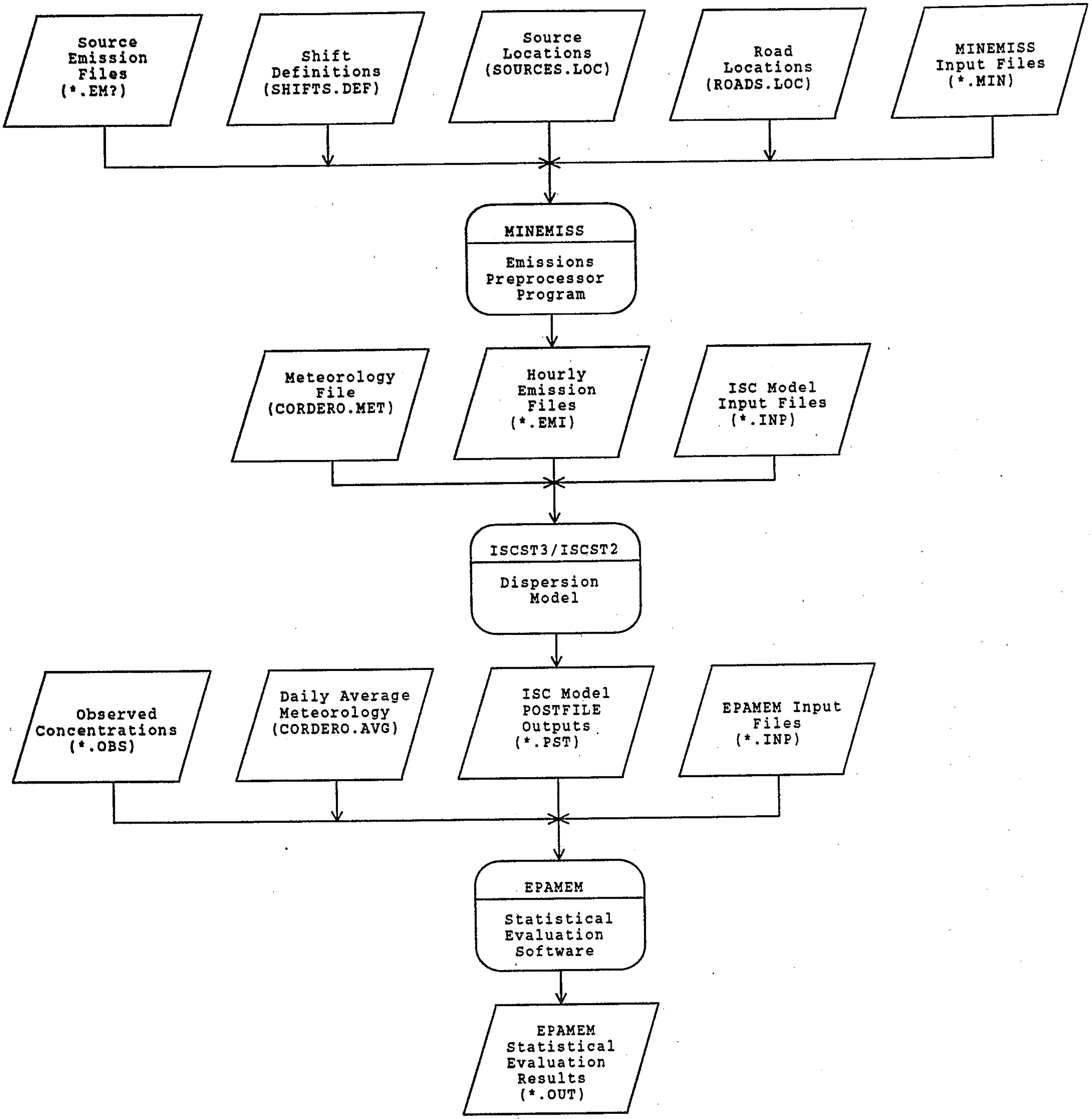

Figure G-1. Flow Chart of the Emissions Preprocessing, Modeling and Evaluation Analysis

Disk #1:

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MINEMISS.ZIP- Code and EXE files for the MINEMISS Emissions Preprocessor

Length	Name	Description
412970	MINEMISS.EXE	LAHEY EXE for the Emissions Preprocessor
341343	MINEAREA.EXE	LAHEY EXE for the ISCST2 Version of the Emissions Preprocessor
40471	EMIAREA.FOR	FORTRAN Code for the Emissions Preprocessor
36869	EMIPROC.FOR	Modified Version of EMIAREA.FOR for ISCST2 Output
69260	MINEMISS.FOR	FORTRAN Code for the Emissions Preprocessor
62929	SETUP.FOR	FORTRAN Code for the Emissions Preprocessor
11080	MINEMISS.INC	FORTRAN Code for the Emissions Preprocessor
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974922		

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EMISINP.ZIP- Input Files for MINEMISS, the Emissions Preprocessor

Length	Name	Description
5016	DCOAL-N.EM1	SET 1 Emissions from Coal Bulldozing/Northpit
5016	DCOAL-S.EM1	SET 1 Emissions from Coal Bulldozing/Southpit
5016	DOVER-N.EM1	SET 1 Emissions from Overburden Bulldozing/Northpit
5016	DOVER-S.EM1	SET 1 Emissions from Overburden Bulldozing/Southpit
1952	DRAGLINE.EM1	SET 1 Emissions from Dragline Activity
2352	LCOAL-N.EM1	SET 1 Emissions from Coal Loading/Northpit
2352	LCOAL-S.EM1	SET 1 Emissions from Coal Loading/Southpit
2297	LOVER-N.EM1	SET 1 Emissions from Overburden Loading/Northpit
2207	LOVER-S.EM1	SET 1 Emissions from Overburden Loading/Southpit
90312	ROADS.EM1	SET 1 Emissions from Vehicle Travel Over Roads
5016	SCRAPER.EM1	SET 1 Emissions from Scraper Activity
2195	UCOAL.EM1	SET 1 Emissions from Coal Unloading
2299	UOVER-N.EM1	SET 1 Emissions from Overburden Unloading/Northpit
2299	UOVER-S.EM1	SET 1 Emissions from Overburden Unoading/Southpit
2586	WCOAL-N.EM1	SET 1 Emissions from Wind Erosion@Coal Loading/Northpit
2586	WCOAL-S.EM1	SET 1 Emissions from Wind Erosion@Coal Loading/Southpit
2586	WLOVER-N.EM1	SET 1 Emissions from Wind Erosion@Overburden Loading/Northpit
2586	WLOVER-S.EM1	SET 1 Emissions from Wind Erosion@Overburden Loading/Southpit
2586	WUOVER-N.EM1	SET 1 Emissions from Wind Erosion@Overburden Unloading/Northpit
2586	WUOVER-S.EM1	SET 1 Emissions from Wind Erosion@Overburden Unloading/Southpit
5016	DCOAL-N.EM2	SET 2 Emissions from Coal Bulldozing/Northpit
5016	DCOAL-S.EM2	SET 2 Emissions from Coal Bulldozing/Southpit
5016	DOVER-N.EM2	SET 2 Emissions from Overburden Bulldozing/Northpit
5016	DOVER-S.EM2	SET 2 Emissions from Overburden Bulldozing/Southpit
2044	DRAGLINE.EM2	SET 2 Emissions from Dragline Activity
2352	LCOAL-N.EM2	SET 2 Emissions from Coal Loading/Northpit
2352	LCOAL-S.EM2	SET 2 Emissions from Coal Loading/Southpit
2297	LOVER-N.EM2	SET 2 Emissions from Overburden Loading/Northpit
2207	LOVER-S.EM2	SET 2 Emissions from Overburden Loading/Southpit
90314	ROADS.EM2	SET 2 Emissions from Vehicle Travel Over Roads
5016	SCRAPER.EM2	SET 2 Emissions from Scraper Activity
2195	UCOAL.EM2	SET 2 Emissions from Coal Unloading
2483	UOVER-N.EM2	SET 2 Emissions from Overburden Unloading/Northpit
2299	UOVER-S.EM2	SET 2 Emissions from Overburden Unoading/Southpit
2586	WCOAL-N.EM2	SET 2 Emissions from Wind Erosion@Coal Loading/Northpit
2586	WCOAL-S.EM2	SET 2 Emissions from Wind Erosion@Coal Loading/Southpit
2586	WLOVER-N.EM2	SET 2 Emissions from Wind Erosion@Overburden Loading/Northpit
2586	WLOVER-S.EM2	SET 2 Emissions from Wind Erosion@Overburden Loading/Southpit
2586	WUOVER-N.EM2	SET 2 Emissions from Wind Erosion@Overburden Unloading/Northpit
2586	WUOVER-S.EM2	SET 2 Emissions from Wind Erosion@Overburden Unloading/Southpit

```
 5016   DCOAL-N.EM3    SET 3 Emissions from Coal Bulldozing/Northpit
 5016   DCOAL-S.EM3    SET 3 Emissions from Coal Bulldozing/Southpit
 5016   DOVER-N.EM3    SET 3 Emissions from Overburden Bulldozing/Northpit
 5016   DOVER-S.EM3    SET 3 Emissions from Overburden Bulldozing/Southpit
 2044   DRAGLINE.EM3   SET 3 Emissions from Dragline Activity
 2352   LCOAL-N.EM3    SET 3 Emissions from Coal Loading/Northpit
 2352   LCOAL-S.EM3    SET 3 Emissions from Coal Loading/Southpit
 2297   LOVER-N.EM3    SET 3 Emissions from Overburden Loading/Northpit
 2207   LOVER-S.EM3    SET 3 Emissions from Overburden Loading/Southpit
90312   ROADS.EM3      SET 3 Emissions from Vehicle Travel Over Roads
 5016   SCRAPER.EM3    SET 3 Emissions from Scraper Activity
 2195   UCOAL.EM3      SET 3 Emissions from Coal Unloading
 2483   UOVER-N.EM3    SET 3 Emissions from Overburden Unloading/Northpit
 2299   UOVER-S.EM3    SET 3 Emissions from Overburden Unoading/Southpit
 2586   WCOAL-N.EM3    SET 3 Emissions from Wind Erosion@Coal Loading/Northpit
 2586   WCOAL-S.EM3    SET 3 Emissions from Wind Erosion@Coal Loading/Southpit
 2586   WLOVER-N.EM3   SET 3 Emissions from Wind Erosion@Overburden Loading/Northpit
 2586   WLOVER-S.EM3   SET 3 Emissions from Wind Erosion@Overburden Loading/Southpit
 2586   WUOVER-N.EM3   SET 3 Emissions from Wind Erosion@Overburden Unloading/Northpit
 2586   WUOVER-S.EM3   SET 3 Emissions from Wind Erosion@Overburden Unloading/Southpit

 1620   SHIFTS.DEF     Definition of Shift Start and End Times
 3266   ROADS.LOC      Location/Coordinates of Road Segments
 7388   SOURCES.LOC    Location/Coordinates of Area/Volume Sources

 1223   PSET1PV2.MIN   MINEMISS Input File for MODEL-1 |
 1220   PSET3SV2.MIN   MINEMISS Input File for MODEL-2 |
 1171   PSET2PV.MIN    MINEMISS Input File for MODEL-3 |
 1167   PSET2SV.MIN    MINEMISS Input File for MODEL-4 |  - PM10
 1168   PSET3SV.MIN    MINEMISS Input File for MODEL-5 |    * See NOTES Below
 1167   PSET2PA.MIN    MINEMISS Input File for MODEL-6 |
 1163   PSET2SA.MIN    MINEMISS Input File for MODEL-7 |
 1164   PSET3SA.MIN    MINEMISS Input File for MODEL-8 |

 1223   TSET1PV2.MIN   MINEMISS Input File for MODEL-1 |
 1220   TSET3SV2.MIN   MINEMISS Input File for MODEL-2 |
 1171   TSET2PV.MIN    MINEMISS Input File for MODEL-3 |
 1167   TSET2SV.MIN    MINEMISS Input File for MODEL-4 |  - TSP
 1168   TSET3SV.MIN    MINEMISS Input File for MODEL-5 |    * See NOTES Below
 1167   TSET2PA.MIN    MINEMISS Input File for MODEL-6 |
 1163   TSET2SA.MIN    MINEMISS Input File for MODEL-7 |
 1164   TSET3SA.MIN    MINEMISS Input File for MODEL-8 |
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479810

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ISCST3SR.ZIP-     ISCST3 FORTRAN Code

Length  Name           Description
------  ----           -----------
   625  F77LISCS.BAT   Batch File for Compiling with LAHEY
 93249  CALC1.FOR      ISCST3 Routine
 18584  CALC2.FOR      ISCST3 Routine
 14791  CALC3.FOR      ISCST3 Routine
 24802  CALC4.FOR      ISCST3 Routine
 55014  COSET.FOR      ISCST3 Routine
 54310  DEPFLUX.FOR    ISCST3 Routine
 56794  INPSUM.FOR     ISCST3 Routine
 58876  ISCST3.FOR     ISCST3 Routine
 45477  MESET.FOR      ISCST3 Routine
 33909  METEXT.FOR     ISCST3 Routine
 65310  OUSET.FOR      ISCST3 Routine
 69066  OUTPUT.FOR     ISCST3 Routine
  9025  PCCODE.FOR     ISCST3 Routine
 46538  PITAREA.FOR    ISCST3 Routine
 14573  PRISE.FOR      ISCST3 Routine
 67008  RESET.FOR      ISCST3 Routine
 32926  SETUP.FOR      ISCST3 Routine
 26966  SIGMAS.FOR     ISCST3 Routine
101448  SOSET.FOR      ISCST3 Routine
```

```
 20819  TGSET.FOR      ISCST3 Routine
  5098  DEPVAR.INC     ISCST3 Routine
 20934  MAIN1.INC      ISCST3 Routine
   439  MAIN2.INC      ISCST3 Routine
  2194  MAIN3.INC      ISCST3 Routine
   166  F77LISCS.LRF   ISCST3 Link Response File
------
938941

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ISCINPUT.ZIP-     ISCST2/ISCST3 Input Files

Length    Name
------    ----
 55490    CORDERO.MET    Cordero Hourly Meteorology (ASCII) File

 74692    PSET1PV2.INP   ISCST2 Input File for MODEL-1 |
 74710    PSET3SV2.INP   ISCST2 Input File for MODEL-2 |
 79053    PSET2PV.INP    ISCST3 Input File for MODEL-3 |
 79048    PSET2SV.INP    ISCST3 Input File for MODEL-4 | - PM10
 79048    PSET3SV.INP    ISCST3 Input File for MODEL-5 |   * See NOTES Below
 24417    PSET2PA.INP    ISCST3 Input File for MODEL-6 |
 24412    PSET2SA.INP    ISCST3 Input File for MODEL-7 |
 24412    PSET3SA.INP    ISCST3 Input File for MODEL-8 |

 74911    TSET1PV2.INP   ISCST2 Input File for MODEL-1 |
 74929    TSET3SV2.INP   ISCST2 Input File for MODEL-2 |
 79133    TSET2PV.INP    ISCST3 Input File for MODEL-3 |
 79128    TSET2SV.INP    ISCST3 Input File for MODEL-4 | - TSP
 79128    TSET3SV.INP    ISCST3 Input File for MODEL-5 |   * See NOTES Below
 24497    TSET2PA.INP    ISCST3 Input File for MODEL-6 |
 24492    TSET2SA.INP    ISCST3 Input File for MODEL-7 |
 24492    TSET3SA.INP    ISCST3 Input File for MODEL-8 |
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975992       17

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ISCOUTPT.ZIP-     ISCST2/ISCST3 Output Files

Length    Name
------    ----
653991    PSET1PV2.OUT   ISCST2 Output File for MODEL-1 |
654237    PSET3SV2.OUT   ISCST2 Output File for MODEL-2 |
756950    PSET2PV.OUT    ISCST3 Output File for MODEL-3 |
756950    PSET2SV.OUT    ISCST3 Output File for MODEL-4 | - PM10
756950    PSET3SV.OUT    ISCST3 Output File for MODEL-5 |   * See NOTES Below
336264    PSET2PA.OUT    ISCST3 Output File for MODEL-6 |
336264    PSET2SA.OUT    ISCST3 Output File for MODEL-7 |
336264    PSET3SA.OUT    ISCST3 Output File for MODEL-8 |

719659    TSET1PV2.OUT   ISCST2 Output File for MODEL-1 |
719823    TSET3SV2.OUT   ISCST2 Output File for MODEL-2 |
836414    TSET2PV.OUT    ISCST3 Output File for MODEL-3 |
836414    TSET2SV.OUT    ISCST3 Output File for MODEL-4 | - TSP
836414    TSET3SV.OUT    ISCST3 Output File for MODEL-5 |   * See NOTES Below
357252    TSET2PA.OUT    ISCST3 Output File for MODEL-6 |
357252    TSET2SA.OUT    ISCST3 Output File for MODEL-7 |
357252    TSET3SA.OUT    ISCST3 Output File for MODEL-8 |

 24300    PSET1PV2.PST   ISCST2 POST File for MODEL-1 |
 24300    PSET3SV2.PST   ISCST2 POST File for MODEL-2 |
 24300    PSET2PV.PST    ISCST3 POST File for MODEL-3 |
 24300    PSET2SV.PST    ISCST3 POST File for MODEL-4 | - PM-10
 24300    PSET3SV.PST    ISCST3 POST File for MODEL-5 |   * See NOTES Below
 24300    PSET2PA.PST    ISCST3 POST File for MODEL-6 |
 24300    PSET2SA.PST    ISCST3 POST File for MODEL-7 |
 24300    PSET3SA.PST    ISCST3 POST File for MODEL-8 |
```

```
24300   TSET1PV2.PST  ISCST2 POST File for MODEL-1 |
24300   TSET3SV2.PST  ISCST2 POST File for MODEL-2 |
24300   TSET2PV.PST   ISCST3 POST File for MODEL-3 |
24300   TSET2SV.PST   ISCST3 POST File for MODEL-4 |  - TSP
24300   TSET3SV.PST   ISCST3 POST File for MODEL-5 |    * See NOTES Below
24300   TSET2PA.PST   ISCST3 POST File for MODEL-6 |
24300   TSET2SA.PST   ISCST3 POST File for MODEL-7 |
24300   TSET3SA.PST   ISCST3 POST File for MODEL-8 |
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9997150    32
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* NOTES:

MODEL-1 Through MODEL-8 are in the Same Order as the models listed in Table 8 (p 32) of the EPA Report entitled:
"Modeling Fugitive Dust Impacts from Surface Coal Mining Operations - Phase II
(Model Evaluation Protocol)"

Following is the file naming convention for the various models:

```
Character 1    : P - PM10
                 T - TSP

Characters 2-5: SET1 - Emission Set 1
                SET2 - Emission Set 2
                SET3 - Emission Set 3

Character 6    : P - 30-day Period Average
                 S - Shift Average

Character 7    : V - Roads as Volume Sources
                 A - Roads as Area Sources

(Character 8) : (null) - ISCST3
                2 -      ISCST2
==========================================================================
```

Disk #2:

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==========================================================================

EPAMEM.ZIP-       Code and EXE files for EPAMEM

 Length   Name          Description
 ------   ----          -----------
2474182   EPAMEM.EXE    LAHEY EXE for EPAMEM
 219343   EPAMEM.FOR    FORTRAN code for EPAMEM
   9982   MAIN1.INC     FORTRAN code for EPAMEM
    439   MAIN2.INC     FORTRAN code for EPAMEM
 ------
2703946
==========================================================================

OVERMEM.ZIP -    Code and EXE files for Overprediction Version of EPAMEM

 Length   Name          Description
 ------   ----          -----------
2907670   OVERMEM.EXE   LAHEY EXE for the "Overprediction" version of EPAMEM
 221674   OVERMEM.FOR   FORTRAN code for the "Overprediction" version of EPAMEM
   9982   MAIN1.INC     FORTRAN code for the "Overprediction" version of EPAMEM
    439   MAIN2.INC     FORTRAN code for the "Overprediction" version of EPAMEM
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3139765       4
```

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MEMFILES.ZIP- EPAMEM / OVERMEM Inputs and Outputs

Length	Name	Description
2550	CORDERO.AVG	Daily Average Meteorology
3270	24H-PM10.OBS	24-Hr Average Monitored Concentrations / PM-10
3270	24H-TSP.OBS	24-Hr Average Monitored Concentrations / TSP
4030	PMSTAT.INP	EPAMEM Input File for PM-10 Best-Model Analysis
4030	PMOVER.INP	OVERMEM Input File for PM-10 Overprediction Analysis
4027	TSPSTAT.INP	EPAMEM Input File for TSP Best-Model Analysis
4027	TSPOVER.INP	OVERMEM Input File for TSP Overprediction Analysis
31891	PMSTAT.OUT	EPAMEM Output File for PM-10 Best-Model Analysis
36127	PMOVER.OUT	OVERMEM Output File for PM-10 Overprediction Analysis
31891	TSPSTAT.OUT	EPAMEM Output File for TSP Best-Model Analysis
36127	TSPOVER.OUT	OVERMEM Output File for TSP Overprediction Analysis
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355640	19	

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APPNDXC.ZIP- Modeled and Observed Concentrations (from Appendix C)

Length	Name	Description
96820	APPNDXC.TXT	Modeled and Observed Concentrations in space delimited text file, based on the tables in Appendix C
------	-------	
96820	1	

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TECHNICAL REPORT DATA
(Please read Instructions on reverse before completing)

1. REPORT NO. EPA-454/R-96-002	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Modeling Fugitive Dust Impacts from Surface Coal Mining Operations-Phase III. Evaluating Model Performance		5. REPORT DATE December 1995
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S)		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Pacific Environmental Services, Inc. 5001 S. Miami Blvd. Research Triangle Park, NC 27709		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO. EPA Contract No. 68D30001
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Emissions, Monitoring & Analysis Division Research Triangle Park, NC 27711		13. TYPE OF REPORT AND PERIOD COVERED Final Report
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES
EPA Work Assignment Manager: Jawad S. Touma

16. ABSTRACT

This report is the third part of a study under Section 234 of the amended Clean Air Act which requires that EPA analyze the accuracy of the Industrial Source Complex (ISC) model and AP-42 Compilation of Air Pollutant Emission Factors to determine the effect on air quality of fugitive particulate emissions from surface coal mines. The first report, titled "Modeling Fugitive Dust Impacts from Surface Coal Mining Operations-Phase I", 454/R-94-024 described the field monitoring program to collect data on ambient air quality, meteorology and source activity at a surface coal mine in the Powder River Basin in Wyoming. The second report titled "Modeling Fugitive Dust Impacts from Surface Coal Mining Operations-Phase II, Model Evaluation Protocol", EPA-454/R-94-025 defined the procedures that were used to identify the best performing model. This third report presents the results of the performance evaluation of several models which include the recent improvements to the ISC model applicable to fugitive particulate emissions, and improvements to the emission factors used to estimate emissions from surface coal mine activity.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTORS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COSATI Field/Group
Air Pollution Air Quality Dispersion Models Meteorology Surface Coal Mines Fugitive Dust		

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