Prince George Air Quality Emissions and Modelling: Appendix C

Dispersion Model (CALPUFF) Setup and Evaluation

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1. Executive Summary

This appendix is supplementary to the main *Prince George Air Quality Emissions and Modelling* report. The Prince George modelling system consists of four primary parts: the micro-emission inventory (MEI), the meteorological model (CALMET), the dispersion model (CALPUFF), and the web-based analysis and simulation tool (AirQuest). Each section is explored in detail in individual appendices. This appendix will detail the setup and evaluation process for the CALPUFF meteorological model for the Prince George airshed.

CALPUFF is a Gaussian puff dispersion model with chemical removal, wet and dry deposition, complex terrain algorithms, and other effects (Scire et. al. 2011). The dispersion model is driven by the CALMET meteorological model outputs, and simulates hourly concentrations of PM_{10}, $PM_{2.5}$, SO_2, and NO_x (= NO + NO_2) in the Prince George airshed (defined as a 40 km x 40 km area centered over the city) for the 2014 – 2016 period. Hourly concentrations of SO_4 and NO_3 are simulated using the ARM/Rivad chemical transformation module in Calpuff based on concentrations of SO_2, NO_x, ammonia and background ozone values. SO_4 and NO_3 concentrations, which depend on SO_2 and NO_x concentrations, are used for the calculation of secondary particulate matter, which have been included in the model outputs. Emission rates by source category are detailed in the MEI – emission rates of NO_x are detailed in the MEI and are split into NO (90%) and NO_2 (10%) prior to modelling. PM_{10} and $PM_{2.5}$ are the primary pollutants of concern and these will be used for evaluation and analysis. Hourly concentrations are output at a 0.5 km resolution receptor grid, 1.5 m above the surface over the urban center, and at a resolution of 1 km for the remainder of the airshed.

There were six ambient observations stations within the Prince George airshed measuring one or more of PM_{10}, $PM_{2.5}$, SO_2, NO_x (NO and NO_2) between 2014 and 2016. Evaluation of the CALPUFF outputs involves comparing the outputs at the same locations and heights as the observation stations. These comparisons were made for PM_{10} and $PM_{2.5}$ – the primary pollutants of concern.

Three of the stations had hourly observations of PM_{10} – two of which also had observations of $PM_{2.5}$ and wind speed and direction. Overall, the model was successful at simulating both PM_{10} and $PM_{2.5}$. Peak PM_{10} concentrations (> 25 µg m^{-3}) and peak $PM_{2.5}$ (> 14 µg m^{-3}) concentrations are underpredicted when winds are from the south at the Gladstone Elementary station and when winds are from the north – east wind sector at the Plaza 400 station. The model outputs of PM_{10} and $PM_{2.5}$ include mean background concentrations which do not capture the full variability of the true background levels. As a result, lower observations of these pollutants are overpredicted by the model.

Daily hourly average observations of PM_{10} and $PM_{2.5}$ are bimodal, with a morning peak near 07:00 and an evening peak near 19:00. The morning peak is underpredicted by the model at Plaza 400 for PM_{10} and $PM_{2.5}$ and at the BCR Warehouse for PM_{10}. Otherwise, the model predicts the hour-of-day average PM_{10} and $PM_{2.5}$ at the observation stations quite well. The

model also predicts month-of-year averages for the three-year period quite well. February and November observations are underpredicted at all three stations for PM_{10} as well as those observations from March to May at Plaza 400. The same is seen for $PM_{2.5}$ to a lesser extent, albeit with a different pattern.

The AirQuest web-based tool can be used to analyze and adjust the CALPUFF model outputs. Simulations can be performed where emissions from specific source(s) are increased/decreased by some percentage. As the modelled ambient concentrations due to a source are linearly related to the emissions from that source, a change in emissions imparts a proportional change in the contribution from that sources emissions to a concentration at a specific location and time. This provides a utility for air quality managers to visualize the impacts various emission reduction scenarios may have on the air quality in the Prince George airshed.

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3. Acknowledgements

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4. Introduction

The CALPUFF dispersion model simulates the dispersion of air pollutants within the Prince George airshed. Full documentation of the CALPUFF dispersion model can be found in Scire et al (2011). The version of CALPUFF (v6.42) was not updated from earlier phases in the project, and previous input settings were used where applicable. A copy of the CALPUFF input file is included at the end of this report, detailing the settings and flags implemented in the model. There were no changes to the CALPUFF setup itself in the current phase of the project. Changes in the CALPUFF results are due to the updates made to the micro-emission inventory and CALMET meteorological model.

CALPUFF outputs hourly gridded concentrations of PM_{10}, $PM_{2.5}$, SO_2, NO_x (= NO + NO_2), NO_3, and SO_4 for receptor locations in two separate grids over the Prince George airshed at a height of 1.5 m above the surface. The latter four pollutants are utilized for the calculation of secondary particulate matter in post-processing. The first grid covers the entire airshed (40 km x 40 km, 1 km resolution), while the second is a smaller, higher resolution grid covering the majority of receptors (13 km x 23 km, 0.5 km resolution). Additional discrete receptors are included at the height and locations of the observation stations located in the airshed for making direct comparisons.

Evaluation of the model results is accomplished by comparing these model outputs with regular observations from ambient observation stations in the airshed. This allows for the model to be adjusted iteratively and improved. If these stations also have observations of wind speed and direction, additional information can be revealed as to which emissions source(s) may be influencing unexpected behavior (such as model over or underprediction). For example, if a primary source of some pollutant's emissions in the airshed is located northwest of a station, and the model tends to over or underpredict the concentrations when winds are from that direction at that station, one can infer that inaccurate emissions from this source may be causing the observed discrepancy. As PM_{10} and $PM_{2.5}$ are the primary pollutants of concern, the evaluation of these pollutants is presented below.

5. CALPUFF Evaluation

There were six ambient observation stations monitoring one or more of PM_{10}, $PM_{2.5}$, SO_2 and NO_x (= NO + NO) within the Prince George airshed between 2014 - 2016. These stations were all located in the southeast region of the City, with no observations during the period in the northwest regions or near the airshed boundaries (Figure 1). All stations were operated by the British Columbia Ministry of Environment and Climate Change Strategy. Three of the stations (PLAZ, GLAD, and MSLX) were also meteorological monitoring sites, while the remaining three only observed ambient concentrations. The JAIL, CBCT and MSLX stations only monitored SO_2 during this period.

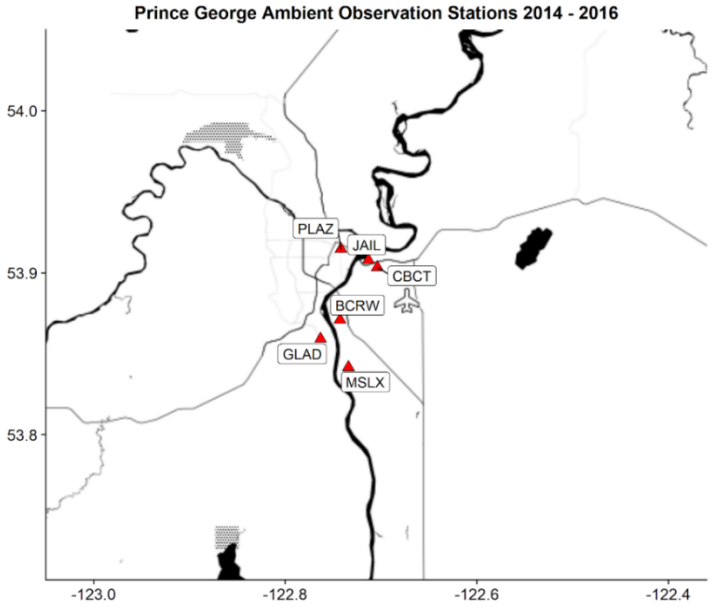


Figure 1. Ambient observation stations monitoring PM_{10}, $PM_{2.5}$, SO_2, NO, and/or NO_2 within the Prince George airshed between 2014 – 2016. All stations were operated by the British Columbia Ministry of Environment. PLAZ, GLAD, and MSLX were also meteorological monitoring sites. JAIL, CBCT, and MSLX did not monitor PM_{10} or $PM_{2.5}$.

Both the BCR Warehouse (BCRW) and Gladstone Elementary (GLAD) did not have observations in 2016 while the remaining stations had data for all three years (

Table 1). PM_{10} was monitored at the BCR Warehouse (BCRW), Gladstone Elementary (GLAD), and Plaza 400 (PLAZ) stations. $PM_{2.5}$ was also monitored at PLAZ and GLAD. Hourly data capture was between 80% and 99% for each station with observations every year. Due to heavy influence from wildfire smoke during July and August 2014, observations of PM_{10} and $PM_{2.5}$ from these two months were excluded from the evaluations, since wildfire smoke is not in the emission inventory.

Table 1. Percent data capture by year for respirable particulate matter (PM_{10} and $PM_{2.5}$) at the three ambient observation stations in Prince George with available data from 2014 -2016. GLAD and PLAZ also observed hourly wind speed and direction. The CBCT, JAIL and MSLX stations are not included as they only measured SO_2 during this period.

Station	Has Wind?	PM_{10}			$PM_{2.5}$		
		2014	2015	2016	2014	2015	2016
BCRW	No	93%	85%	0%	0%	0%	0%
GLAD	Yes	79%	86%	0%	98%	85%	0%
PLAZ	Yes	99%	98%	92%	99%	83%	99%

Monthly average modelled concentrations over the three-year period match those for the observations well for most pollutants at most stations (Figure 2). Monthly averages of PM_{10} and $PM_{2.5}$ tend to be somewhat underpredicted by the model but perform well otherwise.

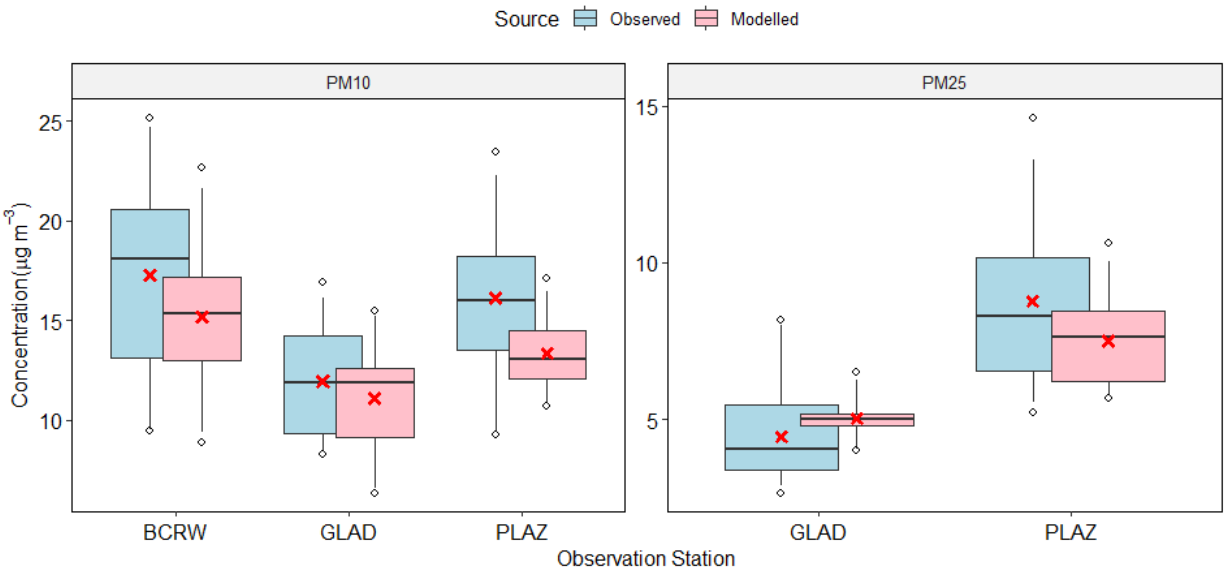


Figure 2. Distributions of monthly average observed (grey) and modelled (blue) PM_{10} and $PM_{2.5}$ concentrations for the 2014 to 2016 period at four observation stations in Prince George, BC. The outlier points (circles) mark the 2nd and 98th percentiles, whereas the box and whiskers mark the 5th, 25th, 50th, 75th, and 95th percentiles. The mean of the monthly average concentrations is marked with a red 'x'.

The hourly 24-hour average PM_{10} and $PM_{2.5}$ (for each hour, the average of the previous 24 hours was taken) at observation stations are predicted well by the model (Figure). However, the model tends to underpredict the peak concentrations, rarely exceeding the 24-hour Air Quality Objective (AQO) of 50 µg m^{-3} and 25 µg m^{-3} for PM_{10} and $PM_{2.5}$, respectively (BCMoE 2018). On average, the model underpredicts the 24-hour averages for PM_{10} at all three stations (less significantly at Gladstone Elementary). For $PM_{2.5}$ however, the model overpredicts the mean of the hourly 24-hour averages at Gladstone Elementary – these concentrations at Plaza 400 are still underpredicted by the model.

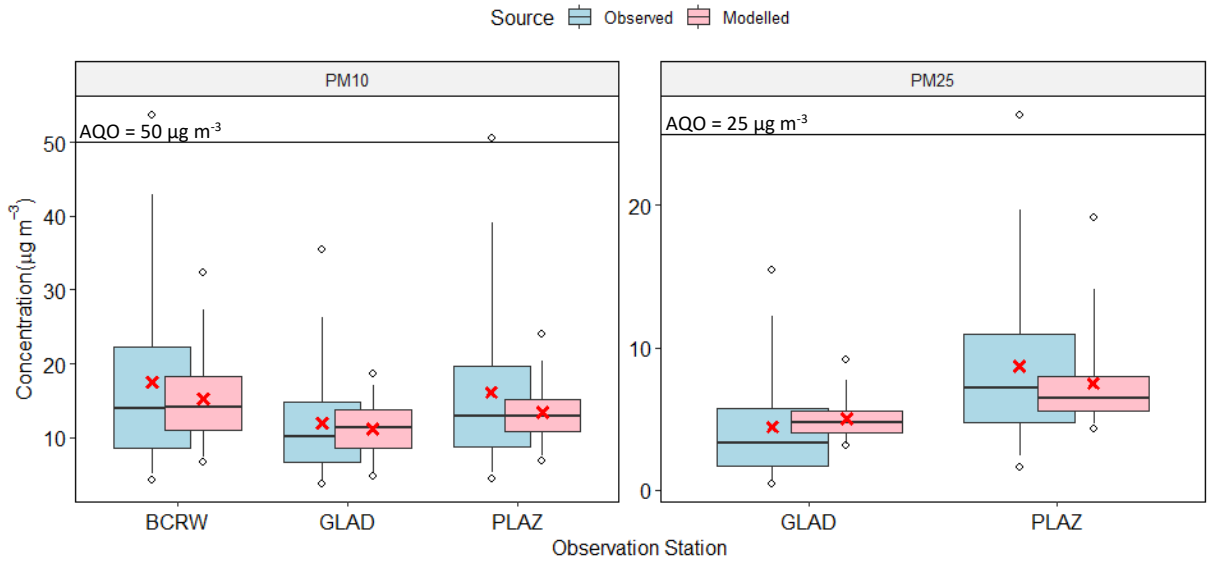


Figure 3. Hourly 24-hour averages of observations (grey) and model outputs (right) at observation stations for PM_{10} (left) and $PM_{2.5}$ (right) for the 2014 – 2016 period. 2nd and 98th quantiles are marked with circles, the mean with an 'x', and the box and whiskers display the 25th, 50th, and 75th percentiles.

The 24-hour average AQOs for PM_{10} and $PM_{2.5}$ are 50 µg m^{-3} and 25 µg m^{-3}, respectively (BCMoE 2018). The number of hours for each year where the hourly 24-hour average observations and model outputs exceed these levels are shown in Table 2. The model underpredicts these exceedances at all stations, more so for PM_{10}. The model performs best for $PM_{2.5}$ at the Plaza 400 station, however, still underpredicts the number of observed exceedances.

Table 2. Number of hours per year where the 24-hour average concentration of PM_{10} and $PM_{2.5}$ exceeded the Air Quality Objectives of 50 µg m^{-3} and 25 µg m^{-3} for observations and model outputs at the BCR Warehouse (BCRW), Gladstone Elementary (GLAD) and Plaza 400 (PLAZ) station locations. There were no observations in 2016 for the BCRW or GLAD stations.

Pol.	Station	Number of Hours Where 24-hr Averages Exceed AQO					
		2014		2015		2016	
		Observed	Modelled	Observed	Modelled	Observed	Modelled
PM_{10}	BCRW	220	9	214	0	--	16
	GLAD	32	0	24	0	--	0
	PLAZ	141	0	197	0	170	5
$PM_{2.5}$	GLAD	44	0	0	0	--	0
	PLAZ	265	33	163	48	127	98

5.1. Evaluation of PM_{10}

Of the three ambient observation stations with hourly PM_{10} observations (PLAZ, GLAD, and BCRW), only the first two also had hourly observations of wind speed and direction at the same location. Observed winds less than 0.5 m s^{-1} are considered calm due to instrument limitations at low wind speeds resulting in 14.4% and 12.9% calm at GLAD and PLAZ respectively (Figure). Modelled winds, however, are never calm due to how the model interpolates observation data. At

GLAD hourly observations of PM_{10} greater than 25 µg m^{-3} are underpredicted when winds are from the south and north. PM_{10} at PLAZ is underpredicted when winds are from the east to northeast. The model outputs include mean background concentrations which vary by season and precipitation conditions (See Appendix A). These values range from 4.7 to 11.3 µg m^{-3}, and as a result modelled PM_{10} concentrations are rarely in the 0 to 5 µg m^{-3} range. This in turn would increase the frequency of concentrations in the 5 to 10 µg m^{-3} range for the model outputs. In reality, the background concentrations have greater variation allowing for a higher frequency of observations in the 0 to 5 µg m^{-3} range.

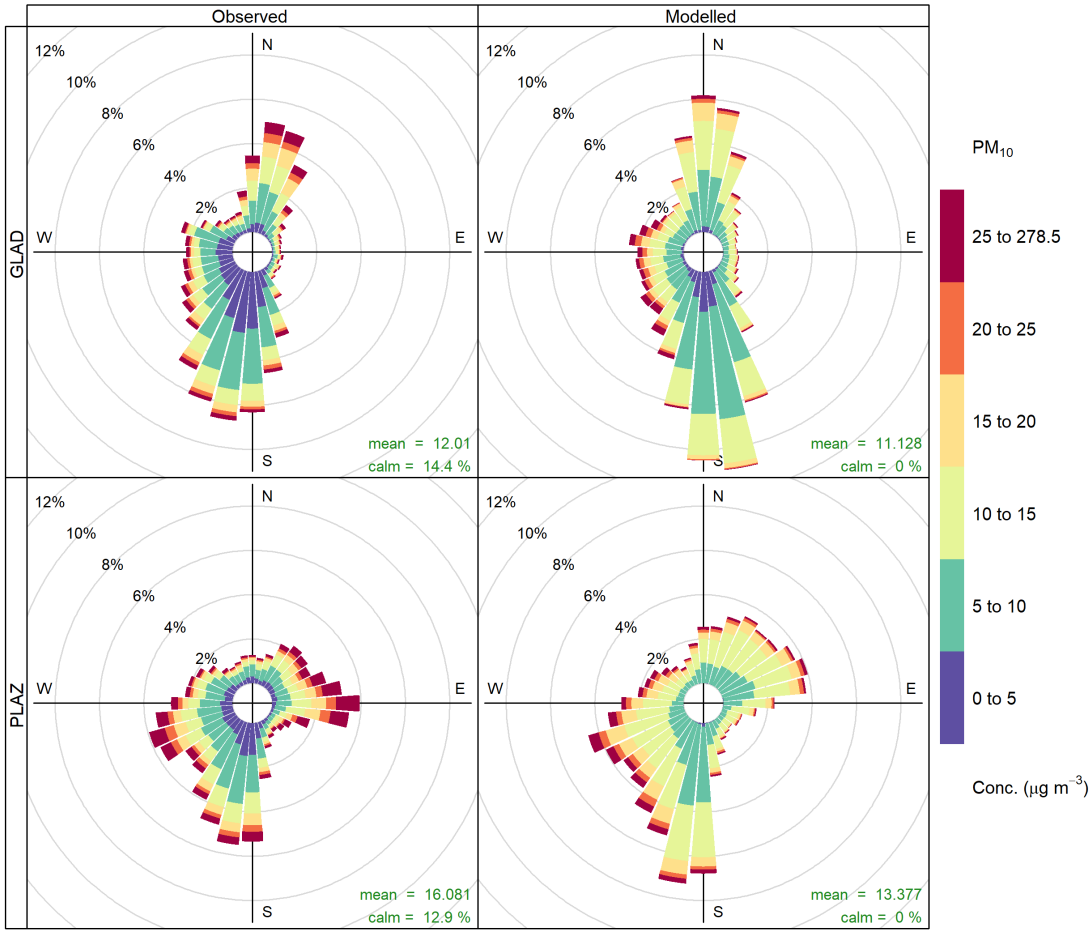


Figure 4. Hourly pollution roses for observed and CALPUFF modelled PM_{10} concentrations at the PLAZ and GLAD observation stations for the 2014 – 2016 period. The plots display frequency of counts for six PM_{10} (µg m^{-3}) 'bins' by wind direction. Frequencies are shown in the northwest quadrant, radiating from the center. The mean of all hourly PM_{10} concentrations over the 3 years is displayed in the bottom right for each station along with the percent frequency of calm winds (those < 0.5 m s^{-1} for observations only).

At all three stations observing PM_{10} there are bimodal peaks in the daily hourly averages for the 2014 - 2016 period (Figure A). The mean model outputs also display the bimodal peaks, with GLAD matching the observed pattern best. At BCRW the modelled morning peak around 07:00 is close to half that of the observations. The evening peak around 20:00 is slightly higher in the

model outputs than in the observations. Both peaks are shifted back by one to two hours in the model outputs. Morning observations of PM_{10} at GLAD are underpredicted here (less so than at BCRW), however the evening peak is slightly underpredicted as well. The evening peak is highest of all in the observations at PLAZ. This peak is captured better than the morning peak at PLAZ, which is nearly half that of the observations. There is an additional, smaller peak in modelled hour average PM_{10} concentrations at PLAZ not seen in the observations. The modelled monthly averages fit the observations quite well (Figure B). There are peaks in mean February and November PM_{10} observations that are not simulated in the model. Concentrations at PLAZ are underpredicted from February through May, but this is not seen at the other observation stations. The model does not accurately simulate the day-of-week pattern for PM_{10} (Figure C), suggesting that differential allocation of emissions from some activities that are much higher during the week compared with weekends is not strong enough.

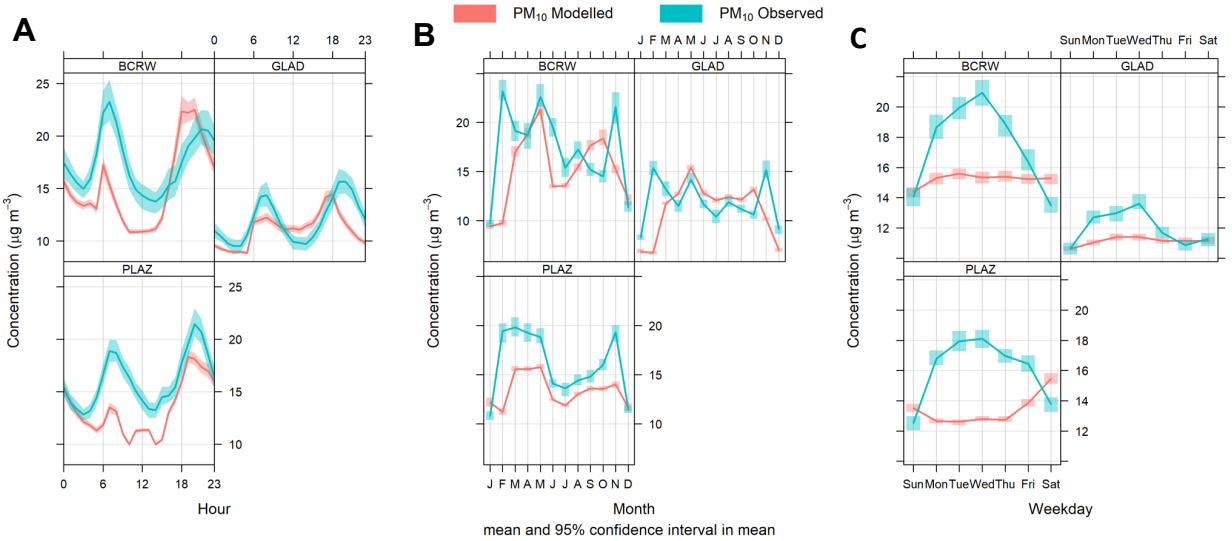


Figure 5. The variation with time of the observed (blue) and CALPUFF modelled (red) hourly PM_{10} concentrations (µg m^{-3}) at the BCRW, GLAD, and PLAZ observation stations. Each station's observations were grouped by (A) hour-of-day, (B) month of the year, and (C) day-of-week. This was done for the CALPUFF model outputs at these locations as well. Then the mean and 95% confidence interval in the mean were calculated for each group, with the uncertainty intervals determined using bootstrap resampling.

5.2. Evaluation of $PM_{2.5}$

Only two observation stations regularly measured $PM_{2.5}$ during the modelling period, PLAZ and GLAD, both of which also had hourly wind observations. Observed winds are 14.2% and 12.9% calm at GLAD and PLAZ respectively (Figure). Observed winds less than 0.5 m s^{-1} are considered calm due to instrument limitations. Modelled winds, however, are never calm due to how the model interpolates observation data. Approximately half of the hourly observations of $PM_{2.5}$ at GLAD when winds are from the south are less than 2 µg m^{-3}. This is not seen in the model outputs at that location, however, due to the mean background levels all being above 3 µg m^{-3}. Hourly $PM_{2.5}$ concentrations greater than 14 µg m^{-3} are underpredicted by the model at GLAD when winds are from the northeast and to a lesser extent from the south to southeast.

Hourly $PM_{2.5}$ concentrations greater than 14 µg m^{-3} are also underpredicted by the model at PLAZ when winds are from the east to northeast.

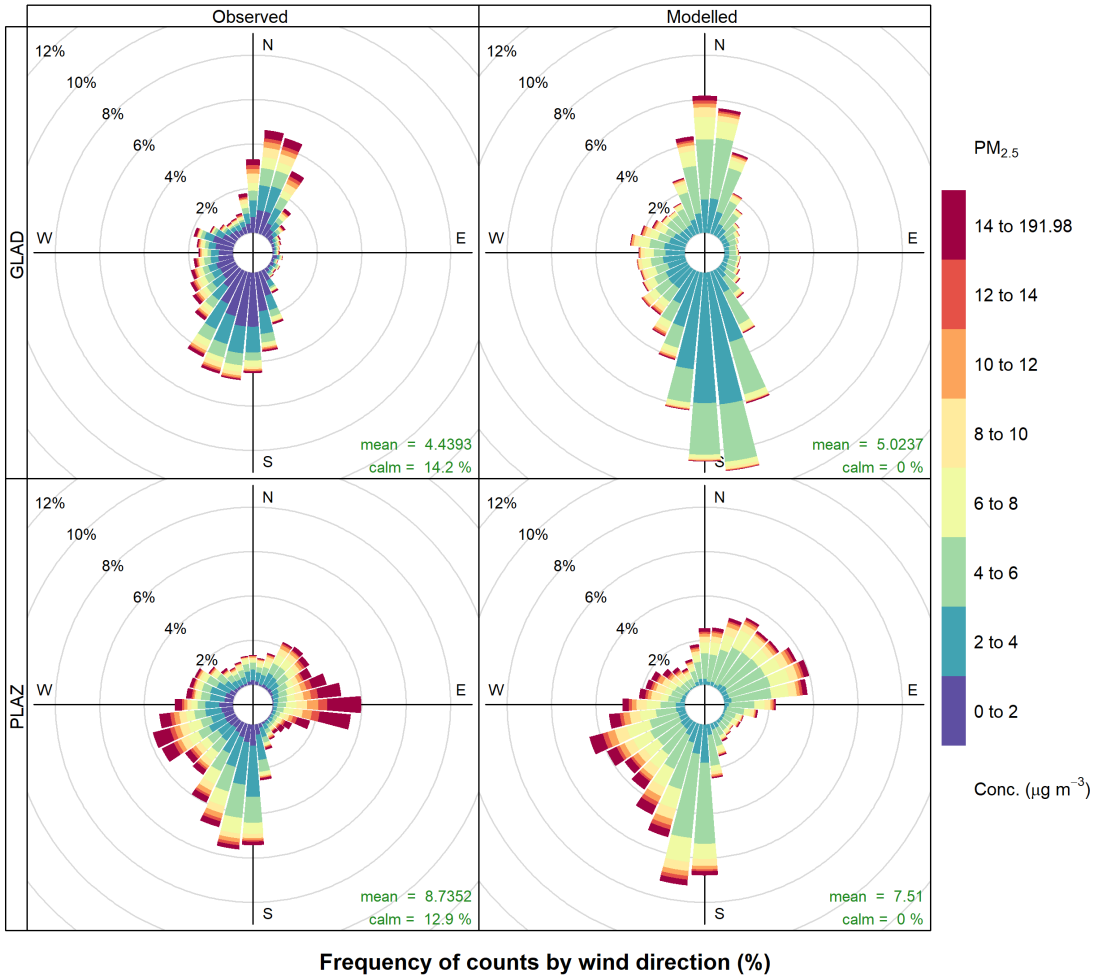


Figure 6. Hourly pollution roses for observed and CALPUFF modelled $PM_{2.5}$ concentrations at the PLAZ and GLAD observation stations for the 2014 – 2016 period. The plots display frequency of counts for eight $PM_{2.5}$ (µg m^{-3}) 'bins' by wind direction. Frequencies are shown in the northwest quadrant, radiating from the center. The mean of all hourly $PM_{2.5}$ concentrations over the 3 years is displayed in the bottom right for each station along with the percent frequency of calm winds (those < 0.5 m s^{-1} for observations only).

Similar to PM_{10}, observed daily one-hour averages of $PM_{2.5}$ for the 2014 -2016 period at GLAD and PLAZ are bimodal with peaks at 07:00 for both mornings and at 20:00 and 23:00 at GLAD and PLAZ respectively for the evening (Figure A). Hour average $PM_{2.5}$ GLAD observations and model outputs are approximately half that of PLAZ. Model outputs perform the worst at GLAD from 08:00 to 14:00, and the evening peak is shifted back two hours from the observations. At PLAZ the model underpredicts the morning peak and has an additional peak at 13:00. The evening model outputs match the observations well, with a slightly earlier peak. Monthly averages of $PM_{2.5}$ peaks in February and November at both stations (Figure B). At GLAD, the model overpredicts monthly average $PM_{2.5}$ concentrations from May to September. The monthly pattern fits the observations better at PLAZ, however, the peak values in February and November

are underpredicted. Day-of-week $PM_{2.5}$ concentrations at GLAD match well Monday through Wednesday, however, the model overpredicts $PM_{2.5}$ concentrations the remaining days (Figure C). The model does not predict the day-of-week $PM_{2.5}$ concentrations at PLAZ well, tending to overpredict the weekend concentrations and underpredict the weekday concentrations. This over-prediction on weekends may be due to an overestimation in residential woodburning emissions that are higher on weekends.

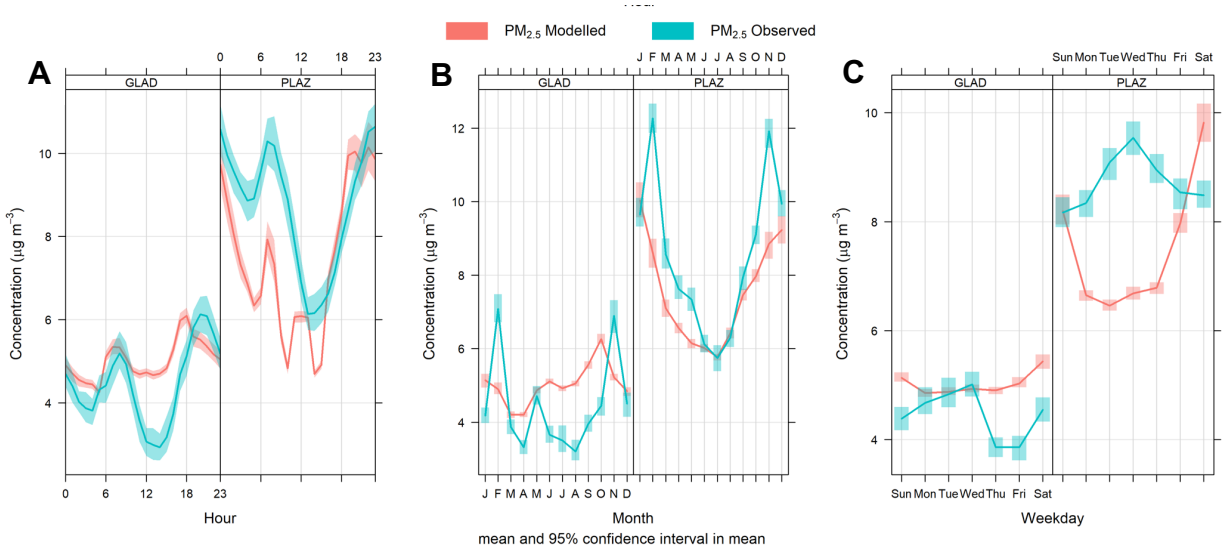


Figure 7 The variation with time of the observed (blue) and CALPUFF modelled (red) hourly $PM_{2.5}$ concentrations (µg m^{-3}) at the GLAD and PLAZ observation stations. Each station's observations were grouped by (A) hour-of-day, (B) month of the year, and (C) day-of-week. This was done for the CALPUFF model outputs at these locations as well. Then the mean and 95% confidence interval in the mean were calculated for each group, with the uncertainty intervals determined using bootstrap resampling.

6. Conclusions: Limitations, Future Work and Recommendations

The model is judged to be generally successful for the pollutants of most interest ($PM_{2.5}$ and PM_{10}) for longer term averages, however evaluation of the CALPUFF dispersion model results point to several possible issues. Many of these issues can be due to inadequacies in the MEI as well as limitations of the CALMET system. CALPUFF modelled concentrations are linearly related to the emission amounts in the MEI; if the emissions are too low or high then the modelled concentrations will also be too low or high by the same relative amount. CALMET forms the basis for the dispersion of pollutants in the CALPUFF model and consequently has a strong influence on the resulting modelled concentrations. A perfect modelling system does not exist; however, it is important to acknowledge possible limitations when using the CALPUFF model results and to outline future improvements to be made.

Unlike previous renditions of the project, emissions from open burning were not included. In 2005, this source only made up 3% of the modelled annual average $PM_{2.5}$ concentration at the Plaza 400 site (Stantec 2010). Since 2005, open burning has been eliminated within the city, which would further reduce the actual open burning emissions in 2014-2016. Based on data from the Open Fire Tracking System, there were approximately forty open burns per year within the

model domain from 2014 - 2016. Additional details on the date, size and duration of each fire were not available. Consequently, due to time constraints, open burning emissions were not included, which would slightly reduce the total modelled PM_{10} and $PM_{2.5}$.

Emissions from rail activity have likely increased since 2005 due to the implementation of an inland port terminal in Prince George in 2007. Emission and rail activity data were requested, but not provided. Modelled concentrations from rail emissions using 2005 data are relatively low in most neighbourhoods however these values are almost certainly underestimated, given the increase in rail activity in 2014 – 2016 compared with in 2005.

Several other sources were also not updated with 2014 - 2016 data. These sources were considered lower priority due to their small relative impact and/or lower risk of significant changes in the 11-year period.

Pollution roses at PLAZ and GLAD comparing CALPUFF outputs of $PM_{2.5}$ and PM_{10} with observations suggest that emissions from Residential Heating, 96% of which are from wood burning, contribute to a higher than expected proportion of the ambient $PM_{2.5}$ levels in many neighborhoods in the Winter. When winds are from the south to west at Plaza 400, placing the monitoring site downwind from several of the residential areas, the model overpredicts $PM_{2.5}$ by approximately 17%, indicating that residential wood burning emissions may be overestimated. This is also suggested by the hebdomadal pattern of PM2.5 showing higher-than-expected modelled levels on weekends (when residential wood burning is highest in the emission inventory). The overprediction by the model suggesting overestimation of residential wood emissions should be investigated further.

When winds are from the east to northeast (winds coming from the heavy industrial area) PM_{10} and $PM_{2.}$ are both underpredicted by the model at Plaza 400. PM_{10} is underpredicted at Plaza from this wind sector by ~42%, similarly for $PM_{2.5}$ (~41%). These underpredictions are much less when winds are from other directions for particulate matter (5% for PM_{10} and 8% for $PM_{2.5}$). Industrial emissions are modelled using an average value which is either on or off, depending on whether the site is operating at that time. Average values are determined from stack test results for the major sources - these stack tests are performed under normal operating conditions at facilities and may not represent emissions under sub-optimal conditions, so may under-represent true average emission rates. Also, in reality these emissions can vary by time of year and time of day. As many of these average values are based on a few single-point-in-time measurements, this variability is not captured. Several of these average values are from allocations produced from tests done on similar equipment which may be underestimating the and PM emission rates. Since the majority of PM in the heavy industrial area to the northeast of Plaza 400 is emitted from stacks, this underprediction suggests that either the average emission rates of these pollutants is underestimated in the MEI, or that the modelling system is diluting and dispersing the emissions too well.

7. References

(BCMoE) British Columbia Ministry of Environment & Climate Change Strategy (2018). British Columbia Ambient Air Quality Objectives. Provincial Air Quality Objective Information Sheet. Accessed October 6th, 2019 from: https://www2.gov.bc.ca/assets/gov/environment/air-land-water/air/reports-pub/aqotable.pdf

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Stantec (2010): Prince George Air Quality Dispersion Modelling Study – A Revision. Final Report, Ministry of Environment Environmental Protection Division, Prince George, BC.

8. CALPUFF Input File

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CALPUFF.INP     2.0             File version record

Template for creating all CALPUFF.INP files

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                   CALPUFF MODEL CONTROL FILE
                   --------------------------

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

INPUT GROUP: 0 -- Input and Output File Names

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Default Name  Type           File Name
------------  ----           ---------
CALMET.DAT    input    * METDAT =             *
    or
ISCMET.DAT    input    * ISCDAT =             *
    or
PLMMET.DAT    input    * PLMDAT =             *
    or
PROFILE.DAT   input    * PRFDAT =             *
SURFACE.DAT   input    * SFCDAT =             *
RESTARTB.DAT  input    * RSTARTB=             *
------------------------------------------------------------------------------
CALPUFF.LST   output   ! PUFLST = /pub/atmos/PGEI-2019/CALPUFF/v6.42/output/2per/p1699/14/fb1/2per_fb1_14.lst
!
CONC.DAT      output   ! CONDAT = /pub/atmos/PGEI-2019/CALPUFF/v6.42/output/2per/p1699/14/fb1/2per_fb1_14.con
!
DFLX.DAT      output   * DFDAT  =             *
WFLX.DAT      output   * WFDAT  =             *

VISB.DAT      output   * VISDAT =             *
TK2D.DAT      output   * T2DDAT =             *
RHO2D.DAT     output   * RHODAT =             *
RESTARTE.DAT  output   * RSTARTE=             *
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Emission Files
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PTEMARB.DAT   input    ! PTDAT  = /pub/atmos/PGEI-2019/CALPUFF/v6.42/input/2per/p1699/14/2per_fb1_14.ems   !
VOLEMARB.DAT  input    * VOLDAT = XXXXXX   *
BAEMARB.DAT   input    * ARDAT  = XXXXXX   *
LNEMARB.DAT   input    * LNDAT  = XXXXXX   *
------------------------------------------------------------------------------
Other Files
-----------
OZONE.DAT     input    * OZDAT  =             *
VD.DAT        input    * VDDAT  =             *
CHEM.DAT      input    * CHEMDAT=             *
AUX           input    ! AUXEXT =aux     !
(Extension added to METDAT filename(s) for files
 with auxiliary 2D and 3D data)
H2O2.DAT      input    * H2O2DAT=             *
NH3Z.DAT      input    * NH3ZDAT=             *
HILL.DAT      input    * HILDAT=             *
HILLRCT.DAT   input    * RCTDAT=             *
COASTLN.DAT   input    * CSTDAT=             *
FLUXBDY.DAT   input    * BDYDAT=             *
BCON.DAT      input    * BCNDAT=             *
DEBUG.DAT     output   * DEBUG =             *
MASSFLX.DAT   output   * FLXDAT=             *
MASSBAL.DAT   output   * BALDAT=             *
FOG.DAT       output   * FOGDAT=             *
RISE.DAT      output   * RISDAT=             *
PFTRAK.DAT    output   * TRKDAT=             *
------------------------------------------------------------------------------

------------------------------------------------------------------------------
    UNBC Netcdf output file
Default Name  Type           File Name
------------  ----           ---------
NETCDF.NCF    output   * NETCDF= XXXXXX *
------------------------------------------------------------------------------
```

```
All file names will be converted to lower case if LCFILES = T
Otherwise, if LCFILES = F, file names will be converted to UPPER CASE
         T = lower case      ! LCFILES = T !
         F = UPPER CASE
NOTE: (1) file/path names can be up to 70 characters in length


Provision for multiple input files
----------------------------------

     Number of CALMET.DAT Domains (NMETDOM)
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     Number of CALMET.DAT files for run (NMETDAT)
     (Total for ALL Domains)
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     Number of PTEMARB.DAT files for run (NPTDAT)
                                   Default: 0       ! NPTDAT =  0  !

     Number of BAEMARB.DAT files for run (NARDAT)
                                   Default: 0       ! NARDAT =  0  !

     Number of VOLEMARB.DAT files for run (NVOLDAT)
                                   Default: 0       ! NVOLDAT =  0  !

!END!

-------------
Subgroup (0a)
-------------

  The following CALMET.DAT filenames are processed in sequence
  if NMETDAT>1

  Enter NMETDAT lines, 1 line for each file name.

                                   a,c,d
Default Name  Type          File Name
------------  ----          ---------
 one          input    ! METDAT1 = met_2014_late_winter.dat  !   !END!
 two          input    ! METDAT1 = met_2014_spring.dat  !   !END!
 three        input    ! METDAT1 = met_2014_summer.dat  !   !END!
 four         input    ! METDAT1 = met_2014_fall.dat  !   !END!
 five         input    ! METDAT1 = met_2014_early_winter.dat  !   !END!

-------------
    a
     The name for each CALMET domain and each CALMET.DAT file is treated
     as a separate input subgroup and therefore must end with an input
     group terminator.
    b
     Use DOMAIN1= to assign the name for the outermost CALMET domain.
     Use DOMAIN2= to assign the name for the next inner CALMET domain.
     Use DOMAIN3= to assign the name for the next inner CALMET domain, etc.
      ---------------------------------------------------------------------
      |   When inner domains with equal resolution (grid-cell size)      |
      |   overlap, the data from the FIRST such domain in the list will  |
      |   be used if all other criteria for choosing the controlling     |
      |   grid domain are inconclusive.                                   |
      ---------------------------------------------------------------------
    c
     Use METDAT1= to assign the file names for the outermost CALMET domain.
     Use METDAT2= to assign the file names for the next inner CALMET domain.
     Use METDAT3= to assign the file names for the next inner CALMET domain, etc.
    d
     The filenames for each domain must be provided in sequential order


-------------
Subgroup (0b)
-------------

  The following PTEMARB.DAT filenames are processed in sequence if NPTDAT>0

Default Name  Type          File Name
------------  ----          ---------
 none         input       * PTDAT=     *   *END*
```

```
-------------
Subgroup (0c)
-------------

  The following BAEMARB.DAT filenames are processed in sequence if NARDAT>0

Default Name  Type          File Name
------------  ----          ---------
 none         input       * ARDAT=     *   *END*


-------------
Subgroup (0d)
-------------

  The following VOLEMARB.DAT filenames are processed in sequence if NARDAT>0

Default Name  Type          File Name
------------  ----          ---------
 none         input       * VOLDAT=     *   *END*

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

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

    Option to run all periods found
    in the met. file     (METRUN)   Default: 0       ! METRUN =   0  !

         METRUN = 0 - Run period explicitly defined below
         METRUN = 1 - Run all periods in met. file

     Starting date:    Year   (IBYR)  --    No default   ! IBYR  =  2014  !
                       Month  (IBMO)  --    No default   ! IBMO  =  1 !
                       Day    (IBDY)  --    No default   ! IBDY  =  1 !
     Starting time:    Hour   (IBHR)  --    No default   ! IBHR  =  0 !
                       Minute (IBMIN) --    No default   ! IBMIN =  0  !
                       Second (IBSEC) --    No default   ! IBSEC =  0  !

     Ending date:      Year   (IEYR)  --    No default   ! IEYR  =  2015  !
                       Month  (IEMO)  --    No default   ! IEMO  =  1 !
                       Day    (IEDY)  --    No default   ! IEDY  =  1 !
     Ending time:      Hour   (IEHR)  --    No default   ! IEHR  =  0 !
                       Minute (IEMIN) --    No default   ! IEMIN =  0  !
                       Second (IESEC) --    No default   ! IESEC =  0  !

     (These are only used if METRUN = 0)

     Base time zone        (ABTZ) -- No default       ! ABTZ=UTC-0800 !
      (character*8)
     The modeling domain may span multiple time zones.  ABTZ defines the
     base time zone used for the entire simulation.  This must match the
     base time zone of the meteorological data.
     Examples:
         Los Angeles, USA          = UTC-0800
         New York, USA             = UTC-0500
         Santiago, Chile           = UTC-0400
         Greenwich Mean Time (GMT) = UTC+0000
         Rome, Italy               = UTC+0100
         Cape Town, S.Africa       = UTC+0200
         Sydney, Australia         = UTC+1000

     Length of modeling time-step (seconds)
     Equal to update period in the primary
     meteorological data files, or an
     integer fraction of it (1/2, 1/3 ...)
     Must be no larger than 1 hour
     (NSECDT)                        Default:3600     ! NSECDT =  3600  !
                                     Units: seconds

     Number of chemical species (NSPEC)
                                     Default: 5       ! NSPEC =  8   !

     Number of chemical species
     to be emitted  (NSE)            Default: 3       ! NSE =  5   !
```

```
     Flag to stop run after
     SETUP phase (ITEST)             Default: 2       ! ITEST =  2   !
     (Used to allow checking
     of the model inputs, files, etc.)
           ITEST = 1 - STOPS program after SETUP phase
           ITEST = 2 - Continues with execution of program
                       after SETUP

     Restart Configuration:

        Control flag (MRESTART)      Default: 0       ! MRESTART =  0   !

           0 = Do not read or write a restart file
           1 = Read a restart file at the beginning of
               the run
           2 = Write a restart file during run
           3 = Read a restart file at beginning of run
               and write a restart file during run

        Number of periods in Restart
        output cycle (NRESPD)        Default: 0       ! NRESPD =  0   !

           0 = File written only at last period
          >0 = File updated every NRESPD periods

     Meteorological Data Format (METFM)
                                     Default: 1       ! METFM =  1   !

           METFM = 1 - CALMET binary file (CALMET.MET)
           METFM = 2 - ISC ASCII file (ISCMET.MET)
           METFM = 3 - AUSPLUME ASCII file (PLMMET.MET)
           METFM = 4 - CTDM plus tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)
           METFM = 5 - AERMET tower file (PROFILE.DAT) and
                       surface parameters file (SURFACE.DAT)

     Meteorological Profile Data Format (MPRFFM)
            (used only for METFM = 1, 2, 3)
                                     Default: 1       ! MPRFFM =  1   !

           MPRFFM = 1 - CTDM plus tower file (PROFILE.DAT)
           MPRFFM = 2 - AERMET tower file (PROFILE.DAT)

     PG sigma-y is adjusted by the factor (AVET/PGTIME)**0.2
     Averaging Time (minutes) (AVET)
                                     Default: 60.0    ! AVET = 60. !
     PG Averaging Time (minutes) (PGTIME)
                                     Default: 60.0    ! PGTIME = 60. !


     Output units for binary concentration and flux files
     written in Dataset v2.2 or later formats
     (IOUTU)                         Default: 1       ! IOUTU = 1 !
         1 = mass      -  g/m3 (conc) or g/m2/s (dep)
         2 = odour     -  odour_units (conc)
         3 = radiation -  Bq/m3 (conc) or Bq/m2/s (dep)


     Output Dataset format for binary concentration
     and flux files (e.g., CONC.DAT)
     (IOVERS)                        Default: 2       ! IOVERS = 2 !
         1 = Dataset Version 2.1
         2 = Dataset Version 2.2



!END!


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

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


     Vertical distribution used in the
     near field (MGAUSS)                  Default: 1     ! MGAUSS =  1   !
        0 = uniform
```

```
   1 = Gaussian

Terrain adjustment method
(MCTADJ)                              Default: 3     ! MCTADJ =  3   !
   0 = no adjustment
   1 = ISC-type of terrain adjustment
   2 = simple, CALPUFF-type of terrain
       adjustment
   3 = partial plume path adjustment

Subgrid-scale complex terrain
flag (MCTSG)                          Default: 0     ! MCTSG =  0   !
   0 = not modeled
   1 = modeled

Near-field puffs modeled as
elongated slugs? (MSLUG)              Default: 0     ! MSLUG =  0   !
   0 = no
   1 = yes (slug model used)

Transitional plume rise modeled?
(MTRANS)                              Default: 1     ! MTRANS =  1   !
   0 = no  (i.e., final rise only)
   1 = yes (i.e., transitional rise computed)

Stack tip downwash? (MTIP)            Default: 1     ! MTIP =  1  !
   0 = no  (i.e., no stack tip downwash)
   1 = yes (i.e., use stack tip downwash)

Method used to compute plume rise for
point sources not subject to building
downwash? (MRISE)                     Default: 1     ! MRISE =  1  !
   1 = Briggs plume rise
   2 = Numerical plume rise

Method used to simulate building
downwash? (MBDW)                      Default: 1     ! MBDW =   1  !
   1 = ISC method
   2 = PRIME method

Vertical wind shear modeled above
stack top? (MSHEAR)                   Default: 0     ! MSHEAR =  0  !
   0 = no  (i.e., vertical wind shear not modeled)
   1 = yes (i.e., vertical wind shear modeled)

Puff splitting allowed? (MSPLIT)      Default: 0     ! MSPLIT =  0  !
   0 = no (i.e., puffs not split)
   1 = yes (i.e., puffs are split)

Chemical mechanism flag (MCHEM)       Default: 1     ! MCHEM =  3   !
   0 = chemical transformation not
       modeled
   1 = transformation rates computed
       internally (MESOPUFF II scheme)
   2 = user-specified transformation
       rates used
   3 = transformation rates computed
       internally (RIVAD/ARM3 scheme)
   4 = secondary organic aerosol formation
       computed (MESOPUFF II scheme for OH)
   5 = user-specified half-life with or
       without transfer to child species
   6 = transformation rates computed
       internally (Updated RIVAD scheme with
       ISORROPIA equilibrium)
   7 = transformation rates computed
       internally (Updated RIVAD scheme with
       ISORROPIA equilibrium and CalTech SOA)

Aqueous phase transformation flag (MAQCHEM)
(Used only if MCHEM = 1, or 3)        Default: 0     ! MAQCHEM =  0   !
   0 = aqueous phase transformation
       not modeled
   1 = transformation rates and wet
       scavenging coefficients adjusted
       for in-cloud aqueous phase reactions
       (adapted from RADM cloud model
        implementation in CMAQ/SCICHEM)
```

```
Liquid Water Content flag (MLWC)
(Used only if MAQCHEM = 1)            Default: 1     ! MLWC =  1   !
   0 = water content estimated from cloud cover
       and presence of precipitation
   1 = gridded cloud water data read from CALMET
       water content output files (filenames are
       the CALMET.DAT names PLUS the extension
       AUXEXT provided in Input Group 0)

Wet removal modeled ? (MWET)          Default: 1     ! MWET =  1   !
   0 = no
   1 = yes

Dry deposition modeled ? (MDRY)       Default: 1     ! MDRY =  1   !
   0 = no
   1 = yes
   (dry deposition method specified
    for each species in Input Group 3)


Gravitational settling (plume tilt)
modeled ? (MTILT)                     Default: 0     ! MTILT =  0   !
   0 = no
   1 = yes
   (puff center falls at the gravitational
    settling velocity for 1 particle species)

Restrictions:
    - MDRY  = 1
    - NSPEC = 1  (must be particle species as well)
    - sg    = 0  GEOMETRIC STANDARD DEVIATION in Group 8 is
                 set to zero for a single particle diameter

Method used to compute dispersion
coefficients (MDISP)                  Default: 3     ! MDISP =  2   !

   1 = dispersion coefficients computed from measured values
       of turbulence, sigma v, sigma w
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
       the MESOPUFF II eqns.
   5 = CTDM sigmas used for stable and neutral conditions.
       For unstable conditions, sigmas are computed as in
       MDISP = 3, described above.  MDISP = 5 assumes that
       measured values are read

Sigma-v/sigma-theta, sigma-w measurements used? (MTURBVW)
(Used only if MDISP = 1 or 5)         Default: 3     ! MTURBVW =  3  !
   1 = use sigma-v or sigma-theta measurements
       from PROFILE.DAT to compute sigma-y
       (valid for METFM = 1, 2, 3, 4, 5)
   2 = use sigma-w measurements
       from PROFILE.DAT to compute sigma-z
       (valid for METFM = 1, 2, 3, 4, 5)
   3 = use both sigma-(v/theta) and sigma-w
       from PROFILE.DAT to compute sigma-y and sigma-z
       (valid for METFM = 1, 2, 3, 4, 5)
   4 = use sigma-theta measurements
       from PLMMET.DAT to compute sigma-y
       (valid only if METFM = 3)

Back-up method used to compute dispersion
when measured turbulence data are
missing (MDISP2)                      Default: 3     ! MDISP2 =  3  !
(used only if MDISP = 1 or 5)
   2 = dispersion coefficients from internally calculated
       sigma v, sigma w using micrometeorological variables
       (u*, w*, L, etc.)
   3 = PG dispersion coefficients for RURAL areas (computed using
       the ISCST multi-segment approximation) and MP coefficients in
       urban areas
   4 = same as 3 except PG coefficients computed using
```

```
       the MESOPUFF II eqns.

[DIAGNOSTIC FEATURE]
Method used for Lagrangian timescale for Sigma-y
(used only if MDISP=1,2 or MDISP2=1,2)
(MTAULY)                              Default: 0     ! MTAULY =  0  !
   0 = Draxler default 617.284 (s)
   1 = Computed as Lag. Length / (.75 q) -- after SCIPUFF
  10 < Direct user input (s)             -- e.g., 306.9


[DIAGNOSTIC FEATURE]
Method used for Advective-Decay timescale for Turbulence
(used only if MDISP=2 or MDISP2=2)
(MTAUADV)                             Default: 0     ! MTAUADV =  0  !
   0 = No turbulence advection
   1 = Computed (OPTION NOT IMPLEMENTED)
  10 < Direct user input (s)   -- e.g., 800


Method used to compute turbulence sigma-v &
sigma-w using micrometeorological variables
(Used only if MDISP = 2 or MDISP2 = 2)
(MCTURB)                              Default: 1     ! MCTURB =  1  !
   1 = Standard CALPUFF subroutines
   2 = AERMOD subroutines

PG sigma-y,z adj. for roughness?      Default: 0     ! MROUGH =  0  !
(MROUGH)
   0 = no
   1 = yes

Partial plume penetration of          Default: 1     ! MPARTL =  1  !
elevated inversion modeled for
point sources?
(MPARTL)
   0 = no
   1 = yes

Partial plume penetration of          Default: 1     ! MPARTLBA =  1  !
elevated inversion modeled for
buoyant area sources?
(MPARTLBA)
   0 = no
   1 = yes

Strength of temperature inversion     Default: 0     ! MTINV =  0  !
provided in PROFILE.DAT extended records?
(MTINV)
   0 = no (computed from measured/default gradients)
   1 = yes

PDF used for dispersion under convective conditions?
                                      Default: 0     ! MPDF =  1  !
(MPDF)
   0 = no
   1 = yes

Sub-Grid TIBL module used for shore line?
                                      Default: 0     ! MSGTIBL = 0  !
(MSGTIBL)
   0 = no
   1 = yes

Boundary conditions (concentration) modeled?
                                      Default: 0     ! MBCON = 0  !
(MBCON)
   0 = no
   1 = yes, using formatted BCON.DAT file
   2 = yes, using unformatted CONC.DAT file

Note:  MBCON > 0 requires that the last species modeled
       be 'BCON'.  Mass is placed in species BCON when
       generating boundary condition puffs so that clean
       air entering the modeling domain can be simulated
       in the same way as polluted air.  Specify zero
       emission of species BCON for all regular sources.
```

```
     Individual source contributions saved?
                                        Default: 0     ! MSOURCE = 0  !
     (MSOURCE)
        0 = no
        1 = yes


     Analyses of fogging and icing impacts due to emissions from
     arrays of mechanically-forced cooling towers can be performed
     using CALPUFF in conjunction with a cooling tower emissions
     processor (CTEMISS) and its associated postprocessors.  Hourly
     emissions of water vapor and temperature from each cooling tower
     cell are computed for the current cell configuration and ambient
     conditions by CTEMISS. CALPUFF models the dispersion of these
     emissions and provides cloud information in a specialized format
     for further analysis. Output to FOG.DAT is provided in either
     'plume mode' or 'receptor mode' format.

     Configure for FOG Model output?
                                        Default: 0     ! MFOG =  0   !
     (MFOG)
        0 = no
        1 = yes  - report results in PLUME Mode format
        2 = yes  - report results in RECEPTOR Mode format


     Test options specified to see if
     they conform to regulatory
     values? (MREG)                     Default: 1     ! MREG =  0   !

        0 = NO checks are made
        1 = Technical options must conform to USEPA
            Long Range Transport (LRT) guidance
                       METFM    1 or 2
                       AVET     60. (min)
                       PGTIME   60. (min)
                       MGAUSS   1
                       MCTADJ   3
                       MTRANS   1
                       MTIP     1
                       MRISE    1
                       MCHEM    1 or 3 (if modeling SOx, NOx)
                       MWET     1
                       MDRY     1
                       MDISP    2 or 3
                       MPDF     0 if MDISP=3
                                1 if MDISP=2
                       MROUGH   0
                       MPARTL   1
                       MPARTLBA 0
                       SYTDEP   550. (m)
                       MHFTSZ   0
                       SVMIN    0.5 (m/s)


!END!


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

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

------------
Subgroup (3a)
------------

  The following species are modeled:

! CSPEC =          SO2 !         !END!
! CSPEC =          SO4 !         !END!
! CSPEC =           NO !         !END!
! CSPEC =          NO2 !         !END!
! CSPEC =         HNO3 !         !END!
! CSPEC =          NO3 !         !END!
! CSPEC =         PM10 !         !END!
! CSPEC =        PM2.5 !         !END!
```

```
                                                                  Dry                OUTPUT GROUP
    SPECIES          MODELED          EMITTED       DEPOSITED                        NUMBER
     NAME         (0=NO, 1=YES)    (0=NO, 1=YES)    (0=NO,                         (0=NONE,
   (Limit: 12                                        1=COMPUTED-GAS                 1=1st CGRUP,
    Characters                                       2=COMPUTED-PARTICLE            2=2nd CGRUP,
    in length)                                       3=USER-SPECIFIED)              3= etc.)

!          SO2  =         1,              1,           1,                0   !
!          SO4  =         1,              0,           2,                0   !
!           NO  =         1,              1,           1,                0   !
!          NO2  =         1,              1,           1,                0   !
!         HNO3  =         1,              0,           1,                0   !
!          NO3  =         1,              0,           2,                0   !
!         PM10  =         1,              1,           2,                0   !
!        PM2.5  =         1,              1,           2,                0   !


!END!

  Note:  The last species in (3a) must be 'BCON' when using the
         boundary condition option (MBCON > 0).  Species BCON should
         typically be modeled as inert (no chem transformation or
         removal).


-------------
Subgroup (3b)
-------------
  The following names are used for Species-Groups in which results
  for certain species are combined (added) prior to output.  The
  CGRUP name will be used as the species name in output files.
  Use this feature to model specific particle-size distributions
  by treating each size-range as a separate species.
  Order must be consistent with 3(a) above.


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


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

     Projection for all (X,Y):
     -------------------------

     Map projection
     (PMAP)                    Default: UTM    ! PMAP = UTM  !

         UTM :  Universal Transverse Mercator
         TTM :  Tangential Transverse Mercator
         LCC :  Lambert Conformal Conic
          PS :  Polar Stereographic
          EM :  Equatorial Mercator
        LAZA :  Lambert Azimuthal Equal Area

     False Easting and Northing (km) at the projection origin
     (Used only if PMAP= TTM, LCC, or LAZA)
     (FEAST)                   Default=0.0     ! FEAST  = 0.000  !
     (FNORTH)                  Default=0.0     ! FNORTH = 0.000  !

     UTM zone (1 to 60)
     (Used only if PMAP=UTM)
     (IUTMZN)                  No Default      ! IUTMZN =  10   !

     Hemisphere for UTM projection?
     (Used only if PMAP=UTM)
     (UTMHEM)                  Default: N      ! UTMHEM = N  !
         N   :  Northern hemisphere projection
         S   :  Southern hemisphere projection

     Latitude and Longitude (decimal degrees) of projection origin
     (Used only if PMAP= TTM, LCC, PS, EM, or LAZA)
     (RLAT0)                   No Default      ! RLAT0 = 0N  !
     (RLON0)                   No Default      ! RLON0 = 0E  !

         TTM :  RLON0 identifies central (true N/S) meridian of projection
                RLAT0 selected for convenience
```

```
          LCC :  RLON0 identifies central (true N/S) meridian of projection
                 RLAT0 selected for convenience
          PS  :  RLON0 identifies central (grid N/S) meridian of projection
                 RLAT0 selected for convenience
          EM  :  RLON0 identifies central meridian of projection
                 RLAT0 is REPLACED by 0.0N (Equator)
          LAZA:  RLON0 identifies longitude of tangent-point of mapping plane
                 RLAT0 identifies latitude of tangent-point of mapping plane

     Matching parallel(s) of latitude (decimal degrees) for projection
     (Used only if PMAP= LCC or PS)
     (XLAT1)                    No Default      ! XLAT1 = 0N  !
     (XLAT2)                    No Default      ! XLAT2 = 0N  !

          LCC :  Projection cone slices through Earth's surface at XLAT1 and XLAT2
          PS  :  Projection plane slices through Earth at XLAT1
                 (XLAT2 is not used)

     ----------
     Note:  Latitudes and longitudes should be positive, and include a
            letter N,S,E, or W indicating north or south latitude, and
            east or west longitude.  For example,
            35.9  N Latitude  =  35.9N
            118.7 E Longitude = 118.7E


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

     The Datum-Region for the coordinates is identified by a character
     string.  Many mapping products currently available use the model of the
     Earth known as the World Geodetic System 1984 (WGS-84).  Other local
     models may be in use, and their selection in CALMET will make its output
     consistent with local mapping products.  The list of Datum-Regions with
     official transformation parameters is provided by the National Imagery and
     Mapping Agency (NIMA).

     NIMA Datum - Regions(Examples)
     ------------------------------------------------------------------------------
     WGS-84    WGS-84 Reference Ellipsoid and Geoid, Global coverage (WGS84)
     NAS-C     NORTH AMERICAN 1927 Clarke 1866 Spheroid, MEAN FOR CONUS (NAD27)
     NAR-C     NORTH AMERICAN 1983 GRS 80 Spheroid, MEAN FOR CONUS (NAD83)
     NWS-84    NWS 6370KM Radius, Sphere
     ESR-S     ESRI REFERENCE 6371KM Radius, Sphere

     Datum-region for output coordinates
     (DATUM)                    Default: WGS-84    ! DATUM = WGS-84  !


METEOROLOGICAL Grid:

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

            No. X grid cells (NX)      No default     ! NX =  40   !
            No. Y grid cells (NY)      No default     ! NY =  40   !
         No. vertical layers (NZ)      No default     ! NZ =  12   !

           Grid spacing (DGRIDKM)      No default     ! DGRIDKM = 1.0 !
                                       Units: km

                Cell face heights
                    (ZFACE(nz+1))      No defaults
                                       Units: m
   ! ZFACE = .0, 20.0, 50.0, 80.0, 110.0, 150.0, 200.0, 300.0, 400.0, 800.0,
              1400.0, 2000.0, 3000.0 !

            Reference Coordinates
           of SOUTHWEST corner of
                grid cell(1, 1):

            X coordinate (XORIGKM)     No default     ! XORIGKM = 500.0 !
            Y coordinate (YORIGKM)     No default     ! YORIGKM = 5955.0 !
                                      Units: km


COMPUTATIONAL Grid:
```

```
     The computational grid is identical to or a subset of the MET. grid.
     The lower left (LL) corner of the computational grid is at grid point
     (IBCOMP, JBCOMP) of the MET. grid.  The upper right (UR) corner of the
     computational grid is at grid point (IECOMP, JECOMP) of the MET. grid.
     The grid spacing of the computational grid is the same as the MET. grid.

        X index of LL corner (IBCOMP)      No default     ! IBCOMP =  1   !
                  (1 <= IBCOMP <= NX)

        Y index of LL corner (JBCOMP)      No default     ! JBCOMP =  1   !
                  (1 <= JBCOMP <= NY)


        X index of UR corner (IECOMP)      No default     ! IECOMP =  40   !
                  (1 <= IECOMP <= NX)

        Y index of UR corner (JECOMP)      No default     ! JECOMP =  40   !
                  (1 <= JECOMP <= NY)


SAMPLING Grid (GRIDDED RECEPTORS):

     The lower left (LL) corner of the sampling grid is at grid point
     (IBSAMP, JBSAMP) of the MET. grid.  The upper right (UR) corner of the
     sampling grid is at grid point (IESAMP, JESAMP) of the MET. grid.
     The sampling grid must be identical to or a subset of the computational
     grid.  It may be a nested grid inside the computational grid.
     The grid spacing of the sampling grid is DGRIDKM/MESHDN.

        Logical flag indicating if gridded
        receptors are used (LSAMP)         Default: T     ! LSAMP = F !
        (T=yes, F=no)

        X index of LL corner (IBSAMP)      No default     ! IBSAMP =  1   !
         (IBCOMP <= IBSAMP <= IECOMP)

        Y index of LL corner (JBSAMP)      No default     ! JBSAMP =  1   !
         (JBCOMP <= JBSAMP <= JECOMP)


        X index of UR corner (IESAMP)      No default     ! IESAMP =  40   !
         (IBCOMP <= IESAMP <= IECOMP)

        Y index of UR corner (JESAMP)      No default     ! JESAMP =  40   !
         (JBCOMP <= JESAMP <= JECOMP)


       Nesting factor of the sampling
        grid (MESHDN)                      Default: 1     ! MESHDN =  1  !
        (MESHDN is an integer >= 1)

!END!


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


INPUT GROUP: 5 -- Output Options
--------------
                                        *                         *
     FILE                       DEFAULT VALUE             VALUE THIS RUN
     ----                       -------------             --------------

   Concentrations (ICON)              1                   !  ICON =  1   !
   Dry Fluxes (IDRY)                  1                   !  IDRY =  0   !
   Wet Fluxes (IWET)                  1                   !  IWET =  0   !
   2D Temperature (IT2D)              0                   !  IT2D =  0   !
   2D Density (IRHO)                  0                   !  IRHO =  0   !
   Relative Humidity (IVIS)           1                   !  IVIS =  0   !
    (relative humidity file is
     required for visibility
     analysis)
   Use data compression option in output file?
   (LCOMPRS)                           Default: T         ! LCOMPRS = T !

   *
    0 = Do not create file, 1 = create file
```

```
QA PLOT FILE OUTPUT OPTION:

   Create a standard series of output files (e.g.
   locations of sources, receptors, grids ...)
   suitable for plotting?
   (IQAPLOT)                      Default: 1         !  IQAPLOT =  1   !
     0 = no
     1 = yes

DIAGNOSTIC PUFF-TRACKING OUTPUT OPTION:

   Puff locations and properties reported to
   PFTRAK.DAT file for postprocessing?
   (IPFTRAK)                      Default: 0         ! IPFTRAK =  0   !
     0 = no
     1 = yes, update puff output at end of each timestep
     2 = yes, update puff output at end of each sampling step

DIAGNOSTIC MASS FLUX OUTPUT OPTIONS:

   Mass flux across specified boundaries
   for selected species reported?
   (IMFLX)                        Default: 0         ! IMFLX =  0  !
     0 = no
     1 = yes (FLUXBDY.DAT and MASSFLX.DAT filenames
              are specified in Input Group 0)

   Mass balance for each species
   reported?
   (IMBAL)                        Default: 0         ! IMBAL =  0  !
     0 = no
     1 = yes (MASSBAL.DAT filename is
          specified in Input Group 0)


NUMERICAL RISE OUTPUT OPTION:

   Create a file with plume properties for each rise
   increment, for each model timestep?
   This applies to sources modeled with numerical rise
   and is limited to ONE source in the run.
   (INRISE)                       Default: 0         ! INRISE =  0  !
     0 = no
     1 = yes (RISE.DAT filename is
              specified in Input Group 0)


LINE PRINTER OUTPUT OPTIONS:

   Print concentrations (ICPRT)    Default: 0         ! ICPRT =  0   !
   Print dry fluxes (IDPRT)        Default: 0         ! IDPRT =  0   !
   Print wet fluxes (IWPRT)        Default: 0         ! IWPRT =  0   !
   (0 = Do not print, 1 = Print)

   Concentration print interval
   (ICFRQ) in timesteps            Default: 1         ! ICFRQ =  1   !
   Dry flux print interval
   (IDFRQ) in timesteps            Default: 1         ! IDFRQ =  1   !
   Wet flux print interval
   (IWFRQ) in timesteps            Default: 1         ! IWFRQ =  1   !

   Units for Line Printer Output
   (IPRTU)                        Default: 1         ! IPRTU =  3   !
                  for             for
              Concentration    Deposition
       1 =       g/m**3          g/m**2/s
       2 =      mg/m**3         mg/m**2/s
       3 =      ug/m**3         ug/m**2/s
       4 =      ng/m**3         ng/m**2/s
       5 =     Odour Units
       6 =      TBq/m**3        TBq/m**2/s    TBq=terabecquerel
       7 =      GBq/m**3        GBq/m**2/s    GBq=gigabecquerel
       8 =       Bq/m**3         Bq/m**2/s    Bq=becquerel (disintegrations/s)

   Messages tracking progress of run
   written to the screen ?
```

```
       (IMESG)                          Default: 2         ! IMESG =  2   !
         0 = no
         1 = yes (advection step, puff ID)
         2 = yes (YYYYJJJHH, # old puffs, # emitted puffs)


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

                 ---- CONCENTRATIONS ----   ------ DRY FLUXES ------   ------ WET FLUXES ------   -- MASS FLUX
--
   SPECIES
   /GROUP        PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   PRINTED?  SAVED ON DISK?   SAVED ON
DISK?
   -------       ------------------------   ------------------------   ------------------------   -------------
--
!          SO2 =     0,           1,           0,           0,           0,           0,           0   !
!          SO4 =     0,           1,           0,           0,           0,           0,           0   !
!           NO =     0,           1,           0,           0,           0,           0,           0   !
!          NO2 =     0,           1,           0,           0,           0,           0,           0   !
!         HNO3 =     0,           1,           0,           0,           0,           0,           0   !
!          NO3 =     0,           1,           0,           0,           0,           0,           0   !
!         PM10 =     0,           1,           0,           0,           0,           0,           0   !
!        PM2.5 =     0,           1,           0,           0,           0,           0,           0   !

  Note:  Species BCON (for MBCON > 0) does not need to be saved on disk.


     OPTIONS FOR PRINTING "DEBUG" QUANTITIES (much output)

       Logical for debug output
       (LDEBUG)                                 Default: F     ! LDEBUG = F !

       First puff to track
       (IPFDEB)                                 Default: 1     ! IPFDEB =  1  !

       Number of puffs to track
       (NPFDEB)                                 Default: 1     ! NPFDEB =  1  !

       Met. period to start output
       (NN1)                                    Default: 1     ! NN1 =  1   !

       Met. period to end output
       (NN2)                                    Default: 10    ! NN2 =  10  !

!END!


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


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

---------------
Subgroup (6a)
---------------
       Number of terrain features (NHILL)       Default: 0     ! NHILL =  0   !

       Number of special complex terrain
       receptors  (NCTREC)                      Default: 0     ! NCTREC =  0   !

       Terrain and CTSG Receptor data for
       CTSG hills input in CTDM format ?
       (MHILL)                                  No Default     ! MHILL =  2   !
       1 = Hill and Receptor data created
           by CTDM processors & read from
           HILL.DAT and HILLRCT.DAT files
       2 = Hill data created by OPTHILL &
           input below in Subgroup (6b);
           Receptor data in Subgroup (6c)

       Factor to convert horizontal dimensions  Default: 1.0   ! XHILL2M = 1.0 !
       to meters (MHILL=1)

       Factor to convert vertical dimensions    Default: 1.0   ! ZHILL2M = 1.0 !
       to meters (MHILL=1)

       X-origin of CTDM system relative to      No Default     ! XCTDMKM = 0 !
```

```
       CALPUFF coordinate system, in Kilometers (MHILL=1)

       Y-origin of CTDM system relative to      No Default     ! YCTDMKM = 0 !
       CALPUFF coordinate system, in Kilometers (MHILL=1)

! END !

---------------
Subgroup (6b)
---------------

                      1 **
     HILL information


HILL            XC         YC        THETAH   ZGRID  RELIEF    EXPO 1    EXPO 2   SCALE 1    SCALE 2    AMAX1
AMAX2
 NO.           (km)       (km)       (deg.)    (m)      (m)       (m)        (m)       (m)         (m)        (m)
(m)
----          ----       ----       ------   -----  ------    ------    ------   -------    -------    -----     -
----

---------------
Subgroup (6c)
---------------

    COMPLEX TERRAIN RECEPTOR INFORMATION

                      XRCT         YRCT         ZRCT          XHH
                      (km)         (km)          (m)
                     ------       -----       ------         ----


-------------------
1
     Description of Complex Terrain Variables:
          XC, YC  = Coordinates of center of hill
          THETAH  = Orientation of major axis of hill (clockwise from
                    North)
          ZGRID   = Height of the  0  of the grid above mean sea
                    level
          RELIEF  = Height of the crest of the hill above the grid elevation
          EXPO 1  = Hill-shape exponent for the major axis
          EXPO 2  = Hill-shape exponent for the major axis
          SCALE 1 = Horizontal length scale along the major axis
          SCALE 2 = Horizontal length scale along the minor axis
          AMAX    = Maximum allowed axis length for the major axis
          BMAX    = Maximum allowed axis length for the major axis

          XRCT, YRCT = Coordinates of the complex terrain receptors
          ZRCT    = Height of the ground (MSL) at the complex terrain
                    Receptor
          XHH     = Hill number associated with each complex terrain receptor
                    (NOTE: MUST BE ENTERED AS A REAL NUMBER)

   **
     NOTE: DATA for each hill and CTSG receptor are treated as a separate
           input subgroup and therefore must end with an input group terminator.

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


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

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

!          SO2 =      .1509,        1000.0,           8.0,              .0,                  .04 !
!           NO =      .1345,           1.0,           2.0,             25.0,                18.0 !
!          NO2 =      .1656,           1.0,           8.0,              5.0,                 3.5 !
!         HNO3 =      .1628,           1.0,          18.0,              .0,               .0000001 ! * 8.0e-8
in the user-guide...?*

NOTE:
```

```
  These values come from an old input file from either John Spagnol or the company Stantec
  (on cluster.unbc.ca: '/hpc/u0/atmos/PGAIR/calpuff/v6.42/input/2per/p12092/05/old/IS1.INP')
  Different values in http://www.harvestenergy.ca/upload/editor/File/Volume_3_Appendix_B.pdf or in the user-
guide.

!END!


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


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

     For SINGLE SPECIES, the mean and standard deviation are used to
     compute a deposition velocity for NINT (see group 9) size-ranges,
     and these are then averaged to obtain a mean deposition velocity.

     For GROUPED SPECIES, the size distribution should be explicitly
     specified (by the 'species' in the group), and the standard deviation
     for each should be entered as 0.  The model will then use the
     deposition velocity for the stated mean diameter.

      SPECIES      GEOMETRIC MASS MEAN        GEOMETRIC STANDARD
       NAME             DIAMETER                 DEVIATION
                        (microns)                (microns)
      -------      -------------------        ------------------
!          SO4 =           .48,                      2.0   !
!          NO3 =           .48,                      2.0   !
!         PM10 =           4.0,                      2.0   !
!        PM2.5 =           1.5,                      2.0   !

NOTE:
  PM10's GEOMETRIC MASS MEAN DIAMETER :
  sometimes 3.0 sometimes 1.0 in John's files,
  but 2.0  in http://www.dnr.mo.gov/env/apcp/docs/appendixk-1.pdf,
  but 0.48 in http://www.epa.gov/scram001/reports/tsd_calpuff_for_bart.pdf
  but 0.48 in http://www.harvestenergy.ca/upload/editor/File/Volume_3_Appendix_B.pdf

!END!


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


INPUT GROUP: 9 -- Miscellaneous dry deposition parameters
--------------

     Reference cuticle resistance (s/cm)
     (RCUTR)                          Default: 30    !  RCUTR = 30.0 !
     Reference ground resistance  (s/cm)
     (RGR)                            Default: 10    !    RGR = 10.0 !
     Reference pollutant reactivity
     (REACTR)                         Default: 8     ! REACTR = 8.0 !

     Number of particle-size intervals used to
     evaluate effective particle deposition velocity
     (NINT)                           Default: 9     !   NINT =  9  !

     Vegetation state in unirrigated areas
     (IVEG)                           Default: 1     !   IVEG =  1   !
        IVEG=1 for active and unstressed vegetation
        IVEG=2 for active and stressed vegetation
        IVEG=3 for inactive vegetation

!END!


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


INPUT GROUP: 10 -- Wet Deposition Parameters
---------------


                     Scavenging Coefficient -- Units: (sec)**(-1)

       Pollutant      Liquid Precip.       Frozen Precip.
```

```
      ---------      --------------       --------------
!          SO2 =         3.0E-05,              0.0E00 !
!          SO4 =         1.0E-04,             3.0E-05 !
!           NO =          0.0E00,              0.0E00 !
!          NO2 =          0.0E00,              0.0E00 !
!         HNO3 =         6.0E-05,              0.0E00 !
!          NO3 =         1.0E-04,             3.0E-05 !
!         PM10 =         1.0E-04,             3.0E-05 !
!        PM2.5 =         1.0E-04,             3.0E-05 !

NOTE:
  Different values in
  http://www.harvestenergy.ca/upload/editor/File/Volume_3_Appendix_B.pdf
  or in

http://www.blm.gov/pgdata/etc/medialib/blm/co/programs/land_use_planning/rmp/white_river/documents/ARTSD.Par.73
831.File.dat/Appendix%20E%20-%20CALPUFF%20Input%20File.pdf

!END!


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


INPUT GROUP: 11 -- Chemistry Parameters
---------------

     Several parameters are needed for one or more of the chemical transformation
     mechanisms.  Those used for each mechanism are:
                                      M                 B
                                      A  B  R  R  R     C  B        N
                                 B    V  C  N  N  N  M  K  C  O     D
                                 C  M  G  K  I  I  I  H  H  K  F  V  E
                              M  K  N  N  N  T  T  T  2  2  P  R  C  C
                              O  O  H  H  H  E  E  E  O  O  M  A  N  A
     Mechanism (MCHEM)        Z  3  3  3  3  1  2  3  2  2  F  C  X  Y
     --------------------   ----------------------------------------------
     0 None                   .  .  .  .  .  .  .  .  .  .  .  .  .  .
     1 MESOPUFF II            X  X  .  .  X  X  X  X  .  .  .  .  .  .
     2 User Rates             .  .  .  .  .  .  .  .  .  .  .  .  .  .
     3 RIVAD                  X  X  .  .  X  .  .  .  .  .  .  .  .  .
     4 SOA                    X  X  .  .  .  .  .  .  .  .  X  X  X  .
     5 Radioactive Decay      .  .  .  .  .  .  .  .  .  .  .  .  .  X
     6 RIVAD/ISORRPIA         X  X  X  X  X  X  .  .  X  X  .  .  .  .
     7 RIVAD/ISORRPIA/SOA     X  X  X  X  X  X  .  .  X  X  X  X  .  .


     Ozone data input option (MOZ)     Default: 1            ! MOZ =  0   !
     (Used only if MCHEM = 1, 3, or 4)
        0 = use a monthly background ozone value
        1 = read hourly ozone concentrations from
            the OZONE.DAT data file

     Monthly ozone concentrations
     (Used only if MCHEM = 1, 3, or 4 and
      MOZ = 0 or MOZ = 1 and all hourly O3 data missing)
     (BCKO3) in ppb                    Default: 12*80.
     !  BCKO3 = 35.00, 40.00, 42.50, 45.00, 45.00, 36.00, 32.50, 30.00, 30.00, 30.00, 31.00, 32.50 !

     Ammonia data option (MNH3)        Default: 0            ! MNH3 =  0   !
     (Used only if MCHEM = 6 or 7)
        0 = use monthly background ammonia values (BCKNH3) - no vertical variation
        1 = read monthly background ammonia values for each layer from
            the NH3Z.DAT data file

     Ammonia vertical averaging option (MAVGNH3)
     (Used only if MCHEM = 6 or 7, and MNH3 = 1)
        0 = use NH3 at puff center height (no averaging is done)
        1 = average NH3 values over vertical extent of puff
                                       Default: 1            ! MAVGNH3 =  0   !

     Monthly ammonia concentrations
     (Used only if MCHEM = 1, or 3)
     (BCKNH3) in ppb                   Default: 12*10.
     !  BCKNH3 =  1.20,  0.80,  0.75,  0.63,  0.47,  0.44,  0.41,  0.42,  0.24,  0.30,  0.65,  1.14 !

     Nighttime SO2 loss rate in %/hour (RNITE1)
     (Used only if MCHEM = 1, 6 or 7)
```

```
     This rate is used only at night for MCHEM=1
     and is added to the computed rate both day
     and night for MCHEM=6,7 (heterogeneous reactions)
                                    Default: 0.2          ! RNITE1 = .2 !

     Nighttime NOx loss rate (RNITE2)
     in percent/hour                Default: 2.0          ! RNITE2 = 2.0 !

     Nighttime HNO3 formation rate (RNITE3)
     in percent/hour                Default: 2.0          ! RNITE3 = 2.0 !

     H2O2 data input option (MH2O2)    Default: 1         ! MH2O2 =  0   !
     (Used only if MAQCHEM = 1)
        0 = use a monthly background H2O2 value
        1 = read hourly H2O2 concentrations from
            the H2O2.DAT data file

     Monthly H2O2 concentrations
     (Used only if MQACHEM = 1 and
      MH2O2 = 0 or MH2O2 = 1 and all hourly H2O2 data missing)
     (BCKH2O2) in ppb               Default: 12*1.
     !  BCKH2O2 = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !


 --- Data for SECONDARY ORGANIC AEROSOL (SOA) Option
     (used only if MCHEM = 4 or 7)

    The MCHEM = 4 SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)
          VOC / NOX ratio (after reaction)         (VCNX)

     The MCHEM = 7 SOA module uses monthly values of:
          Fine particulate concentration in ug/m^3 (BCKPMF)
          Organic fraction of fine particulate     (OFRAC)

     These characterize the air mass when computing
     the formation of SOA from VOC emissions.
     Typical values for several distinct air mass types are:

        Month    1    2    3    4    5    6    7    8    9   10   11   12
                Jan  Feb  Mar  Apr  May  Jun  Jul  Aug  Sep  Oct  Nov  Dec

     Clean Continental
        BCKPMF   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.   1.
        OFRAC  .15  .15  .20  .20  .20  .20  .20  .20  .20  .20  .20  .15
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

     Clean Marine (surface)
        BCKPMF  .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5   .5
        OFRAC  .25  .25  .30  .30  .30  .30  .30  .30  .30  .30  .30  .25
        VCNX    50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.  50.

     Urban - low biogenic (controls present)
        BCKPMF  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.  30.
        OFRAC  .20  .20  .25  .25  .25  .25  .25  .20  .20  .20  .20  .20
        VCNX     4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.   4.

     Urban - high biogenic (controls present)
        BCKPMF  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.  60.
        OFRAC  .25  .25  .30  .30  .30  .55  .55  .55  .35  .35  .35  .25
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

     Regional Plume
        BCKPMF  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.  20.
        OFRAC  .20  .20  .25  .35  .25  .40  .40  .40  .30  .30  .30  .20
        VCNX    15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.  15.

     Urban - no controls present
        BCKPMF 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100. 100.
        OFRAC  .30  .30  .35  .35  .35  .55  .55  .55  .35  .35  .35  .30
        VCNX     2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.   2.

     Default: Clean Continental
     !  BCKPMF = 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00, 1.00 !
     !  OFRAC  = 0.15, 0.15, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.20, 0.15 !
     !  VCNX   = 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00, 50.00 !
```

```
      Number of half-life decay specification blocks provided in Subgroup 11b
     (Used only if MCHEM = 5)
     (NDECAY)                                  Default: 0      ! NDECAY =  0   !

!END!

--------------
Subgroup (11b)
--------------

     Each species modeled may be assigned a decay half-life (sec), and the associated
     mass lost may be assigned to one or more other modeled species using a mass yield
     factor. This information is used only for MCHEM=5.

     Provide NDECAY blocks assigning the half-life for a parent species and mass yield
     factors for each child species (if any) produced by the decay.
     Set HALF_LIFE=0.0 for NO decay (infinite half-life).

                             a            b
        SPECIES      Half-Life   Mass Yield
         NAME          (sec)       Factor
        -------      ---------   ----------

     *   SPEC1   =    3600.,        -1.0   *    (Parent)
     *   SPEC2   =     -1.0,         0.0   *    (Child)
   *END*

--------
    a
     Specify a half life that is greater than or equal to zero for 1 parent species
     in each block, and set the yield factor for this species to -1
    b
     Specify a yield factor that is greater than or equal to zero for 1 or more child
     species in each block, and set the half-life for each of these species to -1

     NOTE: Assignments in each block are treated as a separate input
           subgroup and therefore must end with an input group terminator.
           If NDECAY=0, no assignments and input group terminators should appear.
-------------------------------------------------------------------------------


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

     Horizontal size of puff (m) beyond which
     time-dependent dispersion equations (Heffter)
     are used to determine sigma-y and
     sigma-z (SYTDEP)                          Default: 550.   ! SYTDEP = 5.5E02 !

     Switch for using Heffter equation for sigma z
     as above (0 = Not use Heffter; 1 = use Heffter
     (MHFTSZ)                                  Default: 0      ! MHFTSZ =  0   !

     Stability class used to determine plume
     growth rates for puffs above the boundary
     layer (JSUP)                              Default: 5      ! JSUP =  5   !

     Vertical dispersion constant for stable
     conditions (k1 in Eqn. 2.7-3)  (CONK1)    Default: 0.01   ! CONK1 = .01 !

     Vertical dispersion constant for neutral/
     unstable conditions (k2 in Eqn. 2.7-4)
     (CONK2)                                   Default: 0.1    ! CONK2 = .1 !

     Factor for determining Transition-point from
     Schulman-Scire to Huber-Snyder Building Downwash
     scheme (SS used for Hs < Hb + TBD * HL)
     (TBD)                                     Default: 0.5    ! TBD = .5 !
        TBD < 0   ==> always use Huber-Snyder
        TBD = 1.5 ==> always use Schulman-Scire
        TBD = 0.5 ==> ISC Transition-point

     Range of land use categories for which
     urban dispersion is assumed
     (IURB1, IURB2)                            Default: 10     ! IURB1 =  10  !
                                                        19     ! IURB2 =  19  !

     Site characterization parameters for single-point Met data files ---------
```

```
(needed for METFM = 2,3,4,5)

   Land use category for modeling domain
   (ILANDUIN)                          Default: 20     ! ILANDUIN =  20  !

   Roughness length (m) for modeling domain
   (Z0IN)                              Default: 0.25   ! Z0IN = .25 !

   Leaf area index for modeling domain
   (XLAIIN)                            Default: 3.0    ! XLAIIN = 3.0 !

   Elevation above sea level (m)
   (ELEVIN)                            Default: 0.0    ! ELEVIN = .0 !

   Latitude (degrees) for met location
   (XLATIN)                            Default: -999.  ! XLATIN = -999.0 !

   Longitude (degrees) for met location
   (XLONIN)                            Default: -999.  ! XLONIN = -999.0 !

Specialized information for interpreting single-point Met data files -----

   Anemometer height (m) (Used only if METFM = 2,3)
   (ANEMHT)                            Default: 10.    ! ANEMHT = 10.0 !

   Form of lateral turbulance data in PROFILE.DAT file
   (Used only if METFM = 4,5 or MTURBVW = 1 or 3)
   (ISIGMAV)                           Default: 1      ! ISIGMAV =  1  !
       0 = read sigma-theta
       1 = read sigma-v

   Choice of mixing heights (Used only if METFM = 4)
   (IMIXCTDM)                          Default: 0      ! IMIXCTDM =  0  !
       0 = read PREDICTED mixing heights
       1 = read OBSERVED mixing heights

Maximum length of a slug (met. grid units)
(XMXLEN)                               Default: 1.0    ! XMXLEN = 1.0 !

Maximum travel distance of a puff/slug (in
grid units) during one sampling step
(XSAMLEN)                              Default: 1.0    ! XSAMLEN = 1.0 !

Maximum Number of slugs/puffs release from
one source during one time step
(MXNEW)                                Default: 99     ! MXNEW =  99   !

Maximum Number of sampling steps for
one puff/slug during one time step
(MXSAM)                                Default: 99     ! MXSAM =  99   !

Number of iterations used when computing
the transport wind for a sampling step
that includes gradual rise (for CALMET
and PROFILE winds)
(NCOUNT)                               Default: 2      ! NCOUNT =  2   !

Minimum sigma y for a new puff/slug (m)
(SYMIN)                                Default: 1.0    ! SYMIN = 1.0  !

Minimum sigma z for a new puff/slug (m)
(SZMIN)                                Default: 1.0    ! SZMIN = 1.0  !

Maximum sigma z (m) allowed to avoid
numerical problem in calculating virtual
time or distance.  Cap should be large
enough to have no influence on normal events.
Enter a negative cap to disable.
(SZCAP_M)                              Default: 5.0e06 ! SZCAP_M = 5.0E06 !

Default minimum turbulence velocities sigma-v and sigma-w
for each stability class over land and over water (m/s)
(SVMIN(12) and SWMIN(12))

                ----------  LAND  ----------       ---------  WATER  ----------
   Stab Class :  A    B    C    D    E    F        A    B    C    D    E    F
                 ---  ---  ---  ---  ---  ---      ---  ---  ---  ---  ---  ---
Default SVMIN : .50, .50, .50, .50, .50, .50,      .37, .37, .37, .37, .37, .37
```

```
Default SWMIN : .20, .12, .08, .06, .03, .016,     .20, .12, .08, .06, .03, .016

      ! SVMIN = 0.500, 0.500, 0.500, 0.500, 0.500, 0.500, 0.370, 0.370, 0.370, 0.370, 0.370, 0.370!
      ! SWMIN = 0.200, 0.120, 0.080, 0.060, 0.030, 0.016, 0.200, 0.120, 0.080, 0.060, 0.030, 0.016!

Divergence criterion for dw/dz across puff
used to initiate adjustment for horizontal
convergence (1/s)
Partial adjustment starts at CDIV(1), and
full adjustment is reached at CDIV(2)
(CDIV(2))                                 Default: 0.0,0.0  ! CDIV = .0, .0 !

Search radius (number of cells) for nearest
land and water cells used in the subgrid
TIBL module
(NLUTIBL)                                 Default: 4      ! NLUTIBL =  4  !

Minimum wind speed (m/s) allowed for
non-calm conditions. Also used as minimum
speed returned when using power-law
extrapolation toward surface
(WSCALM)                                  Default: 0.5    ! WSCALM = .5 !

Maximum mixing height (m)
(XMAXZI)                                  Default: 3000.  ! XMAXZI = 3000.0 !

Minimum mixing height (m)
(XMINZI)                                  Default: 50.    ! XMINZI = 50.0 !

Default wind speed classes --
5 upper bounds (m/s) are entered;
the 6th class has no upper limit
(WSCAT(5))                      Default   :
                                ISC RURAL : 1.54, 3.09, 5.14, 8.23, 10.8 (10.8+)

                          Wind Speed Class :  1     2     3     4     5
                                              ---   ---   ---   ---   ---
                                    ! WSCAT = 1.54, 3.09, 5.14, 8.23, 10.80 !

Default wind speed profile power-law
exponents for stabilities 1-6
(PLX0(6))                       Default   : ISC RURAL values
                                ISC RURAL : .07, .07, .10, .15, .35, .55
                                ISC URBAN : .15, .15, .20, .25, .30, .30

                           Stability Class :  A     B     C     D     E     F
                                              ---   ---   ---   ---   ---   ---
                                      ! PLX0 = 0.07, 0.07, 0.10, 0.15, 0.35, 0.55 !

Default potential temperature gradient
for stable classes E, F (degK/m)
(PTG0(2))                       Default: 0.020, 0.035
                                   ! PTG0 = 0.020,   0.035 !

Default plume path coefficients for
each stability class (used when option
for partial plume height terrain adjustment
is selected -- MCTADJ=3)
(PPC(6))                     Stability Class :  A     B     C     D     E     F
                                Default  PPC : .50,  .50,  .50,  .50,  .35,  .35
                                              ---   ---   ---   ---   ---   ---
                                      !  PPC = 0.50, 0.50, 0.50, 0.50, 0.35, 0.35 !

Slug-to-puff transition criterion factor
equal to sigma-y/length of slug
(SL2PF)                                   Default: 10.        ! SL2PF = 10.0 !

Puff-splitting control variables ------------------------

  VERTICAL SPLIT
  --------------

  Number of puffs that result every time a puff
  is split - nsplit=2 means that 1 puff splits
  into 2
  (NSPLIT)                                Default:   3        ! NSPLIT =  3  !

  Time(s) of a day when split puffs are eligible to
```

```
      be split once again; this is typically set once
      per day, around sunset before nocturnal shear develops.
      24 values: 0 is midnight (00:00) and 23 is 11 PM (23:00)
      0=do not re-split    1=eligible for re-split
      (IRESPLIT(24))                    Default:  Hour 17 = 1
      !  IRESPLIT = 0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0,1,0,0,0,0,0,0 !

      Split is allowed only if last hour's mixing
      height (m) exceeds a minimum value
      (ZISPLIT)                         Default: 100.       ! ZISPLIT = 100.0 !

      Split is allowed only if ratio of last hour's
      mixing ht to the maximum mixing ht experienced
      by the puff is less than a maximum value (this
      postpones a split until a nocturnal layer develops)
      (ROLDMAX)                         Default: 0.25       ! ROLDMAX = 0.25 !


      HORIZONTAL SPLIT
      ----------------

      Number of puffs that result every time a puff
      is split - nsplith=5 means that 1 puff splits
      into 5
      (NSPLITH)                         Default:   5        ! NSPLITH =  5  !

      Minimum sigma-y (Grid Cells Units) of puff
      before it may be split
      (SYSPLITH)                        Default:  1.0       ! SYSPLITH = 1.0 !

      Minimum puff elongation rate (SYSPLITH/hr) due to
      wind shear, before it may be split
      (SHSPLITH)                        Default:  2.        ! SHSPLITH = 2.0 !

      Minimum concentration (g/m^3) of each
      species in puff before it may be split
      Enter array of NSPEC values; if a single value is
      entered, it will be used for ALL species
      (CNSPLITH)                        Default:  1.0E-07   ! CNSPLITH = 1.0E-07 !

    Integration control variables ------------------------

      Fractional convergence criterion for numerical SLUG
      sampling integration
      (EPSSLUG)                         Default:   1.0e-04  ! EPSSLUG = 1.0E-04 !

      Fractional convergence criterion for numerical AREA
      source integration
      (EPSAREA)                         Default:   1.0e-06  ! EPSAREA = 1.0E-06 !

      Trajectory step-length (m) used for numerical rise
      integration
      (DSRISE)                          Default:   1.0      ! DSRISE = 1.0 !

      Boundary Condition (BC) Puff control variables ------------------------

      Minimum height (m) to which BC puffs are mixed as they are emitted
      (MBCON=2 ONLY).  Actual height is reset to the current mixing height
      at the release point if greater than this minimum.
      (HTMINBC)                         Default:   500.     ! HTMINBC = 500.0 !

      Search radius (km) about a receptor for sampling nearest BC puff.
      BC puffs are typically emitted with a spacing of one grid cell
      length, so the search radius should be greater than DGRIDKM.
      (RSAMPBC)                         Default:   10.      ! RSAMPBC = 10.0 !

      Near-Surface depletion adjustment to concentration profile used when
      sampling BC puffs?
      (MDEPBC)                          Default:   1        ! MDEPBC =  1  !
         0 = Concentration is NOT adjusted for depletion
         1 = Adjust Concentration for depletion

!END!

--------------------------------------------------------------------------------
```

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

---------------
Subgroup (13a)
---------------

     Number of point sources with
     parameters provided below      (NPT1)  No default  !  NPT1 =  0  !

     Units used for point source
     emissions below                (IPTU)  Default: 1  !  IPTU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (13d)        (NSPT1) Default: 0  !  NSPT1 =  0  !

     Number of point sources with
     variable emission parameters
     provided in external file      (NPT2)  No default  !  NPT2 =  1  !

     (If NPT2 > 0, these point
     source emissions are read from
     the file: PTEMARB.DAT)

!END!

---------------
Subgroup (13b)
---------------
                                    a
          POINT SOURCE: CONSTANT DATA
          ---------------------------
                                                                          b          c
  Source       X         Y       Stack    Base     Stack    Exit  Exit    Bldg.  Emission
   No.     Coordinate Coordinate Height Elevation Diameter  Vel.  Temp.   Dwash   Rates
              (km)       (km)       (m)      (m)       (m)   (m/s) (deg. K)
  ------   ---------- ---------- ------  ------   -------- ----- -------- ----- --------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

     SRCNAM  is a 12-character name for a source
             (No default)
     X       is an array holding the source data listed by the column headings
             (No default)
     SIGYZI  is an array holding the initial sigma-y and sigma-z (m)
             (Default: 0.,0.)
     FMFAC   is a vertical momentum flux factor (0. or 1.0) used to represent
             the effect of rain-caps or other physical configurations that
             reduce momentum rise associated with the actual exit velocity.
             (Default: 1.0  -- full momentum used)
     ZPLTFM  is the platform height (m) for sources influenced by an isolated
             structure that has a significant open area between the surface
             and the bulk of the structure, such as an offshore oil platform.
             The Base Elevation is that of the surface (ground or ocean),
             and the Stack Height is the release height above the Base (not
             above the platform).  Building heights entered in Subgroup 13c
             must be those of the buildings on the platform, measured from
             the platform deck.  ZPLTFM is used only with MBDW=1 (ISC
             downwash method) for sources with building downwash.
             (Default: 0.0)

    b
     0. = No building downwash modeled
     1. = Downwash modeled for buildings resting on the surface
     2. = Downwash modeled for buildings raised above the surface (ZPLTFM > 0.)
```

```
     NOTE: must be entered as a REAL number (i.e., with decimal point)

    c
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IPTU
     (e.g. 1 for g/s).

---------------
Subgroup (13c)
---------------

           BUILDING DIMENSION DATA FOR SOURCES SUBJECT TO DOWNWASH
           -------------------------------------------------------
Source                                                                  a
 No.       Effective building height, width, length and X/Y offset (in meters)
           every 10 degrees.  LENGTH, XBADJ, and YBADJ are only needed for
           MBDW=2 (PRIME downwash option)
------     ---------------------------------------------------------------------


--------

    a
     Building height, width, length, and X/Y offset from the source are treated
     as a separate input subgroup for each source and therefore must end with
     an input group terminator.  The X/Y offset is the position, relative to the
     stack, of the center of the upwind face of the projected building, with the
     x-axis pointing along the flow direction.

---------------
Subgroup (13d)
---------------
                                              a
          POINT SOURCE: VARIABLE EMISSIONS DATA
          -------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 13b.  Factors entered multiply the rates in 13b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use PTEMARB.DAT and NPT2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                              Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


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


INPUT GROUPS: 14a, 14b, 14c, 14d -- Area source parameters
---------------------------------

---------------
Subgroup (14a)
---------------

     Number of polygon area sources with
     parameters specified below (NAR1)       No default  !  NAR1 =  0   !
```

```
     Units used for area source
     emissions below            (IARU)       Default: 1  !  IARU =   1  !
           1 =        g/m**2/s
           2 =       kg/m**2/hr
           3 =       lb/m**2/hr
           4 =     tons/m**2/yr
           5 =     Odour Unit * m/s  (vol. flux/m**2 of odour compound)
           6 =     Odour Unit * m/min
           7 =     metric tons/m**2/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (14d)        (NSAR1) Default: 0  !  NSAR1 =  0  !

     Number of buoyant polygon area sources
     with variable location and emission
     parameters (NAR2)                      No default  !  NAR2 =  0   !
     (If NAR2 > 0, ALL parameter data for
     these sources are read from the file: BAEMARB.DAT)

!END!

---------------
Subgroup (14b)
---------------
                                   a
          AREA SOURCE: CONSTANT DATA
          ----------------------------
                                                          b
Source           Effect.    Base      Initial    Emission
 No.             Height   Elevation   Sigma z     Rates
                   (m)       (m)        (m)
-------          ------    ------     --------   ---------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IARU
     (e.g. 1 for g/m**2/s).

---------------
Subgroup (14c)
---------------

           COORDINATES (km) FOR EACH VERTEX(4) OF EACH POLYGON
           ----------------------------------------------------------
Source                                                                 a
 No.       Ordered list of X followed by list of Y, grouped by source
------     ------------------------------------------------------------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.


---------------
Subgroup (14d)
---------------
                                          a
          AREA SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 14b.  Factors entered multiply the rates in 14b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use BAEMARB.DAT and NAR2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                           Default: 0
```

```
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)


--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


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

INPUT GROUPS: 15a, 15b, 15c -- Line source parameters
---------------------------

---------------
Subgroup (15a)
---------------

     Number of buoyant line sources
     with variable location and emission
     parameters (NLN2)                             No default  !  NLN2 =  0   !

     (If NLN2 > 0, ALL parameter data for
      these sources are read from the file: LNEMARB.DAT)

     Number of buoyant line sources (NLINES)       No default   ! NLINES =  0  !

     Units used for line source
     emissions below               (ILNU)          Default: 1  !  ILNU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (15c)       (NSLN1) Default: 0  !  NSLN1 =  0  !

     Maximum number of segments used to model
     each line (MXNSEG)                            Default: 7   ! MXNSEG =  7  !

     The following variables are required only if NLINES > 0.  They are
     used in the buoyant line source plume rise calculations.

        Number of distances at which               Default: 6   ! NLRISE =  6  !
        transitional rise is computed

        Average building length (XL)               No default   ! XL = .0 !
                                                   (in meters)

        Average building height (HBL)              No default   ! HBL = .0 !
                                                   (in meters)

        Average building width (WBL)               No default   ! WBL = .0 !
                                                   (in meters)

        Average line source width (WML)            No default   ! WML = .0 !
                                                   (in meters)

        Average separation between buildings (DXL) No default   ! DXL = .0 !
                                                   (in meters)
```

```
        Average buoyancy parameter (FPRIMEL)        No default   ! FPRIMEL = .0 !
                                                    (in m**4/s**3)

!END!

---------------
Subgroup (15b)
---------------

          BUOYANT LINE SOURCE: CONSTANT DATA
          ----------------------------------
                                                                                 a
Source     Beg. X      Beg. Y      End. X    End. Y     Release    Base        Emission
 No.     Coordinate  Coordinate  Coordinate Coordinate  Height    Elevation     Rates
           (km)        (km)        (km)       (km)       (m)       (m)
------   ----------  ----------  ---------  ----------  -------   ---------    ---------

--------

    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by ILNTU
     (e.g. 1 for g/s).

---------------
Subgroup (15c)
---------------
                                                    a
          BUOYANT LINE SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 15b.  Factors entered multiply the rates in 15b.
     Skip sources here that have constant emissions.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)



--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


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


INPUT GROUPS: 16a, 16b, 16c -- Volume source parameters
---------------------------

---------------
Subgroup (16a)
---------------

     Number of volume sources with
     parameters provided in 16b,c (NVL1)     No default  !  NVL1 =  0   !
```

```
     Units used for volume source
     emissions below in 16b       (IVLU)     Default: 1  !  IVLU =   1  !
           1 =        g/s
           2 =       kg/hr
           3 =       lb/hr
           4 =     tons/yr
           5 =     Odour Unit * m**3/s  (vol. flux of odour compound)
           6 =     Odour Unit * m**3/min
           7 =     metric tons/yr

     Number of source-species
     combinations with variable
     emissions scaling factors
     provided below in (16c)      (NSVL1)    Default: 0  !  NSVL1 =  0  !

     Number of volume sources with
     variable location and emission
     parameters                   (NVL2)     No default  !  NVL2 =   0   !

     (If NVL2 > 0, ALL parameter data for
      these sources are read from the VOLEMARB.DAT file(s) )

!END!

---------------
Subgroup (16b)
---------------
                                      a
           VOLUME SOURCE: CONSTANT DATA
           ----------------------------
                                                                          b
         X           Y        Effect.    Base     Initial    Initial    Emission
     Coordinate  Coordinate   Height   Elevation  Sigma y    Sigma z     Rates
        (km)        (km)        (m)       (m)        (m)        (m)
     ----------  ----------   ------    ------    --------   --------   --------


--------
    a
     Data for each source are treated as a separate input subgroup
     and therefore must end with an input group terminator.

    b
     An emission rate must be entered for every pollutant modeled.
     Enter emission rate of zero for secondary pollutants that are
     modeled, but not emitted.  Units are specified by IVLU
     (e.g. 1 for g/s).

---------------
Subgroup (16c)
---------------
                                           a
          VOLUME SOURCE: VARIABLE EMISSIONS DATA
          --------------------------------------

     Use this subgroup to describe temporal variations in the emission
     rates given in 16b.  Factors entered multiply the rates in 16b.
     Skip sources here that have constant emissions.  For more elaborate
     variation in source parameters, use VOLEMARB.DAT and NVL2 > 0.

     IVARY determines the type of variation, and is source-specific:
     (IVARY)                                Default: 0
           0 =       Constant
           1 =       Diurnal cycle (24 scaling factors: hours 1-24)
           2 =       Monthly cycle (12 scaling factors: months 1-12)
           3 =       Hour & Season (4 groups of 24 hourly scaling factors,
                                    where first group is DEC-JAN-FEB)
           4 =       Speed & Stab. (6 groups of 6 scaling factors, where
                                    first group is Stability Class A,
                                    and the speed classes have upper
                                    bounds (m/s) defined in Group 12
           5 =       Temperature   (12 scaling factors, where temperature
                                    classes have upper bounds (C) of:
                                    0, 5, 10, 15, 20, 25, 30, 35, 40,
                                    45, 50, 50+)
```

```
--------
    a
     Data for each species are treated as a separate input subgroup
     and therefore must end with an input group terminator.


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

INPUT GROUPS: 17a & 17b -- Non-gridded (discrete) receptor information
-----------------------

---------------
Subgroup (17a)
---------------

     This value must be consistent with the table length in
     "Subgroup (17c) : NON-GRIDDED (DISCRETE) RECEPTOR DATA"

     Number of non-gridded receptors (NREC)  No default  !  NREC =  1607   !

     Group names can be used to assign receptor locations in
     Subgroup 17c and thereby provide an identification that
     can be referenced when postprocessing receptors.  The
     default assignment name X is used when NRGRP = 0.

     Number of receptor group names (NRGRP)  Default: 0  !  NRGRP =  0   !

!END!

---------------
Subgroup (17b)
---------------

     Provide a name for each receptor group if NRGRP>0.
     Enter NRGRP lines.
                    a,b
            Group Name
            ----------
          * RGRPNAM =           *   *END*


-------------
    a
     Each group name provided is treated as a separate input subgroup
     and therefore must end with an input group terminator.
    b
     Receptor group names must not include blanks.


---------------
Subgroup (17c)
---------------
                                              a
           NON-GRIDDED (DISCRETE) RECEPTOR DATA
           ------------------------------------

This table length must be consistent with:
the "Number of non-gridded receptors (NREC)"

                   X           Y          Ground        Height   b
Receptor       Coordinate   Coordinate    Elevation   Above Ground
  No.             (km)         (km)          (m)           (m)
--------       ----------   ----------    ---------   ------------
0001    ! X =     516.898,    5969.200,       590.0,    11.50!  !END!
0002    ! X =     519.450,    5972.813,       733.3,     3.50!  !END!
0003    ! X =     515.568,    5967.882,       583.0,     9.40!  !END!
0004    ! X =     517.476,    5965.931,       604.0,    10.00!  !END!
0005    ! X =     518.832,    5973.326,       616.0,     3.50!  !END!
0006    ! X =     516.950,    5974.064,       588.0,    23.00!  !END!
0007    ! X =     508.164,    5963.660,       747.8,     4.00!  !END!
0008    ! X =     515.681,    5971.371,       593.0,     5.00!  !END!
0009    ! X =     513.310,    5974.198,       607.0,    10.00!  !END!
0010    ! X =     511.387,    5978.299,       591.2,     3.00!  !END!
0011    ! X =     506.500,    5955.000,       749.9,     1.50!  !END!
0012    ! X =     506.500,    5956.000,       747.0,     1.50!  !END!
0013    ! X =     506.500,    5957.000,       750.0,     1.50!  !END!
0014    ! X =     506.500,    5958.000,       743.5,     1.50!  !END!
0015    ! X =     506.500,    5959.000,       735.5,     1.50!  !END!
```

```
0016    ! X =     506.500,    5960.000,       715.0,    1.50!  !END!
0017    ! X =     506.500,    5961.000,       707.8,    1.50!  !END!
0018    ! X =     506.500,    5962.000,       714.0,    1.50!  !END!
0019    ! X =     506.500,    5963.000,       717.9,    1.50!  !END!
0020    ! X =     506.500,    5964.000,       738.0,    1.50!  !END!
0021    ! X =     506.500,    5965.000,       743.1,    1.50!  !END!
0022    ! X =     506.500,    5966.000,       766.0,    1.50!  !END!
0023    ! X =     506.500,    5967.000,       755.0,    1.50!  !END!
0024    ! X =     506.500,    5968.000,       742.5,    1.50!  !END!
0025    ! X =     506.500,    5969.000,       743.0,    1.50!  !END!
0026    ! X =     506.500,    5970.000,       728.0,    1.50!  !END!
0027    ! X =     506.500,    5971.000,       735.0,    1.50!  !END!
0028    ! X =     506.500,    5972.000,       723.5,    1.50!  !END!
0029    ! X =     506.500,    5973.000,       720.9,    1.50!  !END!
0030    ! X =     506.500,    5974.000,       717.0,    1.50!  !END!
0031    ! X =     506.500,    5975.000,       736.2,    1.50!  !END!
0032    ! X =     506.500,    5976.000,       695.1,    1.50!  !END!
0033    ! X =     506.500,    5977.000,       715.7,    1.50!  !END!
0034    ! X =     506.500,    5978.000,       695.2,    1.50!  !END!
0035    ! X =     506.500,    5979.000,       680.9,    1.50!  !END!
0036    ! X =     506.500,    5980.000,       618.8,    1.50!  !END!
0037    ! X =     506.500,    5981.000,       586.2,    1.50!  !END!
0038    ! X =     506.500,    5982.000,       751.5,    1.50!  !END!
0039    ! X =     506.500,    5983.000,       754.0,    1.50!  !END!
0040    ! X =     506.500,    5984.000,       770.0,    1.50!  !END!
0041    ! X =     506.500,    5985.000,       779.5,    1.50!  !END!
0042    ! X =     506.500,    5986.000,       778.6,    1.50!  !END!
0043    ! X =     506.500,    5987.000,       789.0,    1.50!  !END!
0044    ! X =     506.500,    5988.000,       808.9,    1.50!  !END!
0045    ! X =     506.500,    5989.000,       902.9,    1.50!  !END!
0046    ! X =     506.500,    5990.000,       889.9,    1.50!  !END!
0047    ! X =     507.500,    5955.000,       781.7,    1.50!  !END!
0048    ! X =     507.500,    5956.000,       768.0,    1.50!  !END!
0049    ! X =     507.500,    5957.000,       754.4,    1.50!  !END!
0050    ! X =     507.500,    5958.000,       728.0,    1.50!  !END!
0051    ! X =     507.500,    5959.000,       719.5,    1.50!  !END!
0052    ! X =     507.500,    5960.000,       712.6,    1.50!  !END!
0053    ! X =     507.500,    5961.000,       707.0,    1.50!  !END!
0054    ! X =     507.500,    5962.000,       723.0,    1.50!  !END!
0055    ! X =     507.500,    5963.000,       716.0,    1.50!  !END!
0056    ! X =     507.500,    5964.000,       744.9,    1.50!  !END!
0057    ! X =     507.500,    5965.000,       755.3,    1.50!  !END!
0058    ! X =     507.500,    5966.000,       755.1,    1.50!  !END!
0059    ! X =     507.500,    5967.000,       749.8,    1.50!  !END!
0060    ! X =     507.500,    5968.000,       745.9,    1.50!  !END!
0061    ! X =     507.500,    5969.000,       751.4,    1.50!  !END!
0062    ! X =     507.500,    5970.000,       729.8,    1.50!  !END!
0063    ! X =     507.500,    5971.000,       752.0,    1.50!  !END!
0064    ! X =     507.500,    5972.000,       728.3,    1.50!  !END!
0065    ! X =     507.500,    5973.000,       739.7,    1.50!  !END!
0066    ! X =     507.500,    5974.000,       758.0,    1.50!  !END!
0067    ! X =     507.500,    5975.000,       763.0,    1.50!  !END!
0068    ! X =     507.500,    5976.000,       741.3,    1.50!  !END!
0069    ! X =     507.500,    5977.000,       752.6,    1.50!  !END!
0070    ! X =     507.500,    5978.000,       728.8,    1.50!  !END!
0071    ! X =     507.500,    5979.000,       695.3,    1.50!  !END!
0072    ! X =     507.500,    5980.000,       616.2,    1.50!  !END!
0073    ! X =     507.500,    5981.000,       582.0,    1.50!  !END!
0074    ! X =     507.500,    5982.000,       703.0,    1.50!  !END!
0075    ! X =     507.500,    5983.000,       718.4,    1.50!  !END!
0076    ! X =     507.500,    5984.000,       767.0,    1.50!  !END!
0077    ! X =     507.500,    5985.000,       775.0,    1.50!  !END!
0078    ! X =     507.500,    5986.000,       775.3,    1.50!  !END!
0079    ! X =     507.500,    5987.000,       784.0,    1.50!  !END!
0080    ! X =     507.500,    5988.000,       848.1,    1.50!  !END!
0081    ! X =     507.500,    5989.000,       887.1,    1.50!  !END!
0082    ! X =     507.500,    5990.000,       839.8,    1.50!  !END!
0083    ! X =     508.500,    5955.000,       756.8,    1.50!  !END!
0084    ! X =     508.500,    5956.000,       762.2,    1.50!  !END!
0085    ! X =     508.500,    5957.000,       748.5,    1.50!  !END!
0086    ! X =     508.500,    5958.000,       719.0,    1.50!  !END!
0087    ! X =     508.500,    5959.000,       708.4,    1.50!  !END!
0088    ! X =     508.500,    5960.000,       699.0,    1.50!  !END!
0089    ! X =     508.500,    5961.000,       706.0,    1.50!  !END!
0090    ! X =     508.500,    5962.000,       720.0,    1.50!  !END!
0091    ! X =     508.500,    5963.000,       732.8,    1.50!  !END!
0092    ! X =     508.500,    5964.000,       750.5,    1.50!  !END!
0093    ! X =     508.500,    5965.000,       771.0,    1.50!  !END!
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0094    ! X =     508.500,    5966.000,       771.7,    1.50!  !END!
0095    ! X =     508.500,    5967.000,       750.1,    1.50!  !END!
0096    ! X =     508.500,    5968.000,       740.0,    1.50!  !END!
0097    ! X =     508.500,    5969.000,       733.0,    1.50!  !END!
0098    ! X =     508.500,    5970.000,       749.9,    1.50!  !END!
0099    ! X =     508.500,    5971.000,       754.4,    1.50!  !END!
0100    ! X =     508.500,    5972.000,       765.5,    1.50!  !END!
0101    ! X =     508.500,    5973.000,       756.5,    1.50!  !END!
0102    ! X =     508.500,    5974.000,       800.7,    1.50!  !END!
0103    ! X =     508.500,    5975.000,       774.0,    1.50!  !END!
0104    ! X =     508.500,    5976.000,       773.4,    1.50!  !END!
0105    ! X =     508.500,    5977.000,       771.0,    1.50!  !END!
0106    ! X =     508.500,    5978.000,       746.9,    1.50!  !END!
0107    ! X =     508.500,    5979.000,       733.9,    1.50!  !END!
0108    ! X =     508.500,    5980.000,       623.6,    1.50!  !END!
0109    ! X =     508.500,    5981.000,       601.2,    1.50!  !END!
0110    ! X =     508.500,    5982.000,       731.9,    1.50!  !END!
0111    ! X =     508.500,    5983.000,       762.8,    1.50!  !END!
0112    ! X =     508.500,    5984.000,       765.3,    1.50!  !END!
0113    ! X =     508.500,    5985.000,       778.0,    1.50!  !END!
0114    ! X =     508.500,    5986.000,       770.4,    1.50!  !END!
0115    ! X =     508.500,    5987.000,       810.1,    1.50!  !END!
0116    ! X =     508.500,    5988.000,       808.8,    1.50!  !END!
0117    ! X =     508.500,    5989.000,       868.0,    1.50!  !END!
0118    ! X =     508.500,    5990.000,       815.8,    1.50!  !END!
0119    ! X =     509.500,    5955.000,       698.0,    1.50!  !END!
0120    ! X =     509.500,    5956.000,       708.8,    1.50!  !END!
0121    ! X =     509.500,    5957.000,       736.4,    1.50!  !END!
0122    ! X =     509.500,    5958.000,       706.0,    1.50!  !END!
0123    ! X =     509.500,    5959.000,       697.0,    1.50!  !END!
0124    ! X =     509.500,    5960.000,       704.9,    1.50!  !END!
0125    ! X =     509.500,    5961.000,       727.7,    1.50!  !END!
0126    ! X =     509.500,    5962.000,       714.8,    1.50!  !END!
0127    ! X =     509.500,    5963.000,       744.6,    1.50!  !END!
0128    ! X =     509.500,    5964.000,       770.0,    1.50!  !END!
0129    ! X =     509.500,    5965.000,       755.1,    1.50!  !END!
0130    ! X =     509.500,    5966.000,       754.0,    1.50!  !END!
0131    ! X =     509.500,    5967.000,       739.0,    1.50!  !END!
0132    ! X =     509.500,    5968.000,       755.5,    1.50!  !END!
0133    ! X =     509.500,    5969.000,       793.8,    1.50!  !END!
0134    ! X =     509.500,    5970.000,       819.6,    1.50!  !END!
0135    ! X =     509.500,    5971.000,       824.6,    1.50!  !END!
0136    ! X =     509.500,    5972.000,       815.3,    1.50!  !END!
0137    ! X =     509.500,    5973.000,       838.2,    1.50!  !END!
0138    ! X =     509.500,    5974.000,       787.0,    1.50!  !END!
0139    ! X =     509.500,    5975.000,       796.0,    1.50!  !END!
0140    ! X =     509.500,    5976.000,       779.5,    1.50!  !END!
0141    ! X =     509.500,    5977.000,       749.1,    1.50!  !END!
0142    ! X =     509.500,    5978.000,       719.8,    1.50!  !END!
0143    ! X =     509.500,    5979.000,       647.5,    1.50!  !END!
0144    ! X =     509.500,    5980.000,       579.6,    1.50!  !END!
0145    ! X =     509.500,    5981.000,       653.7,    1.50!  !END!
0146    ! X =     509.500,    5982.000,       700.1,    1.50!  !END!
0147    ! X =     509.500,    5983.000,       765.8,    1.50!  !END!
0148    ! X =     509.500,    5984.000,       764.0,    1.50!  !END!
0149    ! X =     509.500,    5985.000,       771.7,    1.50!  !END!
0150    ! X =     509.500,    5986.000,       784.0,    1.50!  !END!
0151    ! X =     509.500,    5987.000,       799.8,    1.50!  !END!
0152    ! X =     509.500,    5988.000,       794.2,    1.50!  !END!
0153    ! X =     509.500,    5989.000,       811.1,    1.50!  !END!
0154    ! X =     509.500,    5990.000,       788.1,    1.50!  !END!
0155    ! X =     510.500,    5955.000,       691.9,    1.50!  !END!
0156    ! X =     510.500,    5956.000,       691.8,    1.50!  !END!
0157    ! X =     510.500,    5957.000,       702.1,    1.50!  !END!
0158    ! X =     510.500,    5958.000,       695.4,    1.50!  !END!
0159    ! X =     510.500,    5959.000,       699.0,    1.50!  !END!
0160    ! X =     510.500,    5960.000,       701.0,    1.50!  !END!
0161    ! X =     510.500,    5961.000,       718.2,    1.50!  !END!
0162    ! X =     510.500,    5962.000,       734.0,    1.50!  !END!
0163    ! X =     510.500,    5963.000,       752.1,    1.50!  !END!
0164    ! X =     510.500,    5964.000,       767.4,    1.50!  !END!
0165    ! X =     510.500,    5965.000,       772.9,    1.50!  !END!
0166    ! X =     510.500,    5966.000,       748.4,    1.50!  !END!
0167    ! X =     510.500,    5967.000,       747.0,    1.50!  !END!
0168    ! X =     510.500,    5968.000,       758.0,    1.50!  !END!
0169    ! X =     510.500,    5969.000,       792.0,    1.50!  !END!
0170    ! X =     510.500,    5970.000,       822.9,    1.50!  !END!
0171    ! X =     510.500,    5971.000,       822.0,    1.50!  !END!
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0172    ! X =     510.500,    5972.000,       824.1,    1.50!  !END!
0173    ! X =     510.500,    5973.000,       804.8,    1.50!  !END!
0174    ! X =     510.500,    5974.000,       775.0,    1.50!  !END!
0175    ! X =     510.500,    5975.000,       766.0,    1.50!  !END!
0176    ! X =     510.500,    5976.000,       760.0,    1.50!  !END!
0177    ! X =     510.500,    5977.000,       730.2,    1.50!  !END!
0178    ! X =     510.500,    5978.000,       633.8,    1.50!  !END!
0179    ! X =     510.500,    5979.000,       578.4,    1.50!  !END!
0180    ! X =     510.500,    5980.000,       661.0,    1.50!  !END!
0181    ! X =     510.500,    5981.000,       673.8,    1.50!  !END!
0182    ! X =     510.500,    5982.000,       751.4,    1.50!  !END!
0183    ! X =     510.500,    5983.000,       780.8,    1.50!  !END!
0184    ! X =     510.500,    5984.000,       769.9,    1.50!  !END!
0185    ! X =     510.500,    5985.000,       782.3,    1.50!  !END!
0186    ! X =     510.500,    5986.000,       779.7,    1.50!  !END!
0187    ! X =     510.500,    5987.000,       761.5,    1.50!  !END!
0188    ! X =     510.500,    5988.000,       774.6,    1.50!  !END!
0189    ! X =     510.500,    5989.000,       791.8,    1.50!  !END!
0190    ! X =     510.500,    5990.000,       779.0,    1.50!  !END!
0191    ! X =     511.500,    5955.000,       720.2,    1.50!  !END!
0192    ! X =     511.500,    5956.000,       702.8,    1.50!  !END!
0193    ! X =     511.500,    5957.000,       705.5,    1.50!  !END!
0194    ! X =     511.500,    5958.000,       696.3,    1.50!  !END!
0195    ! X =     511.500,    5959.000,       701.5,    1.50!  !END!
0196    ! X =     511.500,    5960.000,       755.4,    1.50!  !END!
0197    ! X =     511.500,    5961.000,       759.0,    1.50!  !END!
0198    ! X =     511.500,    5962.000,       757.0,    1.50!  !END!
0199    ! X =     511.500,    5963.000,       786.0,    1.50!  !END!
0200    ! X =     511.500,    5964.000,       788.5,    1.50!  !END!
0201    ! X =     511.500,    5965.000,       765.3,    1.50!  !END!
0202    ! X =     511.500,    5965.500,       755.1,    1.50!  !END!
0203    ! X =     511.500,    5966.000,       746.5,    1.50!  !END!
0204    ! X =     511.500,    5966.500,       740.0,    1.50!  !END!
0205    ! X =     511.500,    5967.000,       731.0,    1.50!  !END!
0206    ! X =     511.500,    5967.500,       739.0,    1.50!  !END!
0207    ! X =     511.500,    5968.000,       750.1,    1.50!  !END!
0208    ! X =     511.500,    5968.500,       762.3,    1.50!  !END!
0209    ! X =     511.500,    5969.000,       790.1,    1.50!  !END!
0210    ! X =     511.500,    5969.500,       792.0,    1.50!  !END!
0211    ! X =     511.500,    5970.000,       809.3,    1.50!  !END!
0212    ! X =     511.500,    5970.500,       791.2,    1.50!  !END!
0213    ! X =     511.500,    5971.000,       792.3,    1.50!  !END!
0214    ! X =     511.500,    5971.500,       807.0,    1.50!  !END!
0215    ! X =     511.500,    5972.000,       797.3,    1.50!  !END!
0216    ! X =     511.500,    5972.500,       779.0,    1.50!  !END!
0217    ! X =     511.500,    5973.000,       762.0,    1.50!  !END!
0218    ! X =     511.500,    5973.500,       746.7,    1.50!  !END!
0219    ! X =     511.500,    5974.000,       735.2,    1.50!  !END!
0220    ! X =     511.500,    5974.500,       722.9,    1.50!  !END!
0221    ! X =     511.500,    5975.000,       720.7,    1.50!  !END!
0222    ! X =     511.500,    5975.500,       719.8,    1.50!  !END!
0223    ! X =     511.500,    5976.000,       712.8,    1.50!  !END!
0224    ! X =     511.500,    5976.500,       684.5,    1.50!  !END!
0225    ! X =     511.500,    5977.000,       622.7,    1.50!  !END!
0226    ! X =     511.500,    5977.500,       630.4,    1.50!  !END!
0227    ! X =     511.500,    5978.000,       577.7,    1.50!  !END!
0228    ! X =     511.500,    5978.500,       610.0,    1.50!  !END!
0229    ! X =     511.500,    5979.000,       616.7,    1.50!  !END!
0230    ! X =     511.500,    5979.500,       630.7,    1.50!  !END!
0231    ! X =     511.500,    5980.000,       666.3,    1.50!  !END!
0232    ! X =     511.500,    5980.500,       676.1,    1.50!  !END!
0233    ! X =     511.500,    5981.000,       727.4,    1.50!  !END!
0234    ! X =     511.500,    5981.500,       695.6,    1.50!  !END!
0235    ! X =     511.500,    5982.000,       816.0,    1.50!  !END!
0236    ! X =     511.500,    5982.500,       790.4,    1.50!  !END!
0237    ! X =     511.500,    5983.000,       783.3,    1.50!  !END!
0238    ! X =     511.500,    5984.000,       768.2,    1.50!  !END!
0239    ! X =     511.500,    5985.000,       766.9,    1.50!  !END!
0240    ! X =     511.500,    5986.000,       770.1,    1.50!  !END!
0241    ! X =     511.500,    5987.000,       756.0,    1.50!  !END!
0242    ! X =     511.500,    5988.000,       756.0,    1.50!  !END!
0243    ! X =     511.500,    5989.000,       762.9,    1.50!  !END!
0244    ! X =     511.500,    5990.000,       755.8,    1.50!  !END!
0245    ! X =     512.000,    5965.000,       748.8,    1.50!  !END!
0246    ! X =     512.000,    5965.500,       749.0,    1.50!  !END!
0247    ! X =     512.000,    5966.000,       743.2,    1.50!  !END!
0248    ! X =     512.000,    5966.500,       733.0,    1.50!  !END!
0249    ! X =     512.000,    5967.000,       743.1,    1.50!  !END!
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0250    ! X =     512.000,    5967.500,       760.5,    1.50!  !END!
0251    ! X =     512.000,    5968.000,       775.9,    1.50!  !END!
0252    ! X =     512.000,    5968.500,       779.0,    1.50!  !END!
0253    ! X =     512.000,    5969.000,       773.5,    1.50!  !END!
0254    ! X =     512.000,    5969.500,       784.6,    1.50!  !END!
0255    ! X =     512.000,    5970.000,       789.0,    1.50!  !END!
0256    ! X =     512.000,    5970.500,       794.5,    1.50!  !END!
0257    ! X =     512.000,    5971.000,       775.7,    1.50!  !END!
0258    ! X =     512.000,    5971.500,       791.2,    1.50!  !END!
0259    ! X =     512.000,    5972.000,       779.2,    1.50!  !END!
0260    ! X =     512.000,    5972.500,       751.3,    1.50!  !END!
0261    ! X =     512.000,    5973.000,       707.4,    1.50!  !END!
0262    ! X =     512.000,    5973.500,       646.7,    1.50!  !END!
0263    ! X =     512.000,    5974.000,       627.2,    1.50!  !END!
0264    ! X =     512.000,    5974.500,       620.6,    1.50!  !END!
0265    ! X =     512.000,    5975.000,       617.5,    1.50!  !END!
0266    ! X =     512.000,    5975.500,       620.5,    1.50!  !END!
0267    ! X =     512.000,    5976.000,       618.2,    1.50!  !END!
0268    ! X =     512.000,    5976.500,       583.0,    1.50!  !END!
0269    ! X =     512.000,    5977.000,       602.5,    1.50!  !END!
0270    ! X =     512.000,    5977.500,       581.4,    1.50!  !END!
0271    ! X =     512.000,    5978.000,       604.7,    1.50!  !END!
0272    ! X =     512.000,    5978.500,       602.1,    1.50!  !END!
0273    ! X =     512.000,    5979.000,       617.7,    1.50!  !END!
0274    ! X =     512.000,    5979.500,       655.3,    1.50!  !END!
0275    ! X =     512.000,    5980.000,       670.9,    1.50!  !END!
0276    ! X =     512.000,    5980.500,       696.1,    1.50!  !END!
0277    ! X =     512.000,    5981.000,       712.1,    1.50!  !END!
0278    ! X =     512.000,    5981.500,       690.5,    1.50!  !END!
0279    ! X =     512.000,    5982.000,       813.2,    1.50!  !END!
0280    ! X =     512.000,    5982.500,       788.3,    1.50!  !END!
0281    ! X =     512.000,    5983.000,       792.0,    1.50!  !END!
0282    ! X =     512.500,    5955.000,       794.6,    1.50!  !END!
0283    ! X =     512.500,    5956.000,       753.1,    1.50!  !END!
0284    ! X =     512.500,    5957.000,       725.1,    1.50!  !END!
0285    ! X =     512.500,    5958.000,       706.9,    1.50!  !END!
0286    ! X =     512.500,    5959.000,       741.9,    1.50!  !END!
0287    ! X =     512.500,    5960.000,       794.4,    1.50!  !END!
0288    ! X =     512.500,    5961.000,       796.4,    1.50!  !END!
0289    ! X =     512.500,    5962.000,       808.2,    1.50!  !END!
0290    ! X =     512.500,    5963.000,       794.8,    1.50!  !END!
0291    ! X =     512.500,    5964.000,       771.0,    1.50!  !END!
0292    ! X =     512.500,    5965.000,       739.7,    1.50!  !END!
0293    ! X =     512.500,    5965.500,       732.3,    1.50!  !END!
0294    ! X =     512.500,    5966.000,       735.7,    1.50!  !END!
0295    ! X =     512.500,    5966.500,       732.1,    1.50!  !END!
0296    ! X =     512.500,    5967.000,       744.1,    1.50!  !END!
0297    ! X =     512.500,    5967.500,       757.7,    1.50!  !END!
0298    ! X =     512.500,    5968.000,       763.7,    1.50!  !END!
0299    ! X =     512.500,    5968.500,       770.5,    1.50!  !END!
0300    ! X =     512.500,    5969.000,       778.7,    1.50!  !END!
0301    ! X =     512.500,    5969.500,       778.3,    1.50!  !END!
0302    ! X =     512.500,    5970.000,       773.3,    1.50!  !END!
0303    ! X =     512.500,    5970.500,       780.2,    1.50!  !END!
0304    ! X =     512.500,    5971.000,       773.7,    1.50!  !END!
0305    ! X =     512.500,    5971.500,       757.7,    1.50!  !END!
0306    ! X =     512.500,    5972.000,       722.7,    1.50!  !END!
0307    ! X =     512.500,    5972.500,       666.2,    1.50!  !END!
0308    ! X =     512.500,    5973.000,       607.6,    1.50!  !END!
0309    ! X =     512.500,    5973.500,       613.6,    1.50!  !END!
0310    ! X =     512.500,    5974.000,       612.0,    1.50!  !END!
0311    ! X =     512.500,    5974.500,       612.6,    1.50!  !END!
0312    ! X =     512.500,    5975.000,       613.6,    1.50!  !END!
0313    ! X =     512.500,    5975.500,       617.1,    1.50!  !END!
0314    ! X =     512.500,    5976.000,       592.7,    1.50!  !END!
0315    ! X =     512.500,    5976.500,       613.7,    1.50!  !END!
0316    ! X =     512.500,    5977.000,       597.2,    1.50!  !END!
0317    ! X =     512.500,    5977.500,       577.3,    1.50!  !END!
0318    ! X =     512.500,    5978.000,       606.5,    1.50!  !END!
0319    ! X =     512.500,    5978.500,       611.6,    1.50!  !END!
0320    ! X =     512.500,    5979.000,       616.8,    1.50!  !END!
0321    ! X =     512.500,    5979.500,       662.8,    1.50!  !END!
0322    ! X =     512.500,    5980.000,       694.0,    1.50!  !END!
0323    ! X =     512.500,    5980.500,       682.8,    1.50!  !END!
0324    ! X =     512.500,    5981.000,       678.8,    1.50!  !END!
0325    ! X =     512.500,    5981.500,       776.2,    1.50!  !END!
0326    ! X =     512.500,    5982.000,       800.0,    1.50!  !END!
0327    ! X =     512.500,    5982.500,       782.0,    1.50!  !END!
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0328    ! X =     512.500,    5983.000,       777.8,    1.50!  !END!
0329    ! X =     512.500,    5984.000,       761.0,    1.50!  !END!
0330    ! X =     512.500,    5985.000,       765.0,    1.50!  !END!
0331    ! X =     512.500,    5986.000,       754.0,    1.50!  !END!
0332    ! X =     512.500,    5987.000,       736.3,    1.50!  !END!
0333    ! X =     512.500,    5988.000,       738.0,    1.50!  !END!
0334    ! X =     512.500,    5989.000,       731.8,    1.50!  !END!
0335    ! X =     512.500,    5990.000,       746.4,    1.50!  !END!
0336    ! X =     513.000,    5965.000,       733.0,    1.50!  !END!
0337    ! X =     513.000,    5965.500,       717.8,    1.50!  !END!
0338    ! X =     513.000,    5966.000,       712.1,    1.50!  !END!
0339    ! X =     513.000,    5966.500,       734.5,    1.50!  !END!
0340    ! X =     513.000,    5967.000,       750.7,    1.50!  !END!
0341    ! X =     513.000,    5967.500,       754.7,    1.50!  !END!
0342    ! X =     513.000,    5968.000,       732.8,    1.50!  !END!
0343    ! X =     513.000,    5968.500,       765.6,    1.50!  !END!
0344    ! X =     513.000,    5969.000,       744.8,    1.50!  !END!
0345    ! X =     513.000,    5969.500,       732.6,    1.50!  !END!
0346    ! X =     513.000,    5970.000,       733.1,    1.50!  !END!
0347    ! X =     513.000,    5970.500,       746.6,    1.50!  !END!
0348    ! X =     513.000,    5971.000,       736.2,    1.50!  !END!
0349    ! X =     513.000,    5971.500,       679.3,    1.50!  !END!
0350    ! X =     513.000,    5972.000,       607.0,    1.50!  !END!
0351    ! X =     513.000,    5972.500,       607.7,    1.50!  !END!
0352    ! X =     513.000,    5973.000,       605.0,    1.50!  !END!
0353    ! X =     513.000,    5973.500,       605.0,    1.50!  !END!
0354    ! X =     513.000,    5974.000,       606.0,    1.50!  !END!
0355    ! X =     513.000,    5974.500,       609.0,    1.50!  !END!
0356    ! X =     513.000,    5975.000,       613.4,    1.50!  !END!
0357    ! X =     513.000,    5975.500,       608.6,    1.50!  !END!
0358    ! X =     513.000,    5976.000,       613.8,    1.50!  !END!
0359    ! X =     513.000,    5976.500,       592.6,    1.50!  !END!
0360    ! X =     513.000,    5977.000,       577.0,    1.50!  !END!
0361    ! X =     513.000,    5977.500,       608.0,    1.50!  !END!
0362    ! X =     513.000,    5978.000,       604.8,    1.50!  !END!
0363    ! X =     513.000,    5978.500,       617.7,    1.50!  !END!
0364    ! X =     513.000,    5979.000,       690.9,    1.50!  !END!
0365    ! X =     513.000,    5979.500,       674.5,    1.50!  !END!
0366    ! X =     513.000,    5980.000,       672.2,    1.50!  !END!
0367    ! X =     513.000,    5980.500,       679.4,    1.50!  !END!
0368    ! X =     513.000,    5981.000,       738.9,    1.50!  !END!
0369    ! X =     513.000,    5981.500,       793.5,    1.50!  !END!
0370    ! X =     513.000,    5982.000,       779.0,    1.50!  !END!
0371    ! X =     513.000,    5982.500,       768.0,    1.50!  !END!
0372    ! X =     513.000,    5983.000,       763.0,    1.50!  !END!
0373    ! X =     513.500,    5955.000,       805.7,    1.50!  !END!
0374    ! X =     513.500,    5956.000,       791.5,    1.50!  !END!
0375    ! X =     513.500,    5957.000,       754.0,    1.50!  !END!
0376    ! X =     513.500,    5958.000,       757.1,    1.50!  !END!
0377    ! X =     513.500,    5959.000,       780.8,    1.50!  !END!
0378    ! X =     513.500,    5960.000,       801.0,    1.50!  !END!
0379    ! X =     513.500,    5961.000,       793.6,    1.50!  !END!
0380    ! X =     513.500,    5962.000,       795.3,    1.50!  !END!
0381    ! X =     513.500,    5963.000,       799.8,    1.50!  !END!
0382    ! X =     513.500,    5964.000,       787.5,    1.50!  !END!
0383    ! X =     513.500,    5965.000,       726.9,    1.50!  !END!
0384    ! X =     513.500,    5965.500,       710.6,    1.50!  !END!
0385    ! X =     513.500,    5966.000,       707.8,    1.50!  !END!
0386    ! X =     513.500,    5966.500,       722.0,    1.50!  !END!
0387    ! X =     513.500,    5967.000,       724.0,    1.50!  !END!
0388    ! X =     513.500,    5967.500,       733.8,    1.50!  !END!
0389    ! X =     513.500,    5968.000,       741.0,    1.50!  !END!
0390    ! X =     513.500,    5968.500,       704.0,    1.50!  !END!
0391    ! X =     513.500,    5969.000,       703.4,    1.50!  !END!
0392    ! X =     513.500,    5969.500,       722.5,    1.50!  !END!
0393    ! X =     513.500,    5970.000,       715.3,    1.50!  !END!
0394    ! X =     513.500,    5970.500,       675.3,    1.50!  !END!
0395    ! X =     513.500,    5971.000,       659.5,    1.50!  !END!
0396    ! X =     513.500,    5971.500,       607.0,    1.50!  !END!
0397    ! X =     513.500,    5972.000,       605.0,    1.50!  !END!
0398    ! X =     513.500,    5972.500,       604.0,    1.50!  !END!
0399    ! X =     513.500,    5973.000,       605.7,    1.50!  !END!
0400    ! X =     513.500,    5973.500,       604.0,    1.50!  !END!
0401    ! X =     513.500,    5974.000,       606.5,    1.50!  !END!
0402    ! X =     513.500,    5974.500,       600.8,    1.50!  !END!
0403    ! X =     513.500,    5975.000,       607.0,    1.50!  !END!
0404    ! X =     513.500,    5975.500,       611.2,    1.50!  !END!
0405    ! X =     513.500,    5976.000,       594.7,    1.50!  !END!
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0406    ! X =     513.500,    5976.500,       575.8,    1.50!  !END!
0407    ! X =     513.500,    5977.000,       605.3,    1.50!  !END!
0408    ! X =     513.500,    5977.500,       606.6,    1.50!  !END!
0409    ! X =     513.500,    5978.000,       670.7,    1.50!  !END!
0410    ! X =     513.500,    5978.500,       697.3,    1.50!  !END!
0411    ! X =     513.500,    5979.000,       680.3,    1.50!  !END!
0412    ! X =     513.500,    5979.500,       668.7,    1.50!  !END!
0413    ! X =     513.500,    5980.000,       681.0,    1.50!  !END!
0414    ! X =     513.500,    5980.500,       747.0,    1.50!  !END!
0415    ! X =     513.500,    5981.000,       755.4,    1.50!  !END!
0416    ! X =     513.500,    5981.500,       760.1,    1.50!  !END!
0417    ! X =     513.500,    5982.000,       750.7,    1.50!  !END!
0418    ! X =     513.500,    5982.500,       756.7,    1.50!  !END!
0419    ! X =     513.500,    5983.000,       749.9,    1.50!  !END!
0420    ! X =     513.500,    5984.000,       745.0,    1.50!  !END!
0421    ! X =     513.500,    5985.000,       744.9,    1.50!  !END!
0422    ! X =     513.500,    5986.000,       737.0,    1.50!  !END!
0423    ! X =     513.500,    5987.000,       729.9,    1.50!  !END!
0424    ! X =     513.500,    5988.000,       720.2,    1.50!  !END!
0425    ! X =     513.500,    5989.000,       705.2,    1.50!  !END!
0426    ! X =     513.500,    5990.000,       724.0,    1.50!  !END!
0427    ! X =     514.000,    5965.000,       740.0,    1.50!  !END!
0428    ! X =     514.000,    5965.500,       716.0,    1.50!  !END!
0429    ! X =     514.000,    5966.000,       704.1,    1.50!  !END!
0430    ! X =     514.000,    5966.500,       699.3,    1.50!  !END!
0431    ! X =     514.000,    5967.000,       698.1,    1.50!  !END!
0432    ! X =     514.000,    5967.500,       698.1,    1.50!  !END!
0433    ! X =     514.000,    5968.000,       677.7,    1.50!  !END!
0434    ! X =     514.000,    5968.500,       672.2,    1.50!  !END!
0435    ! X =     514.000,    5969.000,       672.8,    1.50!  !END!
0436    ! X =     514.000,    5969.500,       686.8,    1.50!  !END!
0437    ! X =     514.000,    5970.000,       658.8,    1.50!  !END!
0438    ! X =     514.000,    5970.500,       650.1,    1.50!  !END!
0439    ! X =     514.000,    5971.000,       601.0,    1.50!  !END!
0440    ! X =     514.000,    5971.500,       601.0,    1.50!  !END!
0441    ! X =     514.000,    5972.000,       599.0,    1.50!  !END!
0442    ! X =     514.000,    5972.500,       601.0,    1.50!  !END!
0443    ! X =     514.000,    5973.000,       604.1,    1.50!  !END!
0444    ! X =     514.000,    5973.500,       603.0,    1.50!  !END!
0445    ! X =     514.000,    5974.000,       604.9,    1.50!  !END!
0446    ! X =     514.000,    5974.500,       606.9,    1.50!  !END!
0447    ! X =     514.000,    5975.000,       608.7,    1.50!  !END!
0448    ! X =     514.000,    5975.500,       600.7,    1.50!  !END!
0449    ! X =     514.000,    5976.000,       579.6,    1.50!  !END!
0450    ! X =     514.000,    5976.500,       596.8,    1.50!  !END!
0451    ! X =     514.000,    5977.000,       658.5,    1.50!  !END!
0452    ! X =     514.000,    5977.500,       690.4,    1.50!  !END!
0453    ! X =     514.000,    5978.000,       711.1,    1.50!  !END!
0454    ! X =     514.000,    5978.500,       667.3,    1.50!  !END!
0455    ! X =     514.000,    5979.000,       665.2,    1.50!  !END!
0456    ! X =     514.000,    5979.500,       736.0,    1.50!  !END!
0457    ! X =     514.000,    5980.000,       742.9,    1.50!  !END!
0458    ! X =     514.000,    5980.500,       690.1,    1.50!  !END!
0459    ! X =     514.000,    5981.000,       724.5,    1.50!  !END!
0460    ! X =     514.000,    5981.500,       718.8,    1.50!  !END!
0461    ! X =     514.000,    5982.000,       737.0,    1.50!  !END!
0462    ! X =     514.000,    5982.500,       740.0,    1.50!  !END!
0463    ! X =     514.000,    5983.000,       740.4,    1.50!  !END!
0464    ! X =     514.500,    5955.000,       805.8,    1.50!  !END!
0465    ! X =     514.500,    5956.000,       772.0,    1.50!  !END!
0466    ! X =     514.500,    5957.000,       769.6,    1.50!  !END!
0467    ! X =     514.500,    5958.000,       786.0,    1.50!  !END!
0468    ! X =     514.500,    5959.000,       778.9,    1.50!  !END!
0469    ! X =     514.500,    5960.000,       799.0,    1.50!  !END!
0470    ! X =     514.500,    5961.000,       803.2,    1.50!  !END!
0471    ! X =     514.500,    5962.000,       787.0,    1.50!  !END!
0472    ! X =     514.500,    5963.000,       782.0,    1.50!  !END!
0473    ! X =     514.500,    5964.000,       758.0,    1.50!  !END!
0474    ! X =     514.500,    5965.000,       707.4,    1.50!  !END!
0475    ! X =     514.500,    5965.500,       695.3,    1.50!  !END!
0476    ! X =     514.500,    5966.000,       681.1,    1.50!  !END!
0477    ! X =     514.500,    5966.500,       680.1,    1.50!  !END!
0478    ! X =     514.500,    5967.000,       682.2,    1.50!  !END!
0479    ! X =     514.500,    5967.500,       659.8,    1.50!  !END!
0480    ! X =     514.500,    5968.000,       660.4,    1.50!  !END!
0481    ! X =     514.500,    5968.500,       662.0,    1.50!  !END!
0482    ! X =     514.500,    5969.000,       654.0,    1.50!  !END!
0483    ! X =     514.500,    5969.500,       646.0,    1.50!  !END!
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0484    ! X =     514.500,    5970.000,       643.8,    1.50!  !END!
0485    ! X =     514.500,    5970.500,       598.8,    1.50!  !END!
0486    ! X =     514.500,    5971.000,       595.0,    1.50!  !END!
0487    ! X =     514.500,    5971.500,       596.0,    1.50!  !END!
0488    ! X =     514.500,    5972.000,       592.0,    1.50!  !END!
0489    ! X =     514.500,    5972.500,       591.0,    1.50!  !END!
0490    ! X =     514.500,    5973.000,       598.7,    1.50!  !END!
0491    ! X =     514.500,    5973.500,       600.7,    1.50!  !END!
0492    ! X =     514.500,    5974.000,       600.4,    1.50!  !END!
0493    ! X =     514.500,    5974.500,       601.0,    1.50!  !END!
0494    ! X =     514.500,    5975.000,       601.0,    1.50!  !END!
0495    ! X =     514.500,    5975.500,       572.0,    1.50!  !END!
0496    ! X =     514.500,    5976.000,       581.5,    1.50!  !END!
0497    ! X =     514.500,    5976.500,       640.4,    1.50!  !END!
0498    ! X =     514.500,    5977.000,       670.8,    1.50!  !END!
0499    ! X =     514.500,    5977.500,       699.3,    1.50!  !END!
0500    ! X =     514.500,    5978.000,       660.0,    1.50!  !END!
0501    ! X =     514.500,    5978.500,       667.2,    1.50!  !END!
0502    ! X =     514.500,    5979.000,       673.3,    1.50!  !END!
0503    ! X =     514.500,    5979.500,       689.0,    1.50!  !END!
0504    ! X =     514.500,    5980.000,       671.8,    1.50!  !END!
0505    ! X =     514.500,    5980.500,       708.9,    1.50!  !END!
0506    ! X =     514.500,    5981.000,       717.2,    1.50!  !END!
0507    ! X =     514.500,    5981.500,       708.0,    1.50!  !END!
0508    ! X =     514.500,    5982.000,       736.3,    1.50!  !END!
0509    ! X =     514.500,    5982.500,       738.0,    1.50!  !END!
0510    ! X =     514.500,    5983.000,       737.0,    1.50!  !END!
0511    ! X =     514.500,    5984.000,       732.3,    1.50!  !END!
0512    ! X =     514.500,    5985.000,       724.1,    1.50!  !END!
0513    ! X =     514.500,    5986.000,       734.7,    1.50!  !END!
0514    ! X =     514.500,    5987.000,       737.9,    1.50!  !END!
0515    ! X =     514.500,    5988.000,       719.0,    1.50!  !END!
0516    ! X =     514.500,    5989.000,       709.1,    1.50!  !END!
0517    ! X =     514.500,    5990.000,       711.7,    1.50!  !END!
0518    ! X =     515.000,    5965.000,       676.2,    1.50!  !END!
0519    ! X =     515.000,    5965.500,       659.8,    1.50!  !END!
0520    ! X =     515.000,    5966.000,       648.9,    1.50!  !END!
0521    ! X =     515.000,    5966.500,       634.8,    1.50!  !END!
0522    ! X =     515.000,    5967.000,       636.4,    1.50!  !END!
0523    ! X =     515.000,    5967.500,       640.7,    1.50!  !END!
0524    ! X =     515.000,    5968.000,       648.8,    1.50!  !END!
0525    ! X =     515.000,    5968.500,       648.1,    1.50!  !END!
0526    ! X =     515.000,    5969.000,       645.0,    1.50!  !END!
0527    ! X =     515.000,    5969.500,       644.0,    1.50!  !END!
0528    ! X =     515.000,    5970.000,       602.2,    1.50!  !END!
0529    ! X =     515.000,    5970.500,       593.8,    1.50!  !END!
0530    ! X =     515.000,    5971.000,       594.0,    1.50!  !END!
0531    ! X =     515.000,    5971.500,       596.2,    1.50!  !END!
0532    ! X =     515.000,    5972.000,       596.0,    1.50!  !END!
0533    ! X =     515.000,    5972.500,       576.0,    1.50!  !END!
0534    ! X =     515.000,    5973.000,       575.1,    1.50!  !END!
0535    ! X =     515.000,    5973.500,       590.8,    1.50!  !END!
0536    ! X =     515.000,    5974.000,       592.7,    1.50!  !END!
0537    ! X =     515.000,    5974.500,       592.0,    1.50!  !END!
0538    ! X =     515.000,    5975.000,       591.7,    1.50!  !END!
0539    ! X =     515.000,    5975.500,       572.0,    1.50!  !END!
0540    ! X =     515.000,    5976.000,       634.6,    1.50!  !END!
0541    ! X =     515.000,    5976.500,       661.0,    1.50!  !END!
0542    ! X =     515.000,    5977.000,       662.5,    1.50!  !END!
0543    ! X =     515.000,    5977.500,       657.0,    1.50!  !END!
0544    ! X =     515.000,    5978.000,       656.1,    1.50!  !END!
0545    ! X =     515.000,    5978.500,       660.3,    1.50!  !END!
0546    ! X =     515.000,    5979.000,       676.8,    1.50!  !END!
0547    ! X =     515.000,    5979.500,       658.5,    1.50!  !END!
0548    ! X =     515.000,    5980.000,       685.1,    1.50!  !END!
0549    ! X =     515.000,    5980.500,       687.3,    1.50!  !END!
0550    ! X =     515.000,    5981.000,       717.2,    1.50!  !END!
0551    ! X =     515.000,    5981.500,       699.9,    1.50!  !END!
0552    ! X =     515.000,    5982.000,       729.0,    1.50!  !END!
0553    ! X =     515.000,    5982.500,       731.1,    1.50!  !END!
0554    ! X =     515.000,    5983.000,       716.3,    1.50!  !END!
0555    ! X =     515.500,    5955.000,       832.1,    1.50!  !END!
0556    ! X =     515.500,    5956.000,       818.3,    1.50!  !END!
0557    ! X =     515.500,    5957.000,       786.4,    1.50!  !END!
0558    ! X =     515.500,    5958.000,       771.5,    1.50!  !END!
0559    ! X =     515.500,    5959.000,       765.9,    1.50!  !END!
0560    ! X =     515.500,    5960.000,       757.0,    1.50!  !END!
0561    ! X =     515.500,    5961.000,       760.2,    1.50!  !END!
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0562    ! X =     515.500,    5962.000,       711.0,    1.50!  !END!
0563    ! X =     515.500,    5963.000,       710.0,    1.50!  !END!
0564    ! X =     515.500,    5964.000,       700.1,    1.50!  !END!
0565    ! X =     515.500,    5965.000,       643.8,    1.50!  !END!
0566    ! X =     515.500,    5965.500,       621.4,    1.50!  !END!
0567    ! X =     515.500,    5966.000,       621.0,    1.50!  !END!
0568    ! X =     515.500,    5966.500,       615.3,    1.50!  !END!
0569    ! X =     515.500,    5967.000,       620.1,    1.50!  !END!
0570    ! X =     515.500,    5967.500,       620.0,    1.50!  !END!
0571    ! X =     515.500,    5968.000,       610.9,    1.50!  !END!
0572    ! X =     515.500,    5968.500,       616.1,    1.50!  !END!
0573    ! X =     515.500,    5969.000,       619.4,    1.50!  !END!
0574    ! X =     515.500,    5969.500,       615.4,    1.50!  !END!
0575    ! X =     515.500,    5970.000,       572.0,    1.50!  !END!
0576    ! X =     515.500,    5970.500,       577.0,    1.50!  !END!
0577    ! X =     515.500,    5971.000,       594.0,    1.50!  !END!
0578    ! X =     515.500,    5971.500,       593.0,    1.50!  !END!
0579    ! X =     515.500,    5972.000,       593.3,    1.50!  !END!
0580    ! X =     515.500,    5972.500,       588.1,    1.50!  !END!
0581    ! X =     515.500,    5973.000,       574.0,    1.50!  !END!
0582    ! X =     515.500,    5973.500,       578.1,    1.50!  !END!
0583    ! X =     515.500,    5974.000,       589.8,    1.50!  !END!
0584    ! X =     515.500,    5974.500,       590.7,    1.50!  !END!
0585    ! X =     515.500,    5975.000,       574.8,    1.50!  !END!
0586    ! X =     515.500,    5975.500,       570.0,    1.50!  !END!
0587    ! X =     515.500,    5976.000,       653.0,    1.50!  !END!
0588    ! X =     515.500,    5976.500,       704.8,    1.50!  !END!
0589    ! X =     515.500,    5977.000,       661.4,    1.50!  !END!
0590    ! X =     515.500,    5977.500,       647.9,    1.50!  !END!
0591    ! X =     515.500,    5978.000,       660.8,    1.50!  !END!
0592    ! X =     515.500,    5978.500,       651.5,    1.50!  !END!
0593    ! X =     515.500,    5979.000,       656.0,    1.50!  !END!
0594    ! X =     515.500,    5979.500,       685.3,    1.50!  !END!
0595    ! X =     515.500,    5980.000,       676.3,    1.50!  !END!
0596    ! X =     515.500,    5980.500,       697.5,    1.50!  !END!
0597    ! X =     515.500,    5981.000,       712.7,    1.50!  !END!
0598    ! X =     515.500,    5981.500,       720.8,    1.50!  !END!
0599    ! X =     515.500,    5982.000,       712.0,    1.50!  !END!
0600    ! X =     515.500,    5982.500,       735.9,    1.50!  !END!
0601    ! X =     515.500,    5983.000,       697.2,    1.50!  !END!
0602    ! X =     515.500,    5984.000,       740.1,    1.50!  !END!
0603    ! X =     515.500,    5985.000,       702.0,    1.50!  !END!
0604    ! X =     515.500,    5986.000,       736.3,    1.50!  !END!
0605    ! X =     515.500,    5987.000,       732.0,    1.50!  !END!
0606    ! X =     515.500,    5988.000,       715.0,    1.50!  !END!
0607    ! X =     515.500,    5989.000,       706.7,    1.50!  !END!
0608    ! X =     515.500,    5990.000,       695.5,    1.50!  !END!
0609    ! X =     516.000,    5965.000,       615.0,    1.50!  !END!
0610    ! X =     516.000,    5965.500,       617.0,    1.50!  !END!
0611    ! X =     516.000,    5966.000,       619.2,    1.50!  !END!
0612    ! X =     516.000,    5966.500,       612.7,    1.50!  !END!
0613    ! X =     516.000,    5967.000,       619.0,    1.50!  !END!
0614    ! X =     516.000,    5967.500,       619.8,    1.50!  !END!
0615    ! X =     516.000,    5968.000,       601.2,    1.50!  !END!
0616    ! X =     516.000,    5968.500,       594.0,    1.50!  !END!
0617    ! X =     516.000,    5969.000,       590.7,    1.50!  !END!
0618    ! X =     516.000,    5969.500,       565.0,    1.50!  !END!
0619    ! X =     516.000,    5970.000,       565.0,    1.50!  !END!
0620    ! X =     516.000,    5970.500,       576.9,    1.50!  !END!
0621    ! X =     516.000,    5971.000,       564.7,    1.50!  !END!
0622    ! X =     516.000,    5971.500,       593.3,    1.50!  !END!
0623    ! X =     516.000,    5972.000,       581.7,    1.50!  !END!
0624    ! X =     516.000,    5972.500,       571.3,    1.50!  !END!
0625    ! X =     516.000,    5973.000,       575.9,    1.50!  !END!
0626    ! X =     516.000,    5973.500,       569.1,    1.50!  !END!
0627    ! X =     516.000,    5974.000,       577.0,    1.50!  !END!
0628    ! X =     516.000,    5974.500,       581.6,    1.50!  !END!
0629    ! X =     516.000,    5975.000,       577.4,    1.50!  !END!
0630    ! X =     516.000,    5975.500,       570.0,    1.50!  !END!
0631    ! X =     516.000,    5976.000,       642.7,    1.50!  !END!
0632    ! X =     516.000,    5976.500,       630.3,    1.50!  !END!
0633    ! X =     516.000,    5977.000,       663.9,    1.50!  !END!
0634    ! X =     516.000,    5977.500,       651.1,    1.50!  !END!
0635    ! X =     516.000,    5978.000,       644.7,    1.50!  !END!
0636    ! X =     516.000,    5978.500,       658.1,    1.50!  !END!
0637    ! X =     516.000,    5979.000,       679.0,    1.50!  !END!
0638    ! X =     516.000,    5979.500,       666.2,    1.50!  !END!
0639    ! X =     516.000,    5980.000,       689.6,    1.50!  !END!
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0640    ! X =     516.000,    5980.500,       683.3,    1.50!  !END!
0641    ! X =     516.000,    5981.000,       727.0,    1.50!  !END!
0642    ! X =     516.000,    5981.500,       703.8,    1.50!  !END!
0643    ! X =     516.000,    5982.000,       731.8,    1.50!  !END!
0644    ! X =     516.000,    5982.500,       685.0,    1.50!  !END!
0645    ! X =     516.000,    5983.000,       727.2,    1.50!  !END!
0646    ! X =     516.500,    5955.000,       831.0,    1.50!  !END!
0647    ! X =     516.500,    5956.000,       815.1,    1.50!  !END!
0648    ! X =     516.500,    5957.000,       780.0,    1.50!  !END!
0649    ! X =     516.500,    5958.000,       733.5,    1.50!  !END!
0650    ! X =     516.500,    5959.000,       692.2,    1.50!  !END!
0651    ! X =     516.500,    5960.000,       675.0,    1.50!  !END!
0652    ! X =     516.500,    5961.000,       665.6,    1.50!  !END!
0653    ! X =     516.500,    5962.000,       668.3,    1.50!  !END!
0654    ! X =     516.500,    5963.000,       650.0,    1.50!  !END!
0655    ! X =     516.500,    5964.000,       633.4,    1.50!  !END!
0656    ! X =     516.500,    5965.000,       570.4,    1.50!  !END!
0657    ! X =     516.500,    5965.500,       565.0,    1.50!  !END!
0658    ! X =     516.500,    5966.000,       565.0,    1.50!  !END!
0659    ! X =     516.500,    5966.500,       592.7,    1.50!  !END!
0660    ! X =     516.500,    5967.000,       595.0,    1.50!  !END!
0661    ! X =     516.500,    5967.500,       592.5,    1.50!  !END!
0662    ! X =     516.500,    5968.000,       577.8,    1.50!  !END!
0663    ! X =     516.500,    5968.500,       565.0,    1.50!  !END!
0664    ! X =     516.500,    5969.000,       590.8,    1.50!  !END!
0665    ! X =     516.500,    5969.500,       593.2,    1.50!  !END!
0666    ! X =     516.500,    5970.000,       595.0,    1.50!  !END!
0667    ! X =     516.500,    5970.500,       594.0,    1.50!  !END!
0668    ! X =     516.500,    5971.000,       584.4,    1.50!  !END!
0669    ! X =     516.500,    5971.500,       581.9,    1.50!  !END!
0670    ! X =     516.500,    5972.000,       581.2,    1.50!  !END!
0671    ! X =     516.500,    5972.500,       569.7,    1.50!  !END!
0672    ! X =     516.500,    5973.000,       583.0,    1.50!  !END!
0673    ! X =     516.500,    5973.500,       594.0,    1.50!  !END!
0674    ! X =     516.500,    5974.000,       571.0,    1.50!  !END!
0675    ! X =     516.500,    5974.500,       575.7,    1.50!  !END!
0676    ! X =     516.500,    5975.000,       570.9,    1.50!  !END!
0677    ! X =     516.500,    5975.500,       567.8,    1.50!  !END!
0678    ! X =     516.500,    5976.000,       653.4,    1.50!  !END!
0679    ! X =     516.500,    5976.500,       674.8,    1.50!  !END!
0680    ! X =     516.500,    5977.000,       688.5,    1.50!  !END!
0681    ! X =     516.500,    5977.500,       652.0,    1.50!  !END!
0682    ! X =     516.500,    5978.000,       679.0,    1.50!  !END!
0683    ! X =     516.500,    5978.500,       679.3,    1.50!  !END!
0684    ! X =     516.500,    5979.000,       649.3,    1.50!  !END!
0685    ! X =     516.500,    5979.500,       647.7,    1.50!  !END!
0686    ! X =     516.500,    5980.000,       664.7,    1.50!  !END!
0687    ! X =     516.500,    5980.500,       700.0,    1.50!  !END!
0688    ! X =     516.500,    5981.000,       718.3,    1.50!  !END!
0689    ! X =     516.500,    5981.500,       703.1,    1.50!  !END!
0690    ! X =     516.500,    5982.000,       686.2,    1.50!  !END!
0691    ! X =     516.500,    5982.500,       680.4,    1.50!  !END!
0692    ! X =     516.500,    5983.000,       677.7,    1.50!  !END!
0693    ! X =     516.500,    5984.000,       678.2,    1.50!  !END!
0694    ! X =     516.500,    5985.000,       716.4,    1.50!  !END!
0695    ! X =     516.500,    5986.000,       711.4,    1.50!  !END!
0696    ! X =     516.500,    5987.000,       727.0,    1.50!  !END!
0697    ! X =     516.500,    5988.000,       716.1,    1.50!  !END!
0698    ! X =     516.500,    5989.000,       702.9,    1.50!  !END!
0699    ! X =     516.500,    5990.000,       692.0,    1.50!  !END!
0700    ! X =     517.000,    5965.000,       583.0,    1.50!  !END!
0701    ! X =     517.000,    5965.500,       586.0,    1.50!  !END!
0702    ! X =     517.000,    5966.000,       586.0,    1.50!  !END!
0703    ! X =     517.000,    5966.500,       588.1,    1.50!  !END!
0704    ! X =     517.000,    5967.000,       587.4,    1.50!  !END!
0705    ! X =     517.000,    5967.500,       594.0,    1.50!  !END!
0706    ! X =     517.000,    5968.000,       589.0,    1.50!  !END!
0707    ! X =     517.000,    5968.500,       595.0,    1.50!  !END!
0708    ! X =     517.000,    5969.000,       597.0,    1.50!  !END!
0709    ! X =     517.000,    5969.500,       594.9,    1.50!  !END!
0710    ! X =     517.000,    5970.000,       597.5,    1.50!  !END!
0711    ! X =     517.000,    5970.500,       597.0,    1.50!  !END!
0712    ! X =     517.000,    5971.000,       637.9,    1.50!  !END!
0713    ! X =     517.000,    5971.500,       579.9,    1.50!  !END!
0714    ! X =     517.000,    5972.000,       576.0,    1.50!  !END!
0715    ! X =     517.000,    5972.500,       578.1,    1.50!  !END!
0716    ! X =     517.000,    5973.000,       580.0,    1.50!  !END!
0717    ! X =     517.000,    5973.500,       578.0,    1.50!  !END!
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0718    ! X =     517.000,    5974.000,       570.0,    1.50!  !END!
0719    ! X =     517.000,    5974.500,       575.2,    1.50!  !END!
0720    ! X =     517.000,    5975.000,       568.4,    1.50!  !END!
0721    ! X =     517.000,    5975.500,       566.0,    1.50!  !END!
0722    ! X =     517.000,    5976.000,       599.7,    1.50!  !END!
0723    ! X =     517.000,    5976.500,       653.8,    1.50!  !END!
0724    ! X =     517.000,    5977.000,       692.3,    1.50!  !END!
0725    ! X =     517.000,    5977.500,       662.9,    1.50!  !END!
0726    ! X =     517.000,    5978.000,       665.4,    1.50!  !END!
0727    ! X =     517.000,    5978.500,       694.1,    1.50!  !END!
0728    ! X =     517.000,    5979.000,       648.6,    1.50!  !END!
0729    ! X =     517.000,    5979.500,       656.6,    1.50!  !END!
0730    ! X =     517.000,    5980.000,       685.7,    1.50!  !END!
0731    ! X =     517.000,    5980.500,       679.7,    1.50!  !END!
0732    ! X =     517.000,    5981.000,       685.5,    1.50!  !END!
0733    ! X =     517.000,    5981.500,       711.2,    1.50!  !END!
0734    ! X =     517.000,    5982.000,       676.9,    1.50!  !END!
0735    ! X =     517.000,    5982.500,       678.5,    1.50!  !END!
0736    ! X =     517.000,    5983.000,       658.1,    1.50!  !END!
0737    ! X =     517.500,    5955.000,       757.8,    1.50!  !END!
0738    ! X =     517.500,    5956.000,       732.4,    1.50!  !END!
0739    ! X =     517.500,    5957.000,       681.4,    1.50!  !END!
0740    ! X =     517.500,    5958.000,       664.0,    1.50!  !END!
0741    ! X =     517.500,    5959.000,       636.3,    1.50!  !END!
0742    ! X =     517.500,    5960.000,       630.0,    1.50!  !END!
0743    ! X =     517.500,    5961.000,       632.1,    1.50!  !END!
0744    ! X =     517.500,    5962.000,       561.0,    1.50!  !END!
0745    ! X =     517.500,    5963.000,       568.1,    1.50!  !END!
0746    ! X =     517.500,    5964.000,       580.2,    1.50!  !END!
0747    ! X =     517.500,    5965.000,       589.4,    1.50!  !END!
0748    ! X =     517.500,    5965.500,       591.0,    1.50!  !END!
0749    ! X =     517.500,    5966.000,       595.3,    1.50!  !END!
0750    ! X =     517.500,    5966.500,       596.0,    1.50!  !END!
0751    ! X =     517.500,    5967.000,       593.0,    1.50!  !END!
0752    ! X =     517.500,    5967.500,       599.0,    1.50!  !END!
0753    ! X =     517.500,    5968.000,       598.2,    1.50!  !END!
0754    ! X =     517.500,    5968.500,       597.2,    1.50!  !END!
0755    ! X =     517.500,    5969.000,       596.4,    1.50!  !END!
0756    ! X =     517.500,    5969.500,       597.7,    1.50!  !END!
0757    ! X =     517.500,    5970.000,       629.2,    1.50!  !END!
0758    ! X =     517.500,    5970.500,       659.9,    1.50!  !END!
0759    ! X =     517.500,    5971.000,       666.4,    1.50!  !END!
0760    ! X =     517.500,    5971.500,       673.7,    1.50!  !END!
0761    ! X =     517.500,    5972.000,       572.8,    1.50!  !END!
0762    ! X =     517.500,    5972.500,       565.0,    1.50!  !END!
0763    ! X =     517.500,    5973.000,       576.4,    1.50!  !END!
0764    ! X =     517.500,    5973.500,       578.8,    1.50!  !END!
0765    ! X =     517.500,    5974.000,       569.4,    1.50!  !END!
0766    ! X =     517.500,    5974.500,       570.1,    1.50!  !END!
0767    ! X =     517.500,    5975.000,       568.1,    1.50!  !END!
0768    ! X =     517.500,    5975.500,       568.5,    1.50!  !END!
0769    ! X =     517.500,    5976.000,       580.1,    1.50!  !END!
0770    ! X =     517.500,    5976.500,       668.2,    1.50!  !END!
0771    ! X =     517.500,    5977.000,       656.6,    1.50!  !END!
0772    ! X =     517.500,    5977.500,       679.8,    1.50!  !END!
0773    ! X =     517.500,    5978.000,       691.2,    1.50!  !END!
0774    ! X =     517.500,    5978.500,       664.1,    1.50!  !END!
0775    ! X =     517.500,    5979.000,       652.2,    1.50!  !END!
0776    ! X =     517.500,    5979.500,       657.3,    1.50!  !END!
0777    ! X =     517.500,    5980.000,       653.0,    1.50!  !END!
0778    ! X =     517.500,    5980.500,       653.0,    1.50!  !END!
0779    ! X =     517.500,    5981.000,       657.5,    1.50!  !END!
0780    ! X =     517.500,    5981.500,       684.9,    1.50!  !END!
0781    ! X =     517.500,    5982.000,       657.0,    1.50!  !END!
0782    ! X =     517.500,    5982.500,       662.6,    1.50!  !END!
0783    ! X =     517.500,    5983.000,       695.0,    1.50!  !END!
0784    ! X =     517.500,    5984.000,       686.6,    1.50!  !END!
0785    ! X =     517.500,    5985.000,       691.8,    1.50!  !END!
0786    ! X =     517.500,    5986.000,       713.2,    1.50!  !END!
0787    ! X =     517.500,    5987.000,       696.4,    1.50!  !END!
0788    ! X =     517.500,    5988.000,       708.0,    1.50!  !END!
0789    ! X =     517.500,    5989.000,       697.0,    1.50!  !END!
0790    ! X =     517.500,    5990.000,       684.0,    1.50!  !END!
0791    ! X =     518.000,    5965.000,       601.8,    1.50!  !END!
0792    ! X =     518.000,    5965.500,       605.0,    1.50!  !END!
0793    ! X =     518.000,    5966.000,       621.0,    1.50!  !END!
0794    ! X =     518.000,    5966.500,       644.6,    1.50!  !END!
0795    ! X =     518.000,    5967.000,       609.2,    1.50!  !END!
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0796    ! X =     518.000,    5967.500,       640.3,    1.50!  !END!
0797    ! X =     518.000,    5968.000,       662.1,    1.50!  !END!
0798    ! X =     518.000,    5968.500,       670.8,    1.50!  !END!
0799    ! X =     518.000,    5969.000,       672.0,    1.50!  !END!
0800    ! X =     518.000,    5969.500,       669.0,    1.50!  !END!
0801    ! X =     518.000,    5970.000,       664.3,    1.50!  !END!
0802    ! X =     518.000,    5970.500,       678.4,    1.50!  !END!
0803    ! X =     518.000,    5971.000,       686.0,    1.50!  !END!
0804    ! X =     518.000,    5971.500,       685.0,    1.50!  !END!
0805    ! X =     518.000,    5972.000,       687.6,    1.50!  !END!
0806    ! X =     518.000,    5972.500,       677.0,    1.50!  !END!
0807    ! X =     518.000,    5973.000,       615.3,    1.50!  !END!
0808    ! X =     518.000,    5973.500,       567.9,    1.50!  !END!
0809    ! X =     518.000,    5974.000,       575.6,    1.50!  !END!
0810    ! X =     518.000,    5974.500,       569.9,    1.50!  !END!
0811    ! X =     518.000,    5975.000,       568.9,    1.50!  !END!
0812    ! X =     518.000,    5975.500,       566.0,    1.50!  !END!
0813    ! X =     518.000,    5976.000,       581.9,    1.50!  !END!
0814    ! X =     518.000,    5976.500,       668.2,    1.50!  !END!
0815    ! X =     518.000,    5977.000,       680.0,    1.50!  !END!
0816    ! X =     518.000,    5977.500,       685.1,    1.50!  !END!
0817    ! X =     518.000,    5978.000,       670.0,    1.50!  !END!
0818    ! X =     518.000,    5978.500,       663.6,    1.50!  !END!
0819    ! X =     518.000,    5979.000,       692.0,    1.50!  !END!
0820    ! X =     518.000,    5979.500,       665.7,    1.50!  !END!
0821    ! X =     518.000,    5980.000,       651.1,    1.50!  !END!
0822    ! X =     518.000,    5980.500,       663.5,    1.50!  !END!
0823    ! X =     518.000,    5981.000,       654.9,    1.50!  !END!
0824    ! X =     518.000,    5981.500,       661.8,    1.50!  !END!
0825    ! X =     518.000,    5982.000,       653.5,    1.50!  !END!
0826    ! X =     518.000,    5982.500,       675.3,    1.50!  !END!
0827    ! X =     518.000,    5983.000,       682.8,    1.50!  !END!
0828    ! X =     518.500,    5955.000,       649.2,    1.50!  !END!
0829    ! X =     518.500,    5956.000,       596.9,    1.50!  !END!
0830    ! X =     518.500,    5957.000,       597.0,    1.50!  !END!
0831    ! X =     518.500,    5958.000,       602.3,    1.50!  !END!
0832    ! X =     518.500,    5959.000,       600.8,    1.50!  !END!
0833    ! X =     518.500,    5960.000,       585.9,    1.50!  !END!
0834    ! X =     518.500,    5961.000,       596.0,    1.50!  !END!
0835    ! X =     518.500,    5962.000,       588.0,    1.50!  !END!
0836    ! X =     518.500,    5963.000,       605.7,    1.50!  !END!
0837    ! X =     518.500,    5964.000,       609.0,    1.50!  !END!
0838    ! X =     518.500,    5965.000,       634.8,    1.50!  !END!
0839    ! X =     518.500,    5965.500,       646.0,    1.50!  !END!
0840    ! X =     518.500,    5966.000,       648.1,    1.50!  !END!
0841    ! X =     518.500,    5966.500,       654.0,    1.50!  !END!
0842    ! X =     518.500,    5967.000,       667.4,    1.50!  !END!
0843    ! X =     518.500,    5967.500,       665.2,    1.50!  !END!
0844    ! X =     518.500,    5968.000,       659.5,    1.50!  !END!
0845    ! X =     518.500,    5968.500,       669.0,    1.50!  !END!
0846    ! X =     518.500,    5969.000,       683.9,    1.50!  !END!
0847    ! X =     518.500,    5969.500,       688.5,    1.50!  !END!
0848    ! X =     518.500,    5970.000,       686.7,    1.50!  !END!
0849    ! X =     518.500,    5970.500,       676.6,    1.50!  !END!
0850    ! X =     518.500,    5971.000,       694.3,    1.50!  !END!
0851    ! X =     518.500,    5971.500,       696.0,    1.50!  !END!
0852    ! X =     518.500,    5972.000,       698.3,    1.50!  !END!
0853    ! X =     518.500,    5972.500,       684.5,    1.50!  !END!
0854    ! X =     518.500,    5973.000,       627.5,    1.50!  !END!
0855    ! X =     518.500,    5973.500,       569.9,    1.50!  !END!
0856    ! X =     518.500,    5974.000,       569.0,    1.50!  !END!
0857    ! X =     518.500,    5974.500,       568.0,    1.50!  !END!
0858    ! X =     518.500,    5975.000,       568.2,    1.50!  !END!
0859    ! X =     518.500,    5975.500,       568.1,    1.50!  !END!
0860    ! X =     518.500,    5976.000,       641.9,    1.50!  !END!
0861    ! X =     518.500,    5976.500,       667.2,    1.50!  !END!
0862    ! X =     518.500,    5977.000,       675.1,    1.50!  !END!
0863    ! X =     518.500,    5977.500,       668.7,    1.50!  !END!
0864    ! X =     518.500,    5978.000,       646.3,    1.50!  !END!
0865    ! X =     518.500,    5978.500,       679.6,    1.50!  !END!
0866    ! X =     518.500,    5979.000,       669.6,    1.50!  !END!
0867    ! X =     518.500,    5979.500,       694.7,    1.50!  !END!
0868    ! X =     518.500,    5980.000,       683.6,    1.50!  !END!
0869    ! X =     518.500,    5980.500,       680.2,    1.50!  !END!
0870    ! X =     518.500,    5981.000,       677.7,    1.50!  !END!
0871    ! X =     518.500,    5981.500,       673.6,    1.50!  !END!
0872    ! X =     518.500,    5982.000,       679.3,    1.50!  !END!
0873    ! X =     518.500,    5982.500,       685.4,    1.50!  !END!
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0874    ! X =     518.500,    5983.000,       669.8,    1.50!  !END!
0875    ! X =     518.500,    5984.000,       668.9,    1.50!  !END!
0876    ! X =     518.500,    5985.000,       704.9,    1.50!  !END!
0877    ! X =     518.500,    5986.000,       683.9,    1.50!  !END!
0878    ! X =     518.500,    5987.000,       685.4,    1.50!  !END!
0879    ! X =     518.500,    5988.000,       689.0,    1.50!  !END!
0880    ! X =     518.500,    5989.000,       678.0,    1.50!  !END!
0881    ! X =     518.500,    5990.000,       672.6,    1.50!  !END!
0882    ! X =     519.000,    5965.000,       639.0,    1.50!  !END!
0883    ! X =     519.000,    5965.500,       637.1,    1.50!  !END!
0884    ! X =     519.000,    5966.000,       658.2,    1.50!  !END!
0885    ! X =     519.000,    5966.500,       660.0,    1.50!  !END!
0886    ! X =     519.000,    5967.000,       668.6,    1.50!  !END!
0887    ! X =     519.000,    5967.500,       667.2,    1.50!  !END!
0888    ! X =     519.000,    5968.000,       672.0,    1.50!  !END!
0889    ! X =     519.000,    5968.500,       667.6,    1.50!  !END!
0890    ! X =     519.000,    5969.000,       676.0,    1.50!  !END!
0891    ! X =     519.000,    5969.500,       685.0,    1.50!  !END!
0892    ! X =     519.000,    5970.000,       688.0,    1.50!  !END!
0893    ! X =     519.000,    5970.500,       689.8,    1.50!  !END!
0894    ! X =     519.000,    5971.000,       720.4,    1.50!  !END!
0895    ! X =     519.000,    5971.500,       715.5,    1.50!  !END!
0896    ! X =     519.000,    5972.000,       703.7,    1.50!  !END!
0897    ! X =     519.000,    5972.500,       716.8,    1.50!  !END!
0898    ! X =     519.000,    5973.000,       653.0,    1.50!  !END!
0899    ! X =     519.000,    5973.500,       578.3,    1.50!  !END!
0900    ! X =     519.000,    5974.000,       569.0,    1.50!  !END!
0901    ! X =     519.000,    5974.500,       570.0,    1.50!  !END!
0902    ! X =     519.000,    5975.000,       590.0,    1.50!  !END!
0903    ! X =     519.000,    5975.500,       591.3,    1.50!  !END!
0904    ! X =     519.000,    5976.000,       642.8,    1.50!  !END!
0905    ! X =     519.000,    5976.500,       656.8,    1.50!  !END!
0906    ! X =     519.000,    5977.000,       637.4,    1.50!  !END!
0907    ! X =     519.000,    5977.500,       618.4,    1.50!  !END!
0908    ! X =     519.000,    5978.000,       615.6,    1.50!  !END!
0909    ! X =     519.000,    5978.500,       606.3,    1.50!  !END!
0910    ! X =     519.000,    5979.000,       592.0,    1.50!  !END!
0911    ! X =     519.000,    5979.500,       585.6,    1.50!  !END!
0912    ! X =     519.000,    5980.000,       629.7,    1.50!  !END!
0913    ! X =     519.000,    5980.500,       658.1,    1.50!  !END!
0914    ! X =     519.000,    5981.000,       646.9,    1.50!  !END!
0915    ! X =     519.000,    5981.500,       607.1,    1.50!  !END!
0916    ! X =     519.000,    5982.000,       593.4,    1.50!  !END!
0917    ! X =     519.000,    5982.500,       637.8,    1.50!  !END!
0918    ! X =     519.000,    5983.000,       648.9,    1.50!  !END!
0919    ! X =     519.500,    5955.000,       592.9,    1.50!  !END!
0920    ! X =     519.500,    5956.000,       597.3,    1.50!  !END!
0921    ! X =     519.500,    5957.000,       606.7,    1.50!  !END!
0922    ! X =     519.500,    5958.000,       617.1,    1.50!  !END!
0923    ! X =     519.500,    5959.000,       623.7,    1.50!  !END!
0924    ! X =     519.500,    5960.000,       629.0,    1.50!  !END!
0925    ! X =     519.500,    5961.000,       631.0,    1.50!  !END!
0926    ! X =     519.500,    5962.000,       637.6,    1.50!  !END!
0927    ! X =     519.500,    5963.000,       647.6,    1.50!  !END!
0928    ! X =     519.500,    5964.000,       650.9,    1.50!  !END!
0929    ! X =     519.500,    5965.000,       656.4,    1.50!  !END!
0930    ! X =     519.500,    5965.500,       657.0,    1.50!  !END!
0931    ! X =     519.500,    5966.000,       662.0,    1.50!  !END!
0932    ! X =     519.500,    5966.500,       655.5,    1.50!  !END!
0933    ! X =     519.500,    5967.000,       674.9,    1.50!  !END!
0934    ! X =     519.500,    5967.500,       678.0,    1.50!  !END!
0935    ! X =     519.500,    5968.000,       686.8,    1.50!  !END!
0936    ! X =     519.500,    5968.500,       683.3,    1.50!  !END!
0937    ! X =     519.500,    5969.000,       688.0,    1.50!  !END!
0938    ! X =     519.500,    5969.500,       695.7,    1.50!  !END!
0939    ! X =     519.500,    5970.000,       694.2,    1.50!  !END!
0940    ! X =     519.500,    5970.500,       693.1,    1.50!  !END!
0941    ! X =     519.500,    5971.000,       722.1,    1.50!  !END!
0942    ! X =     519.500,    5971.500,       719.8,    1.50!  !END!
0943    ! X =     519.500,    5972.000,       705.7,    1.50!  !END!
0944    ! X =     519.500,    5972.500,       707.7,    1.50!  !END!
0945    ! X =     519.500,    5973.000,       690.3,    1.50!  !END!
0946    ! X =     519.500,    5973.500,       594.9,    1.50!  !END!
0947    ! X =     519.500,    5974.000,       577.2,    1.50!  !END!
0948    ! X =     519.500,    5974.500,       570.0,    1.50!  !END!
0949    ! X =     519.500,    5975.000,       591.0,    1.50!  !END!
0950    ! X =     519.500,    5975.500,       593.5,    1.50!  !END!
0951    ! X =     519.500,    5976.000,       588.3,    1.50!  !END!
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0952    ! X =     519.500,    5976.500,       574.0,    1.50!  !END!
0953    ! X =     519.500,    5977.000,       568.0,    1.50!  !END!
0954    ! X =     519.500,    5977.500,       568.0,    1.50!  !END!
0955    ! X =     519.500,    5978.000,       575.0,    1.50!  !END!
0956    ! X =     519.500,    5978.500,       567.3,    1.50!  !END!
0957    ! X =     519.500,    5979.000,       570.2,    1.50!  !END!
0958    ! X =     519.500,    5979.500,       568.0,    1.50!  !END!
0959    ! X =     519.500,    5980.000,       573.6,    1.50!  !END!
0960    ! X =     519.500,    5980.500,       575.1,    1.50!  !END!
0961    ! X =     519.500,    5981.000,       579.2,    1.50!  !END!
0962    ! X =     519.500,    5981.500,       575.0,    1.50!  !END!
0963    ! X =     519.500,    5982.000,       576.0,    1.50!  !END!
0964    ! X =     519.500,    5982.500,       579.4,    1.50!  !END!
0965    ! X =     519.500,    5983.000,       575.4,    1.50!  !END!
0966    ! X =     519.500,    5984.000,       632.5,    1.50!  !END!
0967    ! X =     519.500,    5985.000,       679.6,    1.50!  !END!
0968    ! X =     519.500,    5986.000,       690.4,    1.50!  !END!
0969    ! X =     519.500,    5987.000,       687.0,    1.50!  !END!
0970    ! X =     519.500,    5988.000,       686.0,    1.50!  !END!
0971    ! X =     519.500,    5989.000,       678.0,    1.50!  !END!
0972    ! X =     519.500,    5990.000,       663.3,    1.50!  !END!
0973    ! X =     520.000,    5965.000,       661.1,    1.50!  !END!
0974    ! X =     520.000,    5965.500,       666.0,    1.50!  !END!
0975    ! X =     520.000,    5966.000,       667.0,    1.50!  !END!
0976    ! X =     520.000,    5966.500,       668.8,    1.50!  !END!
0977    ! X =     520.000,    5967.000,       666.6,    1.50!  !END!
0978    ! X =     520.000,    5967.500,       667.0,    1.50!  !END!
0979    ! X =     520.000,    5968.000,       675.9,    1.50!  !END!
0980    ! X =     520.000,    5968.500,       680.8,    1.50!  !END!
0981    ! X =     520.000,    5969.000,       690.0,    1.50!  !END!
0982    ! X =     520.000,    5969.500,       691.0,    1.50!  !END!
0983    ! X =     520.000,    5970.000,       696.2,    1.50!  !END!
0984    ! X =     520.000,    5970.500,       697.6,    1.50!  !END!
0985    ! X =     520.000,    5971.000,       696.5,    1.50!  !END!
0986    ! X =     520.000,    5971.500,       709.1,    1.50!  !END!
0987    ! X =     520.000,    5972.000,       713.0,    1.50!  !END!
0988    ! X =     520.000,    5972.500,       709.9,    1.50!  !END!
0989    ! X =     520.000,    5973.000,       720.8,    1.50!  !END!
0990    ! X =     520.000,    5973.500,       622.1,    1.50!  !END!
0991    ! X =     520.000,    5974.000,       580.2,    1.50!  !END!
0992    ! X =     520.000,    5974.500,       588.3,    1.50!  !END!
0993    ! X =     520.000,    5975.000,       592.0,    1.50!  !END!
0994    ! X =     520.000,    5975.500,       594.1,    1.50!  !END!
0995    ! X =     520.000,    5976.000,       569.6,    1.50!  !END!
0996    ! X =     520.000,    5976.500,       576.5,    1.50!  !END!
0997    ! X =     520.000,    5977.000,       569.5,    1.50!  !END!
0998    ! X =     520.000,    5977.500,       575.0,    1.50!  !END!
0999    ! X =     520.000,    5978.000,       575.0,    1.50!  !END!
1000    ! X =     520.000,    5978.500,       568.0,    1.50!  !END!
1001    ! X =     520.000,    5979.000,       574.0,    1.50!  !END!
1002    ! X =     520.000,    5979.500,       569.0,    1.50!  !END!
1003    ! X =     520.000,    5980.000,       576.6,    1.50!  !END!
1004    ! X =     520.000,    5980.500,       579.0,    1.50!  !END!
1005    ! X =     520.000,    5981.000,       578.0,    1.50!  !END!
1006    ! X =     520.000,    5981.500,       578.9,    1.50!  !END!
1007    ! X =     520.000,    5982.000,       580.0,    1.50!  !END!
1008    ! X =     520.000,    5982.500,       575.0,    1.50!  !END!
1009    ! X =     520.000,    5983.000,       574.0,    1.50!  !END!
1010    ! X =     520.500,    5955.000,       638.0,    1.50!  !END!
1011    ! X =     520.500,    5956.000,       624.5,    1.50!  !END!
1012    ! X =     520.500,    5957.000,       624.3,    1.50!  !END!
1013    ! X =     520.500,    5958.000,       634.0,    1.50!  !END!
1014    ! X =     520.500,    5959.000,       640.0,    1.50!  !END!
1015    ! X =     520.500,    5960.000,       650.3,    1.50!  !END!
1016    ! X =     520.500,    5961.000,       662.0,    1.50!  !END!
1017    ! X =     520.500,    5962.000,       662.1,    1.50!  !END!
1018    ! X =     520.500,    5963.000,       648.1,    1.50!  !END!
1019    ! X =     520.500,    5964.000,       661.0,    1.50!  !END!
1020    ! X =     520.500,    5965.000,       662.0,    1.50!  !END!
1021    ! X =     520.500,    5965.500,       665.0,    1.50!  !END!
1022    ! X =     520.500,    5966.000,       668.0,    1.50!  !END!
1023    ! X =     520.500,    5966.500,       672.7,    1.50!  !END!
1024    ! X =     520.500,    5967.000,       673.5,    1.50!  !END!
1025    ! X =     520.500,    5967.500,       674.0,    1.50!  !END!
1026    ! X =     520.500,    5968.000,       678.0,    1.50!  !END!
1027    ! X =     520.500,    5968.500,       676.0,    1.50!  !END!
1028    ! X =     520.500,    5969.000,       693.1,    1.50!  !END!
1029    ! X =     520.500,    5969.500,       690.1,    1.50!  !END!
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1030    ! X =     520.500,    5970.000,       693.0,    1.50!  !END!
1031    ! X =     520.500,    5970.500,       696.7,    1.50!  !END!
1032    ! X =     520.500,    5971.000,       689.0,    1.50!  !END!
1033    ! X =     520.500,    5971.500,       702.0,    1.50!  !END!
1034    ! X =     520.500,    5972.000,       698.0,    1.50!  !END!
1035    ! X =     520.500,    5972.500,       693.2,    1.50!  !END!
1036    ! X =     520.500,    5973.000,       707.3,    1.50!  !END!
1037    ! X =     520.500,    5973.500,       641.9,    1.50!  !END!
1038    ! X =     520.500,    5974.000,       570.0,    1.50!  !END!
1039    ! X =     520.500,    5974.500,       591.0,    1.50!  !END!
1040    ! X =     520.500,    5975.000,       590.6,    1.50!  !END!
1041    ! X =     520.500,    5975.500,       595.5,    1.50!  !END!
1042    ! X =     520.500,    5976.000,       569.0,    1.50!  !END!
1043    ! X =     520.500,    5976.500,       583.0,    1.50!  !END!
1044    ! X =     520.500,    5977.000,       578.4,    1.50!  !END!
1045    ! X =     520.500,    5977.500,       573.0,    1.50!  !END!
1046    ! X =     520.500,    5978.000,       568.0,    1.50!  !END!
1047    ! X =     520.500,    5978.500,       575.0,    1.50!  !END!
1048    ! X =     520.500,    5979.000,       571.0,    1.50!  !END!
1049    ! X =     520.500,    5979.500,       568.0,    1.50!  !END!
1050    ! X =     520.500,    5980.000,       578.8,    1.50!  !END!
1051    ! X =     520.500,    5980.500,       581.7,    1.50!  !END!
1052    ! X =     520.500,    5981.000,       580.9,    1.50!  !END!
1053    ! X =     520.500,    5981.500,       573.5,    1.50!  !END!
1054    ! X =     520.500,    5982.000,       571.0,    1.50!  !END!
1055    ! X =     520.500,    5982.500,       572.0,    1.50!  !END!
1056    ! X =     520.500,    5983.000,       575.5,    1.50!  !END!
1057    ! X =     520.500,    5984.000,       581.0,    1.50!  !END!
1058    ! X =     520.500,    5985.000,       669.4,    1.50!  !END!
1059    ! X =     520.500,    5986.000,       679.2,    1.50!  !END!
1060    ! X =     520.500,    5987.000,       690.0,    1.50!  !END!
1061    ! X =     520.500,    5988.000,       685.8,    1.50!  !END!
1062    ! X =     520.500,    5989.000,       678.9,    1.50!  !END!
1063    ! X =     520.500,    5990.000,       670.0,    1.50!  !END!
1064    ! X =     521.000,    5965.000,       649.2,    1.50!  !END!
1065    ! X =     521.000,    5965.500,       664.0,    1.50!  !END!
1066    ! X =     521.000,    5966.000,       666.0,    1.50!  !END!
1067    ! X =     521.000,    5966.500,       669.4,    1.50!  !END!
1068    ! X =     521.000,    5967.000,       676.0,    1.50!  !END!
1069    ! X =     521.000,    5967.500,       680.4,    1.50!  !END!
1070    ! X =     521.000,    5968.000,       683.6,    1.50!  !END!
1071    ! X =     521.000,    5968.500,       687.2,    1.50!  !END!
1072    ! X =     521.000,    5969.000,       684.1,    1.50!  !END!
1073    ! X =     521.000,    5969.500,       683.9,    1.50!  !END!
1074    ! X =     521.000,    5970.000,       688.9,    1.50!  !END!
1075    ! X =     521.000,    5970.500,       689.0,    1.50!  !END!
1076    ! X =     521.000,    5971.000,       686.0,    1.50!  !END!
1077    ! X =     521.000,    5971.500,       683.0,    1.50!  !END!
1078    ! X =     521.000,    5972.000,       686.9,    1.50!  !END!
1079    ! X =     521.000,    5972.500,       687.0,    1.50!  !END!
1080    ! X =     521.000,    5973.000,       689.0,    1.50!  !END!
1081    ! X =     521.000,    5973.500,       657.3,    1.50!  !END!
1082    ! X =     521.000,    5974.000,       570.0,    1.50!  !END!
1083    ! X =     521.000,    5974.500,       592.0,    1.50!  !END!
1084    ! X =     521.000,    5975.000,       592.0,    1.50!  !END!
1085    ! X =     521.000,    5975.500,       591.1,    1.50!  !END!
1086    ! X =     521.000,    5976.000,       572.6,    1.50!  !END!
1087    ! X =     521.000,    5976.500,       583.0,    1.50!  !END!
1088    ! X =     521.000,    5977.000,       593.0,    1.50!  !END!
1089    ! X =     521.000,    5977.500,       592.0,    1.50!  !END!
1090    ! X =     521.000,    5978.000,       570.6,    1.50!  !END!
1091    ! X =     521.000,    5978.500,       574.0,    1.50!  !END!
1092    ! X =     521.000,    5979.000,       573.0,    1.50!  !END!
1093    ! X =     521.000,    5979.500,       568.9,    1.50!  !END!
1094    ! X =     521.000,    5980.000,       576.0,    1.50!  !END!
1095    ! X =     521.000,    5980.500,       576.0,    1.50!  !END!
1096    ! X =     521.000,    5981.000,       572.0,    1.50!  !END!
1097    ! X =     521.000,    5981.500,       568.0,    1.50!  !END!
1098    ! X =     521.000,    5982.000,       571.0,    1.50!  !END!
1099    ! X =     521.000,    5982.500,       574.0,    1.50!  !END!
1100    ! X =     521.000,    5983.000,       569.6,    1.50!  !END!
1101    ! X =     521.500,    5955.000,       615.3,    1.50!  !END!
1102    ! X =     521.500,    5956.000,       653.9,    1.50!  !END!
1103    ! X =     521.500,    5957.000,       646.9,    1.50!  !END!
1104    ! X =     521.500,    5958.000,       649.8,    1.50!  !END!
1105    ! X =     521.500,    5959.000,       658.0,    1.50!  !END!
1106    ! X =     521.500,    5960.000,       656.0,    1.50!  !END!
1107    ! X =     521.500,    5961.000,       654.0,    1.50!  !END!
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1108    ! X =     521.500,    5962.000,       652.6,    1.50!  !END!
1109    ! X =     521.500,    5963.000,       652.2,    1.50!  !END!
1110    ! X =     521.500,    5964.000,       663.0,    1.50!  !END!
1111    ! X =     521.500,    5965.000,       661.0,    1.50!  !END!
1112    ! X =     521.500,    5965.500,       653.7,    1.50!  !END!
1113    ! X =     521.500,    5966.000,       663.0,    1.50!  !END!
1114    ! X =     521.500,    5966.500,       663.0,    1.50!  !END!
1115    ! X =     521.500,    5967.000,       667.9,    1.50!  !END!
1116    ! X =     521.500,    5967.500,       673.6,    1.50!  !END!
1117    ! X =     521.500,    5968.000,       675.0,    1.50!  !END!
1118    ! X =     521.500,    5968.500,       674.3,    1.50!  !END!
1119    ! X =     521.500,    5969.000,       677.5,    1.50!  !END!
1120    ! X =     521.500,    5969.500,       676.4,    1.50!  !END!
1121    ! X =     521.500,    5970.000,       675.6,    1.50!  !END!
1122    ! X =     521.500,    5970.500,       677.1,    1.50!  !END!
1123    ! X =     521.500,    5971.000,       680.0,    1.50!  !END!
1124    ! X =     521.500,    5971.500,       683.0,    1.50!  !END!
1125    ! X =     521.500,    5972.000,       679.6,    1.50!  !END!
1126    ! X =     521.500,    5972.500,       679.0,    1.50!  !END!
1127    ! X =     521.500,    5973.000,       688.7,    1.50!  !END!
1128    ! X =     521.500,    5973.500,       682.0,    1.50!  !END!
1129    ! X =     521.500,    5974.000,       623.9,    1.50!  !END!
1130    ! X =     521.500,    5974.500,       570.0,    1.50!  !END!
1131    ! X =     521.500,    5975.000,       583.9,    1.50!  !END!
1132    ! X =     521.500,    5975.500,       588.8,    1.50!  !END!
1133    ! X =     521.500,    5976.000,       570.6,    1.50!  !END!
1134    ! X =     521.500,    5976.500,       586.0,    1.50!  !END!
1135    ! X =     521.500,    5977.000,       590.8,    1.50!  !END!
1136    ! X =     521.500,    5977.500,       591.7,    1.50!  !END!
1137    ! X =     521.500,    5978.000,       571.9,    1.50!  !END!
1138    ! X =     521.500,    5978.500,       576.0,    1.50!  !END!
1139    ! X =     521.500,    5979.000,       571.2,    1.50!  !END!
1140    ! X =     521.500,    5979.500,       574.0,    1.50!  !END!
1141    ! X =     521.500,    5980.000,       577.8,    1.50!  !END!
1142    ! X =     521.500,    5980.500,       575.5,    1.50!  !END!
1143    ! X =     521.500,    5981.000,       573.5,    1.50!  !END!
1144    ! X =     521.500,    5981.500,       573.0,    1.50!  !END!
1145    ! X =     521.500,    5982.000,       574.0,    1.50!  !END!
1146    ! X =     521.500,    5982.500,       574.0,    1.50!  !END!
1147    ! X =     521.500,    5983.000,       574.7,    1.50!  !END!
1148    ! X =     521.500,    5984.000,       571.5,    1.50!  !END!
1149    ! X =     521.500,    5985.000,       616.7,    1.50!  !END!
1150    ! X =     521.500,    5986.000,       678.5,    1.50!  !END!
1151    ! X =     521.500,    5987.000,       689.0,    1.50!  !END!
1152    ! X =     521.500,    5988.000,       686.0,    1.50!  !END!
1153    ! X =     521.500,    5989.000,       677.2,    1.50!  !END!
1154    ! X =     521.500,    5990.000,       672.0,    1.50!  !END!
1155    ! X =     522.000,    5965.000,       663.0,    1.50!  !END!
1156    ! X =     522.000,    5965.500,       663.0,    1.50!  !END!
1157    ! X =     522.000,    5966.000,       662.0,    1.50!  !END!
1158    ! X =     522.000,    5966.500,       664.0,    1.50!  !END!
1159    ! X =     522.000,    5967.000,       668.0,    1.50!  !END!
1160    ! X =     522.000,    5967.500,       675.3,    1.50!  !END!
1161    ! X =     522.000,    5968.000,       675.8,    1.50!  !END!
1162    ! X =     522.000,    5968.500,       670.0,    1.50!  !END!
1163    ! X =     522.000,    5969.000,       672.0,    1.50!  !END!
1164    ! X =     522.000,    5969.500,       673.0,    1.50!  !END!
1165    ! X =     522.000,    5970.000,       673.0,    1.50!  !END!
1166    ! X =     522.000,    5970.500,       675.0,    1.50!  !END!
1167    ! X =     522.000,    5971.000,       677.0,    1.50!  !END!
1168    ! X =     522.000,    5971.500,       681.6,    1.50!  !END!
1169    ! X =     522.000,    5972.000,       681.0,    1.50!  !END!
1170    ! X =     522.000,    5972.500,       678.8,    1.50!  !END!
1171    ! X =     522.000,    5973.000,       682.3,    1.50!  !END!
1172    ! X =     522.000,    5973.500,       693.5,    1.50!  !END!
1173    ! X =     522.000,    5974.000,       688.7,    1.50!  !END!
1174    ! X =     522.000,    5974.500,       624.2,    1.50!  !END!
1175    ! X =     522.000,    5975.000,       571.0,    1.50!  !END!
1176    ! X =     522.000,    5975.500,       570.0,    1.50!  !END!
1177    ! X =     522.000,    5976.000,       580.3,    1.50!  !END!
1178    ! X =     522.000,    5976.500,       600.2,    1.50!  !END!
1179    ! X =     522.000,    5977.000,       589.7,    1.50!  !END!
1180    ! X =     522.000,    5977.500,       586.0,    1.50!  !END!
1181    ! X =     522.000,    5978.000,       590.0,    1.50!  !END!
1182    ! X =     522.000,    5978.500,       589.3,    1.50!  !END!
1183    ! X =     522.000,    5979.000,       592.4,    1.50!  !END!
1184    ! X =     522.000,    5979.500,       573.0,    1.50!  !END!
1185    ! X =     522.000,    5980.000,       575.0,    1.50!  !END!
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1186    ! X =     522.000,    5980.500,       568.0,    1.50!  !END!
1187    ! X =     522.000,    5981.000,       572.9,    1.50!  !END!
1188    ! X =     522.000,    5981.500,       574.9,    1.50!  !END!
1189    ! X =     522.000,    5982.000,       575.0,    1.50!  !END!
1190    ! X =     522.000,    5982.500,       573.0,    1.50!  !END!
1191    ! X =     522.000,    5983.000,       573.4,    1.50!  !END!
1192    ! X =     522.500,    5955.000,       655.1,    1.50!  !END!
1193    ! X =     522.500,    5956.000,       660.4,    1.50!  !END!
1194    ! X =     522.500,    5957.000,       663.6,    1.50!  !END!
1195    ! X =     522.500,    5958.000,       662.8,    1.50!  !END!
1196    ! X =     522.500,    5959.000,       663.0,    1.50!  !END!
1197    ! X =     522.500,    5960.000,       656.9,    1.50!  !END!
1198    ! X =     522.500,    5961.000,       655.0,    1.50!  !END!
1199    ! X =     522.500,    5962.000,       655.5,    1.50!  !END!
1200    ! X =     522.500,    5963.000,       652.0,    1.50!  !END!
1201    ! X =     522.500,    5964.000,       652.0,    1.50!  !END!
1202    ! X =     522.500,    5965.000,       665.1,    1.50!  !END!
1203    ! X =     522.500,    5965.500,       664.8,    1.50!  !END!
1204    ! X =     522.500,    5966.000,       665.0,    1.50!  !END!
1205    ! X =     522.500,    5966.500,       669.3,    1.50!  !END!
1206    ! X =     522.500,    5967.000,       668.0,    1.50!  !END!
1207    ! X =     522.500,    5967.500,       675.0,    1.50!  !END!
1208    ! X =     522.500,    5968.000,       670.1,    1.50!  !END!
1209    ! X =     522.500,    5968.500,       672.0,    1.50!  !END!
1210    ! X =     522.500,    5969.000,       670.0,    1.50!  !END!
1211    ! X =     522.500,    5969.500,       673.0,    1.50!  !END!
1212    ! X =     522.500,    5970.000,       679.2,    1.50!  !END!
1213    ! X =     522.500,    5970.500,       687.0,    1.50!  !END!
1214    ! X =     522.500,    5971.000,       681.1,    1.50!  !END!
1215    ! X =     522.500,    5971.500,       678.0,    1.50!  !END!
1216    ! X =     522.500,    5972.000,       677.0,    1.50!  !END!
1217    ! X =     522.500,    5972.500,       696.5,    1.50!  !END!
1218    ! X =     522.500,    5973.000,       679.0,    1.50!  !END!
1219    ! X =     522.500,    5973.500,       683.0,    1.50!  !END!
1220    ! X =     522.500,    5974.000,       688.7,    1.50!  !END!
1221    ! X =     522.500,    5974.500,       684.0,    1.50!  !END!
1222    ! X =     522.500,    5975.000,       628.9,    1.50!  !END!
1223    ! X =     522.500,    5975.500,       638.9,    1.50!  !END!
1224    ! X =     522.500,    5976.000,       625.1,    1.50!  !END!
1225    ! X =     522.500,    5976.500,       605.6,    1.50!  !END!
1226    ! X =     522.500,    5977.000,       619.8,    1.50!  !END!
1227    ! X =     522.500,    5977.500,       619.1,    1.50!  !END!
1228    ! X =     522.500,    5978.000,       593.0,    1.50!  !END!
1229    ! X =     522.500,    5978.500,       593.0,    1.50!  !END!
1230    ! X =     522.500,    5979.000,       592.3,    1.50!  !END!
1231    ! X =     522.500,    5979.500,       570.0,    1.50!  !END!
1232    ! X =     522.500,    5980.000,       575.0,    1.50!  !END!
1233    ! X =     522.500,    5980.500,       571.8,    1.50!  !END!
1234    ! X =     522.500,    5981.000,       568.8,    1.50!  !END!
1235    ! X =     522.500,    5981.500,       581.0,    1.50!  !END!
1236    ! X =     522.500,    5982.000,       576.0,    1.50!  !END!
1237    ! X =     522.500,    5982.500,       572.1,    1.50!  !END!
1238    ! X =     522.500,    5983.000,       569.7,    1.50!  !END!
1239    ! X =     522.500,    5984.000,       583.0,    1.50!  !END!
1240    ! X =     522.500,    5985.000,       590.5,    1.50!  !END!
1241    ! X =     522.500,    5986.000,       668.6,    1.50!  !END!
1242    ! X =     522.500,    5987.000,       659.4,    1.50!  !END!
1243    ! X =     522.500,    5988.000,       650.1,    1.50!  !END!
1244    ! X =     522.500,    5989.000,       673.0,    1.50!  !END!
1245    ! X =     522.500,    5990.000,       677.0,    1.50!  !END!
1246    ! X =     523.000,    5965.000,       668.3,    1.50!  !END!
1247    ! X =     523.000,    5965.500,       673.0,    1.50!  !END!
1248    ! X =     523.000,    5966.000,       673.9,    1.50!  !END!
1249    ! X =     523.000,    5966.500,       671.0,    1.50!  !END!
1250    ! X =     523.000,    5967.000,       672.8,    1.50!  !END!
1251    ! X =     523.000,    5967.500,       673.0,    1.50!  !END!
1252    ! X =     523.000,    5968.000,       673.0,    1.50!  !END!
1253    ! X =     523.000,    5968.500,       673.0,    1.50!  !END!
1254    ! X =     523.000,    5969.000,       672.0,    1.50!  !END!
1255    ! X =     523.000,    5969.500,       674.1,    1.50!  !END!
1256    ! X =     523.000,    5970.000,       689.5,    1.50!  !END!
1257    ! X =     523.000,    5970.500,       684.6,    1.50!  !END!
1258    ! X =     523.000,    5971.000,       684.0,    1.50!  !END!
1259    ! X =     523.000,    5971.500,       685.0,    1.50!  !END!
1260    ! X =     523.000,    5972.000,       681.0,    1.50!  !END!
1261    ! X =     523.000,    5972.500,       677.9,    1.50!  !END!
1262    ! X =     523.000,    5973.000,       679.2,    1.50!  !END!
1263    ! X =     523.000,    5973.500,       674.0,    1.50!  !END!
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1264    ! X =     523.000,    5974.000,       673.8,    1.50!  !END!
1265    ! X =     523.000,    5974.500,       683.0,    1.50!  !END!
1266    ! X =     523.000,    5975.000,       661.3,    1.50!  !END!
1267    ! X =     523.000,    5975.500,       648.2,    1.50!  !END!
1268    ! X =     523.000,    5976.000,       605.4,    1.50!  !END!
1269    ! X =     523.000,    5976.500,       637.7,    1.50!  !END!
1270    ! X =     523.000,    5977.000,       635.2,    1.50!  !END!
1271    ! X =     523.000,    5977.500,       642.5,    1.50!  !END!
1272    ! X =     523.000,    5978.000,       631.7,    1.50!  !END!
1273    ! X =     523.000,    5978.500,       594.0,    1.50!  !END!
1274    ! X =     523.000,    5979.000,       593.0,    1.50!  !END!
1275    ! X =     523.000,    5979.500,       595.7,    1.50!  !END!
1276    ! X =     523.000,    5980.000,       570.0,    1.50!  !END!
1277    ! X =     523.000,    5980.500,       570.3,    1.50!  !END!
1278    ! X =     523.000,    5981.000,       580.4,    1.50!  !END!
1279    ! X =     523.000,    5981.500,       584.7,    1.50!  !END!
1280    ! X =     523.000,    5982.000,       580.0,    1.50!  !END!
1281    ! X =     523.000,    5982.500,       576.0,    1.50!  !END!
1282    ! X =     523.000,    5983.000,       573.0,    1.50!  !END!
1283    ! X =     523.500,    5955.000,       659.9,    1.50!  !END!
1284    ! X =     523.500,    5956.000,       657.0,    1.50!  !END!
1285    ! X =     523.500,    5957.000,       662.3,    1.50!  !END!
1286    ! X =     523.500,    5958.000,       668.6,    1.50!  !END!
1287    ! X =     523.500,    5959.000,       676.0,    1.50!  !END!
1288    ! X =     523.500,    5960.000,       669.0,    1.50!  !END!
1289    ! X =     523.500,    5961.000,       665.0,    1.50!  !END!
1290    ! X =     523.500,    5962.000,       665.9,    1.50!  !END!
1291    ! X =     523.500,    5963.000,       675.0,    1.50!  !END!
1292    ! X =     523.500,    5964.000,       668.4,    1.50!  !END!
1293    ! X =     523.500,    5965.000,       676.4,    1.50!  !END!
1294    ! X =     523.500,    5965.500,       674.8,    1.50!  !END!
1295    ! X =     523.500,    5966.000,       678.0,    1.50!  !END!
1296    ! X =     523.500,    5966.500,       677.0,    1.50!  !END!
1297    ! X =     523.500,    5967.000,       674.9,    1.50!  !END!
1298    ! X =     523.500,    5967.500,       677.0,    1.50!  !END!
1299    ! X =     523.500,    5968.000,       675.1,    1.50!  !END!
1300    ! X =     523.500,    5968.500,       675.0,    1.50!  !END!
1301    ! X =     523.500,    5969.000,       676.9,    1.50!  !END!
1302    ! X =     523.500,    5969.500,       681.0,    1.50!  !END!
1303    ! X =     523.500,    5970.000,       687.1,    1.50!  !END!
1304    ! X =     523.500,    5970.500,       683.3,    1.50!  !END!
1305    ! X =     523.500,    5971.000,       678.2,    1.50!  !END!
1306    ! X =     523.500,    5971.500,       681.9,    1.50!  !END!
1307    ! X =     523.500,    5972.000,       683.0,    1.50!  !END!
1308    ! X =     523.500,    5972.500,       681.3,    1.50!  !END!
1309    ! X =     523.500,    5973.000,       676.0,    1.50!  !END!
1310    ! X =     523.500,    5973.500,       672.0,    1.50!  !END!
1311    ! X =     523.500,    5974.000,       667.3,    1.50!  !END!
1312    ! X =     523.500,    5974.500,       676.7,    1.50!  !END!
1313    ! X =     523.500,    5975.000,       689.0,    1.50!  !END!
1314    ! X =     523.500,    5975.500,       671.3,    1.50!  !END!
1315    ! X =     523.500,    5976.000,       647.2,    1.50!  !END!
1316    ! X =     523.500,    5976.500,       646.9,    1.50!  !END!
1317    ! X =     523.500,    5977.000,       654.5,    1.50!  !END!
1318    ! X =     523.500,    5977.500,       649.6,    1.50!  !END!
1319    ! X =     523.500,    5978.000,       639.9,    1.50!  !END!
1320    ! X =     523.500,    5978.500,       636.3,    1.50!  !END!
1321    ! X =     523.500,    5979.000,       629.6,    1.50!  !END!
1322    ! X =     523.500,    5979.500,       625.0,    1.50!  !END!
1323    ! X =     523.500,    5980.000,       627.5,    1.50!  !END!
1324    ! X =     523.500,    5980.500,       629.0,    1.50!  !END!
1325    ! X =     523.500,    5981.000,       621.3,    1.50!  !END!
1326    ! X =     523.500,    5981.500,       629.5,    1.50!  !END!
1327    ! X =     523.500,    5982.000,       606.2,    1.50!  !END!
1328    ! X =     523.500,    5982.500,       572.4,    1.50!  !END!
1329    ! X =     523.500,    5983.000,       573.0,    1.50!  !END!
1330    ! X =     523.500,    5984.000,       580.0,    1.50!  !END!
1331    ! X =     523.500,    5985.000,       587.0,    1.50!  !END!
1332    ! X =     523.500,    5986.000,       586.7,    1.50!  !END!
1333    ! X =     523.500,    5987.000,       577.0,    1.50!  !END!
1334    ! X =     523.500,    5988.000,       630.1,    1.50!  !END!
1335    ! X =     523.500,    5989.000,       676.6,    1.50!  !END!
1336    ! X =     523.500,    5990.000,       674.9,    1.50!  !END!
1337    ! X =     524.000,    5965.000,       670.5,    1.50!  !END!
1338    ! X =     524.000,    5965.500,       669.0,    1.50!  !END!
1339    ! X =     524.000,    5966.000,       672.4,    1.50!  !END!
1340    ! X =     524.000,    5966.500,       677.0,    1.50!  !END!
1341    ! X =     524.000,    5967.000,       682.6,    1.50!  !END!
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1342    ! X =     524.000,    5967.500,       684.0,    1.50!  !END!
1343    ! X =     524.000,    5968.000,       683.0,    1.50!  !END!
1344    ! X =     524.000,    5968.500,       682.0,    1.50!  !END!
1345    ! X =     524.000,    5969.000,       684.0,    1.50!  !END!
1346    ! X =     524.000,    5969.500,       685.1,    1.50!  !END!
1347    ! X =     524.000,    5970.000,       694.3,    1.50!  !END!
1348    ! X =     524.000,    5970.500,       693.5,    1.50!  !END!
1349    ! X =     524.000,    5971.000,       686.4,    1.50!  !END!
1350    ! X =     524.000,    5971.500,       680.3,    1.50!  !END!
1351    ! X =     524.000,    5972.000,       676.1,    1.50!  !END!
1352    ! X =     524.000,    5972.500,       670.7,    1.50!  !END!
1353    ! X =     524.000,    5973.000,       672.6,    1.50!  !END!
1354    ! X =     524.000,    5973.500,       667.0,    1.50!  !END!
1355    ! X =     524.000,    5974.000,       662.2,    1.50!  !END!
1356    ! X =     524.000,    5974.500,       668.1,    1.50!  !END!
1357    ! X =     524.000,    5975.000,       682.0,    1.50!  !END!
1358    ! X =     524.000,    5975.500,       680.0,    1.50!  !END!
1359    ! X =     524.000,    5976.000,       650.3,    1.50!  !END!
1360    ! X =     524.000,    5976.500,       663.8,    1.50!  !END!
1361    ! X =     524.000,    5977.000,       662.0,    1.50!  !END!
1362    ! X =     524.000,    5977.500,       658.2,    1.50!  !END!
1363    ! X =     524.000,    5978.000,       656.9,    1.50!  !END!
1364    ! X =     524.000,    5978.500,       639.0,    1.50!  !END!
1365    ! X =     524.000,    5979.000,       634.8,    1.50!  !END!
1366    ! X =     524.000,    5979.500,       636.1,    1.50!  !END!
1367    ! X =     524.000,    5980.000,       643.6,    1.50!  !END!
1368    ! X =     524.000,    5980.500,       628.9,    1.50!  !END!
1369    ! X =     524.000,    5981.000,       633.4,    1.50!  !END!
1370    ! X =     524.000,    5981.500,       633.3,    1.50!  !END!
1371    ! X =     524.000,    5982.000,       580.7,    1.50!  !END!
1372    ! X =     524.000,    5982.500,       579.0,    1.50!  !END!
1373    ! X =     524.000,    5983.000,       577.2,    1.50!  !END!
1374    ! X =     524.500,    5955.000,       676.3,    1.50!  !END!
1375    ! X =     524.500,    5956.000,       675.0,    1.50!  !END!
1376    ! X =     524.500,    5957.000,       687.2,    1.50!  !END!
1377    ! X =     524.500,    5958.000,       675.2,    1.50!  !END!
1378    ! X =     524.500,    5959.000,       668.7,    1.50!  !END!
1379    ! X =     524.500,    5960.000,       684.6,    1.50!  !END!
1380    ! X =     524.500,    5961.000,       675.3,    1.50!  !END!
1381    ! X =     524.500,    5962.000,       674.0,    1.50!  !END!
1382    ! X =     524.500,    5963.000,       678.0,    1.50!  !END!
1383    ! X =     524.500,    5964.000,       675.0,    1.50!  !END!
1384    ! X =     524.500,    5965.000,       666.1,    1.50!  !END!
1385    ! X =     524.500,    5965.500,       671.0,    1.50!  !END!
1386    ! X =     524.500,    5966.000,       673.8,    1.50!  !END!
1387    ! X =     524.500,    5966.500,       679.0,    1.50!  !END!
1388    ! X =     524.500,    5967.000,       685.0,    1.50!  !END!
1389    ! X =     524.500,    5967.500,       693.0,    1.50!  !END!
1390    ! X =     524.500,    5968.000,       693.0,    1.50!  !END!
1391    ! X =     524.500,    5968.500,       695.9,    1.50!  !END!
1392    ! X =     524.500,    5969.000,       696.0,    1.50!  !END!
1393    ! X =     524.500,    5969.500,       699.0,    1.50!  !END!
1394    ! X =     524.500,    5970.000,       707.8,    1.50!  !END!
1395    ! X =     524.500,    5970.500,       707.0,    1.50!  !END!
1396    ! X =     524.500,    5971.000,       714.0,    1.50!  !END!
1397    ! X =     524.500,    5971.500,       689.8,    1.50!  !END!
1398    ! X =     524.500,    5972.000,       717.8,    1.50!  !END!
1399    ! X =     524.500,    5972.500,       709.3,    1.50!  !END!
1400    ! X =     524.500,    5973.000,       708.0,    1.50!  !END!
1401    ! X =     524.500,    5973.500,       692.8,    1.50!  !END!
1402    ! X =     524.500,    5974.000,       673.4,    1.50!  !END!
1403    ! X =     524.500,    5974.500,       682.7,    1.50!  !END!
1404    ! X =     524.500,    5975.000,       671.1,    1.50!  !END!
1405    ! X =     524.500,    5975.500,       672.3,    1.50!  !END!
1406    ! X =     524.500,    5976.000,       670.2,    1.50!  !END!
1407    ! X =     524.500,    5976.500,       641.9,    1.50!  !END!
1408    ! X =     524.500,    5977.000,       658.0,    1.50!  !END!
1409    ! X =     524.500,    5977.500,       663.4,    1.50!  !END!
1410    ! X =     524.500,    5978.000,       660.1,    1.50!  !END!
1411    ! X =     524.500,    5978.500,       657.1,    1.50!  !END!
1412    ! X =     524.500,    5979.000,       653.2,    1.50!  !END!
1413    ! X =     524.500,    5979.500,       648.6,    1.50!  !END!
1414    ! X =     524.500,    5980.000,       649.8,    1.50!  !END!
1415    ! X =     524.500,    5980.500,       628.0,    1.50!  !END!
1416    ! X =     524.500,    5981.000,       644.5,    1.50!  !END!
1417    ! X =     524.500,    5981.500,       636.0,    1.50!  !END!
1418    ! X =     524.500,    5982.000,       573.2,    1.50!  !END!
1419    ! X =     524.500,    5982.500,       578.0,    1.50!  !END!
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1420    ! X =     524.500,    5983.000,       574.8,    1.50!  !END!
1421    ! X =     524.500,    5984.000,       572.0,    1.50!  !END!
1422    ! X =     524.500,    5985.000,       582.4,    1.50!  !END!
1423    ! X =     524.500,    5986.000,       578.0,    1.50!  !END!
1424    ! X =     524.500,    5987.000,       591.7,    1.50!  !END!
1425    ! X =     524.500,    5988.000,       590.0,    1.50!  !END!
1426    ! X =     524.500,    5989.000,       591.0,    1.50!  !END!
1427    ! X =     524.500,    5990.000,       593.4,    1.50!  !END!
1428    ! X =     525.500,    5955.000,       675.1,    1.50!  !END!
1429    ! X =     525.500,    5956.000,       672.0,    1.50!  !END!
1430    ! X =     525.500,    5957.000,       686.2,    1.50!  !END!
1431    ! X =     525.500,    5958.000,       675.0,    1.50!  !END!
1432    ! X =     525.500,    5959.000,       672.0,    1.50!  !END!
1433    ! X =     525.500,    5960.000,       686.5,    1.50!  !END!
1434    ! X =     525.500,    5961.000,       681.7,    1.50!  !END!
1435    ! X =     525.500,    5962.000,       679.0,    1.50!  !END!
1436    ! X =     525.500,    5963.000,       663.2,    1.50!  !END!
1437    ! X =     525.500,    5964.000,       682.8,    1.50!  !END!
1438    ! X =     525.500,    5965.000,       672.0,    1.50!  !END!
1439    ! X =     525.500,    5966.000,       676.9,    1.50!  !END!
1440    ! X =     525.500,    5967.000,       683.2,    1.50!  !END!
1441    ! X =     525.500,    5968.000,       693.0,    1.50!  !END!
1442    ! X =     525.500,    5969.000,       719.0,    1.50!  !END!
1443    ! X =     525.500,    5970.000,       710.2,    1.50!  !END!
1444    ! X =     525.500,    5971.000,       710.4,    1.50!  !END!
1445    ! X =     525.500,    5972.000,       724.0,    1.50!  !END!
1446    ! X =     525.500,    5973.000,       740.0,    1.50!  !END!
1447    ! X =     525.500,    5974.000,       690.4,    1.50!  !END!
1448    ! X =     525.500,    5975.000,       674.1,    1.50!  !END!
1449    ! X =     525.500,    5976.000,       673.0,    1.50!  !END!
1450    ! X =     525.500,    5977.000,       669.0,    1.50!  !END!
1451    ! X =     525.500,    5978.000,       672.0,    1.50!  !END!
1452    ! X =     525.500,    5979.000,       659.9,    1.50!  !END!
1453    ! X =     525.500,    5980.000,       671.1,    1.50!  !END!
1454    ! X =     525.500,    5981.000,       650.9,    1.50!  !END!
1455    ! X =     525.500,    5982.000,       638.8,    1.50!  !END!
1456    ! X =     525.500,    5983.000,       643.0,    1.50!  !END!
1457    ! X =     525.500,    5984.000,       646.6,    1.50!  !END!
1458    ! X =     525.500,    5985.000,       577.1,    1.50!  !END!
1459    ! X =     525.500,    5986.000,       583.1,    1.50!  !END!
1460    ! X =     525.500,    5987.000,       582.0,    1.50!  !END!
1461    ! X =     525.500,    5988.000,       576.1,    1.50!  !END!
1462    ! X =     525.500,    5989.000,       575.0,    1.50!  !END!
1463    ! X =     525.500,    5990.000,       589.0,    1.50!  !END!
1464    ! X =     526.500,    5955.000,       685.9,    1.50!  !END!
1465    ! X =     526.500,    5956.000,       685.4,    1.50!  !END!
1466    ! X =     526.500,    5957.000,       693.5,    1.50!  !END!
1467    ! X =     526.500,    5958.000,       674.7,    1.50!  !END!
1468    ! X =     526.500,    5959.000,       680.5,    1.50!  !END!
1469    ! X =     526.500,    5960.000,       674.7,    1.50!  !END!
1470    ! X =     526.500,    5961.000,       686.0,    1.50!  !END!
1471    ! X =     526.500,    5962.000,       679.0,    1.50!  !END!
1472    ! X =     526.500,    5963.000,       678.8,    1.50!  !END!
1473    ! X =     526.500,    5964.000,       672.0,    1.50!  !END!
1474    ! X =     526.500,    5965.000,       674.0,    1.50!  !END!
1475    ! X =     526.500,    5966.000,       679.8,    1.50!  !END!
1476    ! X =     526.500,    5967.000,       675.0,    1.50!  !END!
1477    ! X =     526.500,    5968.000,       688.2,    1.50!  !END!
1478    ! X =     526.500,    5969.000,       723.8,    1.50!  !END!
1479    ! X =     526.500,    5970.000,       739.9,    1.50!  !END!
1480    ! X =     526.500,    5971.000,       733.1,    1.50!  !END!
1481    ! X =     526.500,    5972.000,       732.8,    1.50!  !END!
1482    ! X =     526.500,    5973.000,       724.1,    1.50!  !END!
1483    ! X =     526.500,    5974.000,       726.0,    1.50!  !END!
1484    ! X =     526.500,    5975.000,       696.9,    1.50!  !END!
1485    ! X =     526.500,    5976.000,       685.0,    1.50!  !END!
1486    ! X =     526.500,    5977.000,       691.1,    1.50!  !END!
1487    ! X =     526.500,    5978.000,       670.4,    1.50!  !END!
1488    ! X =     526.500,    5979.000,       665.7,    1.50!  !END!
1489    ! X =     526.500,    5980.000,       689.0,    1.50!  !END!
1490    ! X =     526.500,    5981.000,       681.0,    1.50!  !END!
1491    ! X =     526.500,    5982.000,       663.3,    1.50!  !END!
1492    ! X =     526.500,    5983.000,       665.8,    1.50!  !END!
1493    ! X =     526.500,    5984.000,       636.9,    1.50!  !END!
1494    ! X =     526.500,    5985.000,       661.4,    1.50!  !END!
1495    ! X =     526.500,    5986.000,       576.4,    1.50!  !END!
1496    ! X =     526.500,    5987.000,       574.0,    1.50!  !END!
1497    ! X =     526.500,    5988.000,       578.0,    1.50!  !END!
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1498    ! X =     526.500,    5989.000,       575.0,    1.50!  !END!
1499    ! X =     526.500,    5990.000,       589.2,    1.50!  !END!
1500    ! X =     527.500,    5955.000,       689.4,    1.50!  !END!
1501    ! X =     527.500,    5956.000,       693.0,    1.50!  !END!
1502    ! X =     527.500,    5957.000,       693.8,    1.50!  !END!
1503    ! X =     527.500,    5958.000,       680.0,    1.50!  !END!
1504    ! X =     527.500,    5959.000,       678.1,    1.50!  !END!
1505    ! X =     527.500,    5960.000,       681.8,    1.50!  !END!
1506    ! X =     527.500,    5961.000,       675.9,    1.50!  !END!
1507    ! X =     527.500,    5962.000,       677.0,    1.50!  !END!
1508    ! X =     527.500,    5963.000,       675.2,    1.50!  !END!
1509    ! X =     527.500,    5964.000,       668.0,    1.50!  !END!
1510    ! X =     527.500,    5965.000,       668.9,    1.50!  !END!
1511    ! X =     527.500,    5966.000,       671.0,    1.50!  !END!
1512    ! X =     527.500,    5967.000,       677.9,    1.50!  !END!
1513    ! X =     527.500,    5968.000,       672.9,    1.50!  !END!
1514    ! X =     527.500,    5969.000,       729.1,    1.50!  !END!
1515    ! X =     527.500,    5970.000,       739.1,    1.50!  !END!
1516    ! X =     527.500,    5971.000,       747.7,    1.50!  !END!
1517    ! X =     527.500,    5972.000,       734.1,    1.50!  !END!
1518    ! X =     527.500,    5973.000,       735.2,    1.50!  !END!
1519    ! X =     527.500,    5974.000,       748.6,    1.50!  !END!
1520    ! X =     527.500,    5975.000,       755.2,    1.50!  !END!
1521    ! X =     527.500,    5976.000,       727.5,    1.50!  !END!
1522    ! X =     527.500,    5977.000,       709.0,    1.50!  !END!
1523    ! X =     527.500,    5978.000,       726.9,    1.50!  !END!
1524    ! X =     527.500,    5979.000,       679.5,    1.50!  !END!
1525    ! X =     527.500,    5980.000,       692.9,    1.50!  !END!
1526    ! X =     527.500,    5981.000,       709.0,    1.50!  !END!
1527    ! X =     527.500,    5982.000,       685.3,    1.50!  !END!
1528    ! X =     527.500,    5983.000,       691.0,    1.50!  !END!
1529    ! X =     527.500,    5984.000,       684.0,    1.50!  !END!
1530    ! X =     527.500,    5985.000,       629.6,    1.50!  !END!
1531    ! X =     527.500,    5986.000,       655.2,    1.50!  !END!
1532    ! X =     527.500,    5987.000,       667.9,    1.50!  !END!
1533    ! X =     527.500,    5988.000,       625.9,    1.50!  !END!
1534    ! X =     527.500,    5989.000,       575.0,    1.50!  !END!
1535    ! X =     527.500,    5990.000,       594.0,    1.50!  !END!
1536    ! X =     528.500,    5955.000,       699.5,    1.50!  !END!
1537    ! X =     528.500,    5956.000,       706.6,    1.50!  !END!
1538    ! X =     528.500,    5957.000,       693.0,    1.50!  !END!
1539    ! X =     528.500,    5958.000,       688.0,    1.50!  !END!
1540    ! X =     528.500,    5959.000,       676.4,    1.50!  !END!
1541    ! X =     528.500,    5960.000,       680.5,    1.50!  !END!
1542    ! X =     528.500,    5961.000,       679.0,    1.50!  !END!
1543    ! X =     528.500,    5962.000,       691.6,    1.50!  !END!
1544    ! X =     528.500,    5963.000,       707.1,    1.50!  !END!
1545    ! X =     528.500,    5964.000,       700.7,    1.50!  !END!
1546    ! X =     528.500,    5965.000,       682.6,    1.50!  !END!
1547    ! X =     528.500,    5966.000,       695.0,    1.50!  !END!
1548    ! X =     528.500,    5967.000,       728.9,    1.50!  !END!
1549    ! X =     528.500,    5968.000,       700.4,    1.50!  !END!
1550    ! X =     528.500,    5969.000,       686.5,    1.50!  !END!
1551    ! X =     528.500,    5970.000,       700.9,    1.50!  !END!
1552    ! X =     528.500,    5971.000,       701.7,    1.50!  !END!
1553    ! X =     528.500,    5972.000,       708.2,    1.50!  !END!
1554    ! X =     528.500,    5973.000,       712.2,    1.50!  !END!
1555    ! X =     528.500,    5974.000,       720.5,    1.50!  !END!
1556    ! X =     528.500,    5975.000,       730.5,    1.50!  !END!
1557    ! X =     528.500,    5976.000,       719.6,    1.50!  !END!
1558    ! X =     528.500,    5977.000,       720.1,    1.50!  !END!
1559    ! X =     528.500,    5978.000,       727.0,    1.50!  !END!
1560    ! X =     528.500,    5979.000,       714.7,    1.50!  !END!
1561    ! X =     528.500,    5980.000,       709.4,    1.50!  !END!
1562    ! X =     528.500,    5981.000,       704.6,    1.50!  !END!
1563    ! X =     528.500,    5982.000,       690.2,    1.50!  !END!
1564    ! X =     528.500,    5983.000,       700.3,    1.50!  !END!
1565    ! X =     528.500,    5984.000,       689.2,    1.50!  !END!
1566    ! X =     528.500,    5985.000,       676.0,    1.50!  !END!
1567    ! X =     528.500,    5986.000,       678.5,    1.50!  !END!
1568    ! X =     528.500,    5987.000,       680.4,    1.50!  !END!
1569    ! X =     528.500,    5988.000,       683.2,    1.50!  !END!
1570    ! X =     528.500,    5989.000,       669.6,    1.50!  !END!
1571    ! X =     528.500,    5990.000,       575.0,    1.50!  !END!
1572    ! X =     529.500,    5955.000,       700.0,    1.50!  !END!
1573    ! X =     529.500,    5956.000,       695.8,    1.50!  !END!
1574    ! X =     529.500,    5957.000,       693.8,    1.50!  !END!
1575    ! X =     529.500,    5958.000,       697.6,    1.50!  !END!
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1576    ! X =     529.500,    5959.000,       683.1,    1.50!  !END!
1577    ! X =     529.500,    5960.000,       698.7,    1.50!  !END!
1578    ! X =     529.500,    5961.000,       738.7,    1.50!  !END!
1579    ! X =     529.500,    5962.000,       738.0,    1.50!  !END!
1580    ! X =     529.500,    5963.000,       754.9,    1.50!  !END!
1581    ! X =     529.500,    5964.000,       717.0,    1.50!  !END!
1582    ! X =     529.500,    5965.000,       734.5,    1.50!  !END!
1583    ! X =     529.500,    5966.000,       748.2,    1.50!  !END!
1584    ! X =     529.500,    5967.000,       794.6,    1.50!  !END!
1585    ! X =     529.500,    5968.000,       776.3,    1.50!  !END!
1586    ! X =     529.500,    5969.000,       733.1,    1.50!  !END!
1587    ! X =     529.500,    5970.000,       719.5,    1.50!  !END!
1588    ! X =     529.500,    5971.000,       730.1,    1.50!  !END!
1589    ! X =     529.500,    5972.000,       704.1,    1.50!  !END!
1590    ! X =     529.500,    5973.000,       703.0,    1.50!  !END!
1591    ! X =     529.500,    5974.000,       703.0,    1.50!  !END!
1592    ! X =     529.500,    5975.000,       727.6,    1.50!  !END!
1593    ! X =     529.500,    5976.000,       722.5,    1.50!  !END!
1594    ! X =     529.500,    5977.000,       727.1,    1.50!  !END!
1595    ! X =     529.500,    5978.000,       725.3,    1.50!  !END!
1596    ! X =     529.500,    5979.000,       709.2,    1.50!  !END!
1597    ! X =     529.500,    5980.000,       694.6,    1.50!  !END!
1598    ! X =     529.500,    5981.000,       697.8,    1.50!  !END!
1599    ! X =     529.500,    5982.000,       711.8,    1.50!  !END!
1600    ! X =     529.500,    5983.000,       693.1,    1.50!  !END!
1601    ! X =     529.500,    5984.000,       699.0,    1.50!  !END!
1602    ! X =     529.500,    5985.000,       679.0,    1.50!  !END!
1603    ! X =     529.500,    5986.000,       677.1,    1.50!  !END!
1604    ! X =     529.500,    5987.000,       684.8,    1.50!  !END!
1605    ! X =     529.500,    5988.000,       697.9,    1.50!  !END!
1606    ! X =     529.500,    5989.000,       674.5,    1.50!  !END!
1607    ! X =     529.500,    5990.000,       658.2,    1.50!  !END!
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This table length must be consistent with:
the "Number of non-gridded receptors (NREC)"

a
Data for each receptor are treated as a separate input subgroup
and therefore must end with an input group terminator.

b
Receptor height above ground is optional. If no value is entered,
the receptor is placed on the ground.

c
Receptors can be assigned using group names provided in 17b. If no
group names are used (NRGRP=0) then the default assignment name X
must be used.