United States Environmental Protection Agency

Air and Radiation

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May 1998

Program User Guide for Interim Vehicle Clean Screening Credit Utility

DRAFT REPORT

May 7, 1998

Transmittal of the Draft "Description and Documentation for Interim Vehicle Clean Screening Credit Utility"

EPA is today releasing draft guidance on the interim use of clean screening methodologies in state Inspection and Maintenance (I/M) programs. The purpose of the guidance is to share technical information with states and other interested parties, and to advise them of certain types of I/M changes EPA is inclined to approve, should states choose to incorporate them into existing or planned I/M programs. The draft guidance is in the form of two documents and a computer program. One document addresses concepts and documents the derivation of the credit loss estimates. The other document provides detailed steps for use of the FORTRAN utility program which is executed before executing MOBILE5b.

The clean screening concepts described in the draft guidance are potentially of considerable importance to those involved in I/M planning and implementation. In general, clean screening is aimed at making I/M programs more cost effective by focusing inspections on cars more likely than others to be high emitters in need of repair. Clean screening can be used to reduce the number of cars required to be inspected each year--with less than a proportional loss of emission reduction benefit--which can lead to a more cost-effective I/M program.

Please note that all credit estimates in this draft guidance are not final, and may change as a result of new data or insights brought to EPA's attention during this review and comment process. Credit loss estimates for vehicle emitter profiling will change, as EPA continues to make refinements to this part its analysis. Even once finalized, EPA may from time to time revise the guidance to reflect the best available data and understanding of clean screening options.

The draft guidance outlines three broad concepts which could be used to excuse likely low emitters from traditional I/M testing: remote sensing, vehicle emitter profiling, and model year exemptions. The guidance provides brief background and summary information on each of the three concepts, comments on the practical application of clean screening in an operating or planned I/M program, analyses of the probable credit ramifications associated with each approach based on data sets currently available to EPA, instructions on how to calculate rough estimates of the credit loss each methodology would likely cause in a specific I/M program, and a list of references EPA used to prepare the draft guidance.

In preparing this draft guidance, EPA considered a variety of sources and data sets currently available, which are listed in the "References" section of the guidance. The majority of information available comes from analytical studies, pilot programs, and modeling exercises aimed at predicting the immediate credit effect states could expect to experience when choosing to implement clean screening in an I/M program. While two of the concepts outlined in the guidance (RSD and model year exemption) are not new, they have not yet been used as a clean screen in any I/M program. Consequently, there is no large body of real-world application data. Likewise, utilizing vehicle emitter profiling to identify clean vehicles is fairly new concept as a

clean screening option, rather than a tried and true approach. In addition, EPA has had to develop a modeling approach for using information on immediate credit effects to predict credit effects in future years when the mix and condition of cars on the road will be different. For these reasons, EPA is particularly interested in receiving comments on the following:

- additional data sets and analysis not referenced in the draft documents
- the analytical approaches used in determining the modeling protocol for both RSD and vehicle emitter profiling, and any alternatives which may be useful
- options on how to keep an a vehicle emitter profile up to date for a given area without compromising the technical foundation of the profile
- how EPA and states should approach the ongoing evaluation of clean screening programs in operation

EPA is soliciting comment on the draft guidance for 60 days, until July 11, 1998. Comments can be submitted electronically, by mail, or by FAX, at the following locations:

Electronically, to Joe Somers at: somers.joseph@epa.gov

By mail: Joe Somers
U.S. EPA
Assessment and Modeling Division
2000 Traverwood Drive
Ann Arbor, MI 48105
Phone: 734/214-4321

By FAX: 734/214-4821

Additionally, EPA will make every effort to include a discussion of the clean screen guidance at any EPA/stakeholder meetings which occur during the comment period. Once EPA has reviewed the comments and incorporated them appropriately, we will finalize the guidance for release and immediate use. We expect this to take place in the fall of 1998.

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1.0 BACKGROUND AND SUMMARY

"Clean screening" is a generic term for methods used to identify vehicles which are low emitting for purposes of exempting these "clean" vehicles from the next scheduled test in the periodic vehicle inspection and maintenance (I/M) program required by some state and local areas. In September 1996, EPA released a document entitled "User Guide and Description for Interim Remote Sensing Program Credit Utility" (EPA 420-R-96-004) providing details on a program for States to obtain extra I/M emission credits for using remote-sensing devices (RSD) to find high-emitting vehicles and requiring them to obtain early (out of sequence) I/M tests. That guidance remains unchanged. The original release of the RSD credit utility did not include options for using RSD for clean screening. This program option has now been added to the utility along with other clean screening methods, including vehicle emission profiling (VEP). This user guide is intended as a companion document to the original user guide. Users should refer to that document for information about RSD options to identify high-emitting vehicles.

2.0 DESCRIPTION OF CLEAN SCREENING

The original objective of RSD was to identify high emitters in the vehicle fleet. However, the measurement of the emissions of vehicles can also be used to identify "clean" vehicles with a high probability of passing its periodic inspection test. It is expected that by exempting these vehicles from the next periodic inspection, I/M programs can reduce the burden on the inspection system, reduce vehicle owner costs, and increase convenience and program acceptance. A more detailed description of how remote-sensing is done is contained in the original 1996 user guide.

Other methods can be used to identify clean vehicles for exemption from the I/M program. One method, VEP is included in this utility. This method uses known factors about vehicle emissions based on large I/M databases with historic records of failures for different vehicle models to choose low-emitting vehicles for exemption without explicit emission measurements. Another option for clean screening is to exempt entire model years from inspection. Model years can be exempted using parameters within the MOBILE5 model I/M Program Descriptive Record without the use of this utility.

A separate document, "Description and Documentation for Interim Vehicle Clean Screening Credit Utility," (EPA 420-P-98-008) provides a more detailed description of the various approaches to clean-screening programs, the emission benefit impacts of clean-screening, and how the emission estimates were determined. This document is the basis for the default effectiveness values used in this utility.

3.0 CLEAN SCREENING EFFECTS

The EPA MOBILE5 model stores the credits for all I/M programs in separate data files that are read during MOBILE runs. EPA can modify or supplement these files to add new data and/or options that were not included in the original release of the model, without the need for a

new version of the MOBILE model itself. The credits in the I/M credit files can thus be adjusted, as needed, to reflect the operation of clean-screening scenarios.

Since clean-screening excuses vehicles from their next scheduled inspection, the primary effects clean-screening methods have on the benefits of any specific I/M program is to reduce the number of vehicles which receive repairs. The purpose of this utility, then, is to reduce the benefit attributed to I/M programs in the I/M credit file to reflect the effect of clean-screening vehicle exemptions. Because excusing vehicles from inspection reduces the number of vehicles checked for evaporative emission problems in those I/M programs including evaporative emission checks, the evaporative program benefits must also be reduced.

3.1 Basic Clean-Screening Effect Methodology

The clean-screening effects are a function of two basic parameters: 1) the fraction of all vehicles in each model year that is eligible to be excused from their next scheduled inspection, and 2) the effectiveness of the clean-screening method at identifying vehicles which are truly clean. The determination of the fraction of eligible vehicles and effectiveness is done for each model year (vehicle age) in the fleet. Only vehicles with sufficient information to allow for the clean-screening determination are eligible vehicles.

Mathematically, the process to adjust the I/M credits is as follows:

$$\text{New Credit}_{m,p} = \text{Old Credit}_{m,p} * F_m * E_{m,p} \quad (1)$$

Where:

Old Credit = I/M credit from the periodic inspection program;

F = Adjusted fraction of the inspected fleet eligible for clean-screening (referenced below as fleet coverage);

E = Effectiveness of clean-screening at identification of clean vehicles;

m = Quantity is a function of vehicle model year; and

p = Quantity is a function of pollutant (i.e., HC, CO or NOx).

In the equation, the influence of the underlying I/M program is represented by the variable $\text{Old Credit}_{m,p}$ which is chosen from the already-released I/M credits used with the MOBILE5 model. The variables F_m and $E_{m,p}$ in the equation represent the clean-screening fleet coverage and the remote-sensing effectiveness. The fleet coverage is determined as explained in the original user guide (and repeated below). Only coverage options 1 and 2 are allowed for clean-screening scenarios.

3.2 Options for Fleet Coverage for RSD

Fleet coverage is the fraction "F" in the equation given earlier. The clean-screening utility allows a state two options for fleet coverage for RSD-based scenarios. The first option is commitment to a level of effort in which a state commits to a specific number of vehicles that will have valid RSD tests (i.e., valid readings of HC/CO and NOx (if a NOx cutpoint is used) on a specific vehicle, valid recording of license plate, and ability to contact vehicle owners for any required I/M test) in a given time period. The RSD clean-screening utility will internally convert the number of RSD tests to fleet coverage assuming the vehicles to be eligible for clean-screening must receive two or more valid RSD tests. The second option is to commit to a specific RSD fleet coverage in which a certain percentage of the fleet will receive two or more valid RSD tests. These options are discussed in detail in Sections 3.3.1 and 3.3.2 in the original user guide for RSD.

The third vehicle coverage option available in the original 1996 utility (committing to find a specific number of I/M failures using RSD) cannot be applied to RSD clean-screening programs and is not discussed here.

Vehicle Emission Profiling (VEP) programs assume complete (100%) vehicle coverage and are unaffected by the user choice of fleet coverage options.

Option l: Commitment to a Level of Effort

The user specifies the number of valid remote-sensing measurements done. The utility estimates vehicle coverage from this information using coverage information derived from a Poisson distribution. The default effectiveness values for RSD-based clean-screening in this utility assume that each excused vehicle has had at least two valid RSD readings. The method used to make the estimate is described in a later section.

Option 2: Commitment to a Specific Fleet Coverage

The user specifies the fraction of the fleet in each model year that is seen using remote-sensing. This fraction should be only the fraction of the fleet which has had sufficient valid remote-sensing measurements to allow an affirmative decision regarding exemption from the next I/M inspection. For example, if a state decides (to minimize the chance that a dirty vehicle will be excused from its next scheduled inspection) that at least two valid passing RSD readings are needed to make a vehicle eligible for exemption from I/M, this fraction should represent the portion of the fleet that has received two RSD readings.

The default effectiveness values for RSD based clean-screening in this utility assume that each excused vehicle must have at least two valid RSD readings. If a state decides that some other minimum number of valid RSD readings (e.g., one or three) will be used in their RSD program, then the default values for the effects of RSD based clean-screening (based on two valid readings) cannot be used. Section 4.1 describes how the user may enter the alternate effectiveness values if some other minimum number of valid RSD readings are required.

Since newer vehicles travel more and normally make up a larger fraction of all vehicles in an area than older vehicles, newer model years will tend to be more likely to be seen by a remote-sensing device than older vehicles. As a result, the fraction of all vehicles in a given model year which are eligible for exemption from its next I/M inspection will be larger for newer model years than for older model years. Therefore, a program whose intention it is to exempt a given fraction of the fleet will exempt mostly the newer model years.

3.2.1 Option 1: Commitment to a Level of Effort

This is the simplest of the three options in which a state looks at its resources and commits to obtaining a specific number of RSD readings per month. In this option, a modified Poisson algorithm is used to estimate the number of vehicles seen by remote-sensing each year in order to calculate the fraction of the fleet tested by remote-sensing (factor F). This is necessary, since the fraction of all vehicles in the fleet which are measured by remote-sensing is a function of the total number of remote-sensing measurements, but is less than obtained by looking at the number of RSD readings since some vehicles are seen multiple times by RSD. A Poisson algorithm is a standard method to model such a situation. This phenomenon was demonstrated in the California Bureau of Automotive Repair Study done in Sacramento where some individual vehicles were measured several times over the course of the study. This fraction is a function of the annual average vehicle miles traveled (VMT) of a vehicle model year at a given age compared to its VMT when new.

The algorithm used to calculate remote-sensing coverage involves a modification to Lambda in the Poisson series using the ratio of the VMT of the youngest model year (age) to the VMT of the model year (age) being estimated. This adjustment uses national average VMT information, but the VMT information can be modified by the user to reflect local, rather than national default, information. The form of the equation is as follows:

$$P = 1.0 - \exp(k * -\text{Lambda}) \quad (2)$$

Where k is the ratio of VMTs,

$$k = \text{VMT(current age)}/\text{VMT(age=1)}. \quad (3)$$

This algorithm is calculated for each model year and gives the probability of measuring emissions from vehicles of a given model year. One sums the probabilities for each model year to obtain an overall probability for all vehicles. In addition, as mentioned later, this option permits the user to specify only vehicles with more than one RSD reading as having sufficient information to allow an affirmative decision. Such a specification will lower the overall fraction of the fleet seen.

If an I/M program encourages drivers to visit announced RSD sites in hopes of earning an exemption from I/M inspection, or if this practice develops even without encouragement, the Poisson-based coverage estimates may not be applicable. Actual experience may be the only way to determine coverage accurately. The utility allows the actual observed coverage estimates to be inputted using Option 2 (below).

3.2.2 Option 2: Commitment to a Specific Fleet Coverage

In this option, the user inputs related to remote-sensing effort are replaced by a commitment to obtain valid remote-sensing readings on a specific fraction of the fleet as determined by the state. This commitment is for sufficient RSD readings for each vehicle age category (i.e., by model year) separately to meet the commitment of vehicles for RSD targeting. This requires the user to supply the number of current vehicles of each age and the number of those vehicles which are committed to be seen by remote-sensing in the next year.

The default effectiveness values for RSD-based clean-screening in this utility assume that each excused vehicle must have at least two (2) valid RSD readings. If a state decides that some other minimum number of valid RSD readings (e.g., 1 or 3) will be used in their RSD program, then the default values for the effects of RSD-based clean-screening (based on two valid readings) cannot be used. Section 4.1 describes how the user may enter the alternate effectiveness values if some other minimum number of valid RSD readings are required.

There are no default values for this fleet coverage option. Some areas may not have information available regarding the distribution of number of vehicles by age that will likely be seen twice using RSD methods before the clean-screening program actually begins. One approach would be to use the level of effort (Option 1) method to define the vehicle coverage for clean-screening instead of Option 2, where the distribution information is required. Another approach would be to estimate the distribution for different coverage targets using the same Poisson methodology as described in Option 1. Table 1 shows the results of using the Poisson methodology as described in Option 1 to estimate the number of vehicles by age that will likely be seen twice by RSD. This estimate assumes MOBILE5 default values for mileage accumulation and the default passenger car age distribution.

Table 1

Distribution of the Number of Vehicles by Age Seen Twice by Remote Sensing Versus a Target Fleet Coverage

	Target Fleet Coverage		
Vehicle Age	30% of the Fleet	50% of the Fleet	70% of the Fleet
1	47%	71%	89%
2	40%	64%	84%
3	41%	65%	85%
4	39%	62%	82%
5	36%	59%	80%
6	34%	56%	77%
7	31%	53%	75%
8	29%	50%	72%
9	27%	47%	69%
10	25%	44%	66%
11	23%	42%	63%
12	21%	39%	60%
13	20%	36%	57%
14	18%	34%	54%
15	17%	32%	51%
16	15%	29%	48%
17	14%	27%	45%
18	13%	25%	43%
19	12%	23%	40%
20	11%	21%	37%
21	10%	20%	35%
22	9%	18%	32%
23	8%	17%	30%
24	7%	15%	28%
25	7%	15%	28%

For example, about 30% had two or more RSD readings in the California Bureau of Automotive Repair Study in Sacramento. If this was the target coverage for the proposed RSD-based clean-screening program, the distribution in the above table for the 30% fleet coverage could be used as an estimate of the distribution of vehicles seen twice for purposes of calculating the effects of RSD based clean-screening.

3.3 <u>Clean-Screening Effectiveness</u>

Clean-screening effectiveness (factor E) refers to the ability of the clean-screening tests to correctly identify vehicles which would pass an I/M inspection. If assuming that, using remote-sensing was possible to identify only those vehicles in that fleet that would pass an I/M inspection, then the effectiveness of remote-sensing for clean-screening would be 100 percent. In practice, not all vehicles identified by remote-sensing for exemption from inspection would pass the I/M inspection. In general, there will be a non-linear relationship between the percent of vehicles excused from their next scheduled inspection and the emissions benefit loss, since the least dirty cars will be the first to pass. The shortfall in I/M benefit caused by the exemption of failing vehicles depends primarily on the remote-sensing emission measurement cutpoints chosen by the program. In vehicle emission profiling (VEP) programs, a variety of factors are used to identify vehicles for exemption. As in RSD-based clean-screening, the effectiveness of these programs will depend on how well they can identify only those vehicles that will pass the I/M inspection. The full derivation of the default values used for clean-screening effectiveness is discussed in a separate document entitled, "Description and Documentation for Interim Vehicle Clean Screening Credit Utility," (EPA 420-P-98-008).

Some programs include a functional check of the evaporative pressure and/or purge system. It is assumed that each vehicle excused from its next scheduled inspection in the periodic inspection program based on the clean-screening program has an equal probability of having excess evaporative emissions as those vehicles which are inspected. (This is in contrast to the non-linear relationship for tailpipe emissions.) This means that the reduction in pressure/purge effectiveness is directly proportional to the fraction of all vehicles (by age) which are excused from their next scheduled inspection by the clean-screening program. However, since most vehicles eligible for clean-screening will be newer model years (with fewer evaporative failures), the loss in program benefit will be considerably less than the fraction of vehicles excused from their next scheduled inspection.

The default effectiveness values for RSD-based clean-screening in this utility assume that each excused vehicle must have at least two (2) valid RSD readings. If a state decides that some other minimum number of valid RSD readings (e.g., 1 or 3) will be used in their RSD program, then the default values for the effects of RSD-based clean-screening (based on two valid readings) cannot be used. Section 4.1 describes how the user may enter the alternate effectiveness values if some other minimum number of valid RSD readings are required.

The default effectiveness values used by the RSD-based clean-screening utility will assume that the effectiveness of the underlying I/M program inspections is closer to the effectiveness of the IM240 test procedure using the recommended phase-in cutpoints. This is the information currently available and described in the document cited above. The utility also contains effectiveness values for RSD-based clean-screening which assume that the effectiveness of the underlying I/M program inspections is closer to the effectiveness of the IM240 test procedure using the recommended final cutpoints. However, the user must specify that the alternate effectiveness numbers are to be used by the utility, as described in later sections. The more effective the underlying I/M program is, the more likely it is that clean-screening will excuse some potentially failing vehicles from their next scheduled inspection, increasing the loss of

benefit to the I/M program.

4.0 CLEAN-SCREENING UTILITY

4.1 Clean-Screening Utility Input Structure

The updated remote-sensing utility is identical in input structure to the original utility for the existing RSD options and programs. Much of the description of sections from the original user guide which may be useful for clean-screening options is repeated in this user guide for convenience.

The remote-sensing utility is designed to be used once for a scenario selected by the user. The scenario is for one evaluation calendar year, and each model year is indexed by its age in that calendar year, not by the model year itself. It is assumed that the number of scenarios that a user might consider is small enough so that batch run options are not necessary. Each run requires a single input file which contains all of the information required by the utility and supplied by the user. The user is prompted for the name (including the path, if not in the local directory) of the input file.

If the user selects the Vehicle Emission Profiling (VEP) based clean-screening option, the user must enter both the effectiveness and fraction of vehicles excused from their next scheduled inspection. There are no default values stored in this utility for those choices and without the user supplied data, the resulting I/M credits will not reflect the effect of the VEP program. Guidance on how to determine the effectiveness and fraction of vehicles excused from their next scheduled inspection for VEP programs can be found in a separate document entitled, "Description and Documentation for Interim Vehicle Clean Screening Credit Utility," (EPA 420-P-98-008).

The remote-sensing utility is run by simply invoking its name (RSDNEW.EXE) at the DOS prompt. The utility will prompt the user on the screen for the name of the input file.

Enter the name of the remote-sensing input file: (default RSD.D)

All inputs have default values. Here, if the user does not enter a name, the utility will look for a file labeled "RSD.D" in the local directory. Enter the name of the file containing the control information that has been constructed for the desired scenario. This is the only interactive user input necessary to run the utility.

The following sections describe how to construct the input file. The input file contains all of the remaining information needed to calculate the remote-sensing effects, including the location of the original I/M credit data files and the names and location of the output remote-sensing credit files.

The input file is structured so that each line (record) begins with an identification number.

This number indicates what information is contained on that record and allows the records to be entered in any order. Although some records are mandatory, any records missing from the input file revert to default values stored in the utility. In this way, only the information that the user wishes to supply is included in the input file. Any records with a record number of 000 are considered comment records and are not processed. In addition, text may be added to records beyond the last formatted data entry on any card to clarify the contents of that record. This additional text is not read or processed by the utility.

A summary of all of the input records and their contents is shown in Appendix A. Many of these records do not apply to clean-screening options and are not described in this user guide. A description of these records and their contents can be found in the original RSD user guide.

4.1.1 Control Section of Input File

Records 001 and 002 are mandatory records.

Record 001 contains the user selection of the fleet coverage option. The format of this record is (I3,11X,I1), meaning the first three characters contain the record number, followed by 11 blank characters, followed by the user selection of Option. Any characters following the user selection are ignored by the utility, but can be used to annotate the input file. The available option levels for RSD-based clean-screening are:

1: Commitment to a Level of Effort; and

2: Commitment to a Specific Fleet Coverage

An additional option is available in the RSD utility (Commitment to a Number of Failures), but this option is not available for use with clean-screening programs. A more complete description of the third user option is located in the original RSD user guide. Although fleet coverage is assumed to be 100% for vehicle emission profiling (VEP) options, Record 001 must be entered. Since Option 2 requires more user input, users who intend to select a VEP clean-screening scenario should choose Option 1.

Record 002 contains the user selection of I/M program design. The format of this record is identical to Record 001. For clean-screening, this record must be set to:

5: Clean-Screening Remote-Sensing Program

A more complete description of the other four user options is located in the original 1996 RSD user guide. The user must always enter both Record 001 and 002 in order to use the remote- sensing utility. The following is an example input of the control section, including some added comments to add clarity.

000 Control Section
000 ----------
001 2 Option (may be 1, 2, or 3, but may not be 3 if Program Type is 5)
002 5 Program Type (may be 1, 2, 3, 4, or 5)

4.1.2 Filenames Section

In this section, Records 005 through 008 indicate the name and location of the standard I/M credit data files and Records 015 through 018 determine the location and name of the resulting remote-sensing adjusted I/M credit data files. Normally, the resulting I/M credit data will be written to the filenames in Records 015-018. The indicated I/M credit input files are not altered by the utility. Instead, new replacement credit files are created with the appropriate adjustment of the I/M credits to reflect the effects of the user specified remote-sensing program.

The format of each record is (I3,1X,A40), meaning the first three characters contain the record number, the next character is blank, followed by up to 40 characters which indicate the file name, including any necessary path information. If no path is specified, the data files must reside in the same (local) directory from which the utility is run. The record numbers for each file are as follows.

Input Files

Record Description

005: 1981 and newer model year credits
006: 1981 and newer model year Retest-Hybrid credits
007: Pre-1981 model year credits
008: Pre-1981 model year Retest-Hybrid credits
009: Standard pressure/purge credits
010: Retest-Hybrid pressure/purge credits

Output Files

Record Description

011: Adjusted standard pressure/purge credits
012: Adjusted Retest-Hybrid pressure/purge credits
015: Adjusted 1981 and newer model year credits
016: Adjusted 1981 and newer model year Retest-Hybrid
017: Adjusted Pre-1981 model year credits
018: Adjusted Pre-1981 model year Retest-Hybrid credits

Since there are default filenames for the standard I/M credit files and the output files, the user may skip all of these input records and the default names are used. All of the files, however,

must be in the local directory. The following is an example input of the filename section, using files other than the default filenames, including some added comments to add clarity.

```
000 User Input and Output Filenames     Default Filename
000 ------------------------------------ -------------
005 C:\DATA\IM1.D                       IMDATA.D
006 C:\DATA\IMH.D                       HYBRID.IMC
007 TC1.D                               TECH12.D
008 TCH.D                               TECH12.D
009 PP.D                                PPEFFM5.D
010 PPH.D                               PPEFF.D
011 PPRSD.D                             PPM5RSD.D
012 PPHRSD.D                            PPHYRSD.D
015 RSDDAT11.D                          RSDDATA.D
016 RSDDATA.H                           RSDDATA.H
017 TECDAT11.D                          TECDATA.D
018 TECDATA.H                           TECDATA.H
```

For maximum flexibility, separate input has been allowed for Retest-Hybrid I/M credits for the pre-1981 model year vehicles, even though EPA has not calculated separate credits for that case. For this reason, the default input for that case is identical to the standard input file.

4.1.3 RSD Fleet Coverage Option 1: Data Section

The first vehicle coverage input option requires that the user supply information on the level of effort which is applied to make a given number of valid vehicle measurements using remote-sensing. This information includes:

Record Description

021: The number of vehicles in the fleet
022: The number of valid measurements per month that are made using remote-sensing devices
023: The number of times that a vehicle must be seen by RSD before it can be targeted for RSD based clean-screening. (This value must be "2" for RSD based clean-screening options.)

In addition, the user may supply the average vehicle miles traveled per year by vehicle age to override the MOBILE5 default values normally used in the calculations.

The number of vehicles in the fleet represents the population of vehicles which are subject to the inspection program in the area. This number excludes out-of-area vehicles and vehicles excused from the inspection. The number of vehicles in the fleet is entered on Record 021. The format for this record is (I3,1X,I11).

The number of valid measurements per month that are made using remote-sensing devices is

the primary measure of the level of effort related to vehicle coverage. The number of valid measurements that can be made with remote-sensing devices depends on a great variety of factors including the number of practical remote-sensing locations, the number of devices provided, the amount of staff required and available to operate the remote-sensing devices, the density of vehicles subject to the inspection program at the remote-sensing sites, the number of hours and days that the remote-sensing devices are operated, the staff allocated to remote-sensing data processing and the quality of the remote-sensing readings. The number entered by the user represents the commitment by the program to expend sufficient effort to make that number of valid measurements in each month. This number is entered on Record 022. The format for this record is (I3,1X,I11).

The number of times that a state determines a vehicle must be seen using remote-sensing before it can be excused from I/M inspection is entered on Record 023. The default value for this record is two, and although the utility allows the user to specify up to 11 measurements; the present EPA effects of RSD-based clean-screening are based on two measurements and give no additional credit for multiple measurements beyond two. User entry of less than or greater than two measurements is ignored. The format for this record is (I3,1X,I11).

The following is an example input of the Option 1 data section, using values other than the default values, including some added comments to add clarity.

```
000 Option 1 Data Section
000 ---------------------
021  810498  No. of vehicles in inspection area default 1000000
022  110808  Valid veh. measurements per month default 50000
023       2  No. times a veh. must be measured default 2 (1-11)
```

In addition, the user may supply the average vehicle miles traveled per year by vehicle age to override the MOBILE5 default values normally used in the calculations. This requires the entry of 25 separate records (Records 101 through 125). Record 101 contains the mileage accumulation of vehicles from 0 to 1 year of age. Record 102 contains the mileage accumulation of vehicles from 1 to 2 years of age, and so forth. Since vehicles are more likely to be measured if they are driven more, a higher mileage accumulation in proportion to other vehicles increases the expected number of vehicles of that age that are measured. The default values assume that all vehicles travel the roadways which are monitored using remote-sensing. If remote-sensing is to be restricted to only some roadways (such as limited access freeways), the distribution of mileages should be adjusted to reflect the actual distribution of ages expected on those roadways. The format for these records is (I3,1X,I11).

4.1.4 RSD Fleet Coverage Option 2: Data Section

The second vehicle coverage input option requires that the user supply information on the fraction of the fleet in each model year which have sufficient valid vehicle measurements using remote-sensing to allow an affirmative decision on exemption. For example, if it takes, at minimum, two RSD tests excuse a vehicle from it's next I/M inspection, this is the fraction of the fleet which will be measured two or more times by RSD. This is a commitment on the part of the program to apply sufficient resources to find and measure a fraction of each model year using remote-sensing. The fraction of the fleet measured can vary from model year to model year,

reflecting the difficulty in finding and measuring older model years, which drive less and tend to avoid some roadway types, such as limited access freeways.

A separate record must be entered for each of 25 vehicle ages (Records 201 through 225). There are no default values for these inputs. Each record contains the record number, the number of vehicles of that age which are eligible for targeting each year (i.e., the total number of vehicles subject to state regulation), and the total number of vehicles of that age in the vehicle fleet which have sufficient information to allow an affirmative decision on whether to excuse those vehicles from their next I/M inspection (i.e., the total number of vehicles in the eligible fleet on which a state commits to obtain valid remote-sensing readings). The entry of both the number of vehicles subject to the program and the number expected to be eligible for clean-screening in each vehicle age (instead of a fractional estimate) provides an explicit goal of the number of vehicles which must obtain valid remote-sensing readings in each vehicle age (model year) in order to achieve the effect estimated by the utility.

The format for the record is (I3,1X,2I11). This means that the first 3 characters contain the record number, the next character is a blank followed by an integer number in the next 11 spaces, indicating the total number of vehicles of that age subject to state regulation, followed by another integer number in the next 11 spaces, indicating the number of vehicles in that age which have sufficient valid vehicle measurements using remote-sensing to allow an affirmative decision on whether to excuse those vehicles from their next I/M inspection.

The following is an example input of the Option 2 data section. The example assumes a MOBILE5 default distribution of 1 million vehicles and assumes, using remote-sensing, that 50% (500,000) of the vehicles will get two or more valid RSD tests. The distribution of the 500,000 vehicles among the ages of vehicles is taken from the examples in Section 3.3.2 of this document. The records include some added comments after the numbers to add clarity.

```
000 Option 2 Data Section
000       Total   Eligible
000 ---------------------
201       49000      34761  Option 2 : Age  0 -  1
202       79000      50544  Option 2 : Age  1 -  2
203       83000      54025  Option 2 : Age  2 -  3
204       82000      50922  Option 2 : Age  3 -  4
205       84000      49644  Option 2 : Age  4 -  5
206       81000      45433  Option 2 : Age  5 -  6
207       77000      40895  Option 2 : Age  6 -  7
208       56000      28084  Option 2 : Age  7 -  8
209       50000      24103  Option 2 : Age  8 -  9
210       51000      22659  Option 2 : Age  9 - 10
211       50000      20835  Option 2 : Age 10 - 11
212       54000      21060  Option 2 : Age 11 - 12
213       47000      17122  Option 2 : Age 12 - 13
214       37000      12565  Option 2 : Age 13 - 14
215       24000       7579  Option 2 : Age 14 - 15
216       19000       5573  Option 2 : Age 15 - 16
```

```
217       14000       3807  Option 2 : Age 16 - 17
218       15000       3774  Option 2 : Age 17 - 18
219       11000       2556  Option 2 : Age 18 - 19
220        8000       1715  Option 2 : Age 19 - 20
221        6000       1185  Option 2 : Age 20 - 21
222        5000        908  Option 2 : Age 21 - 22
223        4000        667  Option 2 : Age 22 - 23
224        3000        459  Option 2 : Age 23 - 24
225       10000       1529  Option 2 : Age 24 - 25
```

4.1.5 **Program 5: Clean Screening Data Section**

There are six records that describe the extent and variety of the clean-screening program. The first five (Records 034 through 038) determine which I/M credits are adjusted to reflect the effects of clean-screening. Each record contains an integer value which indicates whether the vehicles represented in that record are subject to clean-screening. If not, no adjustment will be made to the I/M credits represented by the record. If the integer value is set to "1", the vehicles will not be included in the clean screening program and full I/M credits will be retained. If the integer value is set to "2," the vehicles are assumed to be eligible for clean-screening and the I/M credits for that vehicle group will be adjusted to reflect the effects of clean-screening on the I/M benefits. The default value for each of these four records is "2," indicating that all vehicles are included in the clean-screening program. If the user wishes to exclude vehicle model year groupings from the clean-screening program, then the appropriate record for those model years must be entered. The five records cover the following vehicle model year groupings:

034: Clean Screening for Pre-1975 model year vehicles (default value=2)
035: Clean Screening for 1975-80 model year vehicles (default value=2)
036: Clean Screening for 1981-85 model year vehicles (default value=2)
037: Clean Screening for 1986-89 model year vehicles (default value=2)
038: Clean Screening for 1990 and newer model year vehicles (default value=2)

Record 039 indicates the choice of clean-screening options the user wishes to apply to the vehicles in the fleet. This record must be entered if the program choice is “5”, indicating a clean-screening option. Both remote-sensing device (RSD) and vehicle emission profiling (VEP) program options are available in the utility. These choices are selected by entry of an integer into Record 039 indicating the choice. The allowed values are:

1: RSD using 0.5/200/1000 (%/ppm/ppm) CO/HC/NOx cutpoints
2: RSD using 0.5/200/1500 (%/ppm/ppm) CO/HC/NOx cutpoints
3: RSD using 0.5/200/2000 (%/ppm/ppm) CO/HC/NOx cutpoints
4: RSD using 0.5/200 (%/ppm) CO/HC cutpoints (no NOx cutpoint)
5: Vehicle Emission Profile with overall 30% excused
6: Vehicle Emission Profile with overall 40% excused
7: Vehicle Emission Profile with overall 50% excused

8: Alternate clean-screening scenario (user supplied effectiveness and fractions)

Choice #8 is intended as a placeholder for additional options not included in this version of the utility. There are default values for the effectiveness and fraction of vehicles excused from their next scheduled inspection for each of the choices (except #8). The following sections describe in more detail how the user can override these default values.

Record 044 indicates the choice of one of two cases for the effectiveness of the underlying periodic I/M test. This information has no effect on any vehicle emission profiling (VEP) program options available in the utility and does not need to be entered for VEP options. If an RSD-based- clean-screening option is chosen, the default effectiveness values used by the RSD-based clean-screening utility will assume that the effectiveness of the underlying I/M program inspections is closer to the effectiveness of the IM240 test procedure using the recommended phase-in cutpoints. The utility also contains effectiveness values for RSD-based clean-screening which assume that the effectiveness of the underlying I/M program inspections is closer to the effectiveness of the IM240 test procedure using the recommended final cutpoints. The user can specify that the alternate effectiveness numbers are to be used by the utility by entering Record 044. If the user replaces the existing default values for RSD-based clean-screening, entering Record 044 will have no effect, since the user supplied RSD-based clean-screening effectiveness values will be used. The allowed values for Record 044 are:

1: RSD clean-screening with IM240 phase in cutpoint effectiveness; and
2: RSD clean-screening with IM240 final cutpoint effectiveness.

The format for each clean-screening control record is (I3,1X,I11). This means that the first 3 characters contain the record number. The next character is a blank followed by an integer number within the next 11 spaces, indicating the user choice for that record. Only Record 039 is required.

The following is an example input of the clean-screening control data. The example assumes the user wishes to have a clean-screening program that only allows exemptions for vehicle that are 1981 and newer model years (Records 034 and 035 = 1). The example assumes that the user wishes to have a RSD based clean-screening program that uses the 0.5/200/2000 CO/HC/NOx cutpoint set for determination of vehicles to be excused from inspection (Record 039 = 3). The records include some added comments (in comment records and also outside the format and not read by the utility) to provide clarity.

```
000 -----------
034           1 Clean-screening for Pre-1975 model year vehicles (default=2)
035           1 Clean-screening for 1975-80 model year vehicles (default=2)
036           2 Clean-screening for 1981-85 model year vehicles (default=2)
037           2 Clean-screening for 1986-89 model year vehicles (default=2)
038           2 Clean-screening for 1990 and newer vehicles (default=2)
039           3 Clean-screening choice (default=8)
044           2 Clean-screening IM240 final cutpoint effectiveness (default=1)
```

4.1.6 User Supplied RSD Based Clean Screening Effectiveness

RSD based clean-screening effectiveness is the fraction of all I/M tailpipe benefits that is retained by the program, even though vehicles are excused from the inspection. An effectiveness of 90%, for example, means that 10% of the emissions benefit from all vehicles which would have failed an I/M inspection are associated with vehicles which are instead excused from the inspection by RSD based clean-screening. The utility assumes that the loss of tailpipe I/M benefits is proportional to the fraction of emissions represented by vehicles excused from the inspection in each model year, not the fraction of vehicles themselves. For example, 50% of the vehicles might be excused from their next scheduled inspection, but they may represent a much smaller fraction of overall potential emissions benefit. The fraction of vehicles excused from their next scheduled inspection (by age) is used directly to calculate evaporative HC benefit losses. An effectiveness of 100% for RSD based clean-screening would have no effect on the benefits of I/M programs.

The default effectiveness values for each of these cutpoint combinations assume that a vehicle must have at least two valid measurements before the vehicle is eligible for clean-screening. In addition to the data describing the vehicle coverage options, users may enter the effectiveness of RSD- or VEP-based clean-screening and the fraction of vehicles excused from their next scheduled inspection by the chosen cutpoints by age. This entry is not required. User entry will override the default values provided by the utility.

The effectiveness array used for the RSD based clean-screening choices have values for three model year groupings, four cutpoint combinations and three pollutants (HC, CO and NOx). The model year groupings are:

- 1981-1985 model years
- 1986-1989 model years
- 1990 and newer model years

The effectiveness for 1981-1985 model years is also applied to pre-1981 model years. The same effectiveness is used for both passenger car and light duty truck benefits for each model years grouping. The available default RSD cutpoint combinations are:

1: 0.5/200/1000 (%/ppm/ppm) CO/HC/NOx cutpoints
2: 0.5/200/1500 (%/ppm/ppm) CO/HC/NOx cutpoints
3: 0.5/200/2000 (%/ppm/ppm) CO/HC/NOx cutpoints
4: 0.5/200 (%/ppm) CO/HC cutpoints (no NOx cutpoint)

Since the user input of RSD effectiveness overrides the default values, the user input does not need to conform to these combinations. However, if the RSD effectiveness values entered by the user do not match the cutpoint combinations described above, the user must also enter the

fraction of vehicles excused from their next scheduled inspection, which ought to be consistent with the user supplied effectiveness values (see the next section). The RSD effectiveness data entry is optional. It is only required if the user wishes to override one or more of the default effectiveness values used by the utility with user supplied RSD effectiveness estimates.

A separate record containing user supplied RSD effectiveness may be entered for each of 12 (Records 951 through 962) combinations of cutpoint combinations and model year groupings. The format for each effectiveness record is (I3,1X,F10.3,F10.3,F10.3). This means that the first 3 characters contain the record number, the next character is a blank followed by a number (including a decimal) within the next 10 spaces, indicating the effectiveness value that will be used for HC, followed by another number (including a decimal) within the next 10 spaces, indicating the effectiveness value that will be used for CO, followed by another number (including a decimal) within the next 10 spaces, indicating the effectiveness value that will be used for NOx. Records 951, 952 and 953 override the effectiveness values for Choice #1 for Pre-1986, 1986-1989 and 1990 and newer model years respectively. Records 954, 955 and 956 override the effectiveness values for Choice #2. Records 957, 958 and 959 override the effectiveness values for Choice #3. Records 960, 961 and 962 override the effectiveness values for Choice #4. The user supplied set of RSD-based clean-screening effectiveness values will be used regardless of the entry of Record 044, described in Section 4.1.5.

The following is an example input of the RSD clean-screening effectiveness data. The example assumes an effectiveness of 100% (no improperly excused vehicles) for all pollutants, cutpoint combinations and model year groupings. The records include some added comments (in comment records and also outside the format and not read by the utility) to provide clarity.

```
000
000       HC         CO         NOx
000  ---------- ---------- ---------- Format
951        1.00       1.00       1.00 Choice #1, Pre-1986 model years
952        1.00       1.00       1.00 Choice #1, 1986-1989 model years
953        1.00       1.00       1.00 Choice #1, 1990 and newer vehicles
954        1.00       1.00       1.00 Choice #2, Pre-1986 model years
955        1.00       1.00       1.00 Choice #2, 1986-1989 model years
956        1.00       1.00       1.00 Choice #2, 1990 and newer vehicles
957        1.00       1.00       1.00 Choice #3, Pre-1986 model years
958        1.00       1.00       1.00 Choice #3, 1986-1989 model years
959        1.00       1.00       1.00 Choice #3, 1990 and newer vehicles
960        1.00       1.00       1.00 Choice #4, Pre-1986 model years
961        1.00       1.00       1.00 Choice #4, 1986-1989 model years
962        1.00       1.00       1.00 Choice #4, 1990 and newer vehicles
```

4.1.7 User Supplied RSD-Based Clean-Screening Vehicle Fractions

Exhaust emission measurements using RSD are assumed not to detect problems with the evaporative emission control systems. If an I/M program includes a functional inspection of the evaporative emission control systems (either a gas cap or fuel tank pressure check or an evaporative system purge check), then excusing those vehicles from the I/M inspection by RSD

based clean-screening will reduce the I/M benefits from these evaporative system checks. The utility does this by reducing the benefits of evaporative emission control system checks by the fraction of vehicles in that vehicle age that are excused from the inspection by RSD based clean-screening. For example, if 40% of vehicles of a given age are excused from their next scheduled inspection by clean-screening, then the benefits of the evaporative system checks for that age are reduced by 40%.

There is a separate default fraction of vehicles excused from their next scheduled inspection by age for each default RSD cutpoint combination in the utility. The combinations are described in the above section regarding RSD-based clean-screening effectiveness. Since the user input of excused fractions overrides the default values, the user input does not need to conform to these cutpoint combinations. However, the user must also enter the corresponding effectiveness values in order to be consistent. This data entry is optional. It is only required if the user wishes to override one or more of the default excused fraction values used by the utility.

A separate record may be entered for each of 25 (Records 971 through 995) ages. The format for each excused fraction record is (I3,1X,F10.3,F10.3,F10.3,F10.3). This means that the first 3 characters contain the record number, the next character is a blank followed by a number (including a decimal) within the next 10 spaces, indicating the excused fraction that are used for the choice #1 cutpoint combination, followed by another number (including a decimal) within the next 10 spaces, indicating the excused fraction that are used for the choice #2 cutpoint combination, followed by another number (including a decimal) within the next 10 spaces, indicating the excused fraction that are used for the choice #3 cutpoint combination, followed by another number (including a decimal) within the next 10 spaces, indicating the excused fraction that are used for the choice #4 cutpoint combination. Record 971 overrides the excused fractions for vehicles of age 1. Record 972 overrides the excused fractions for vehicles of age 2, etc. Record 995 overrides the excused fractions for vehicles of age 25.

The following is an example input of the RSD clean-screening excused fraction data. The example assumes that 40% of vehicles are excused from their next scheduled inspection for all cutpoint combinations and ages. The records include some added comments (in comment records and also outside the format and not read by the utility) to provide clarity.

```
000
000  Choice #1 Choice #2 Choice #3 Choice #4
000  --------- --------- --------- --------- Format
971       0.40      0.40      0.40      0.40 Age 1
972       0.40      0.40      0.40      0.40 Age 2
973       0.40      0.40      0.40      0.40 Age 3
974       0.40      0.40      0.40      0.40 Age 4
975       0.40      0.40      0.40      0.40 Age 5
976       0.40      0.40      0.40      0.40 Age 6
977       0.40      0.40      0.40      0.40 Age 7
978       0.40      0.40      0.40      0.40 Age 8
979       0.40      0.40      0.40      0.40 Age 9
```

```
980       0.40      0.40      0.40      0.40 Age 10
981       0.40      0.40      0.40      0.40 Age 11
982       0.40      0.40      0.40      0.40 Age 12
983       0.40      0.40      0.40      0.40 Age 13
984       0.40      0.40      0.40      0.40 Age 14
985       0.40      0.40      0.40      0.40 Age 15
986       0.40      0.40      0.40      0.40 Age 16
987       0.40      0.40      0.40      0.40 Age 17
988       0.40      0.40      0.40      0.40 Age 18
989       0.40      0.40      0.40      0.40 Age 19
990       0.40      0.40      0.40      0.40 Age 20
991       0.40      0.40      0.40      0.40 Age 21
992       0.40      0.40      0.40      0.40 Age 22
993       0.40      0.40      0.40      0.40 Age 23
994       0.40      0.40      0.40      0.40 Age 24
995       0.40      0.40      0.40      0.40 Age 25
```

4.1.8 User Supplied Vehicle Emission Profiling Effectiveness

Vehicle emission profiling (VEP) can be used as a method to exempt vehicles from inspection in I/M programs. Like RSD based clean-screening, VEP clean-screening will affect I/M benefits because some vehicles which would have failed the I/M inspection will be excused from their next scheduled inspection by clean-screening. As with RSD based clean-screening, the utility assumes that a 90% effectiveness will result in a 10% loss of I/M benefit for the fraction of the fleet subject to the VEP program. Unlike RSD based clean-screening, VEP based clean-screening is assumed by the utility to apply to all vehicles subject to state regulation included in the program and is unaffected by the user choice of vehicle coverage options. This is reflected in the calculations by assuming 100% vehicle coverage. Also, VEP effectiveness varies by age, instead of by model year grouping as for RSD based clean-screening.

The existing flags described in the Clean-screening Data Section 4.1.5 allow the user to restrict VEP clean-screening only to selected model year ranges. Users may wish to apply VEP based clean-screening to only vehicles within a certain range of vehicle ages within these model year ranges, even though a larger range of ages will be subject to the I/M program. This case can be modeled by entering 100% effectiveness for the ages in a given evaluation calendar year which will not be subject to VEP based clean-screening. A separate set of I/M credits must be generated for each evaluation calendar year where VEP based clean-screening is applied.

There are four default choices for VEP clean-screening programs:

5: Vehicle Emission Profile with overall 30% excused (100% coverage)
6: Vehicle Emission Profile with overall 40% excused (100% coverage)
7: Vehicle Emission Profile with overall 50% excused (100% coverage)
8: Alternate clean-screening scenario (user supplied effectiveness and fractions)

Although these choices are available, there are no default effectiveness values available in

this version of the utility. Users must enter the effectiveness values for the users choice of a VEP program. The set of effectiveness values includes values by age for the three pollutants (HC, CO and NOx). The user must assure that the user supplied effectiveness values will be consistent with the user supplied fractions of vehicles excused from their next scheduled inspection (described below). Only the set of effectiveness values corresponding to the VEP program choice made by the user will be overridden. This should present no difficulties, since that will be the scenario used by the utility to calculate the effect of the VEP program on the I/M credits. EPA's current guidance regarding effectiveness values for VEP is given in a separate document, "Description and Documentation for Interim Vehicle Clean-Screening Credit Utility," (EPA 420-P-98-008).

A separate record may be entered for each of 25 (Records 651 through 675) ages. The format for each effectiveness record is (I3,1X,F10.3,F10.3,F10.3). This means that the first 3 characters contain the record number, the next character is a blank followed by a number (including a decimal) within the next 10 spaces, indicating the effectiveness value that will be used for HC, followed by another number (including a decimal) within the next 10 spaces, indicating the effectiveness value that will be used for CO, followed by another number (including a decimal) within the next 10 spaces, indicating the effectiveness value that will be used for NOx. Record 651 overrides the effectiveness for vehicles of age 1. Record 652 overrides the effectiveness for vehicles of age 2, etc. Record 675 overrides the effectiveness for vehicles of age 25.

The following is an example input of the VEP clean-screening effectiveness data. The example assumes an effectiveness of 100% (no improperly excused vehicles) for all pollutants and ages. The records include some added comments (in comment records and also outside the format and not read by the utility) to provide clarity.

```
000
000       HC         CO         NOx
000  --------- --------- --------- Format
651       1.00       1.00       1.00 Age 1
652       1.00       1.00       1.00 Age 2
653       1.00       1.00       1.00 Age 3
654       1.00       1.00       1.00 Age 4
655       1.00       1.00       1.00 Age 5
656       1.00       1.00       1.00 Age 6
657       1.00       1.00       1.00 Age 7
658       1.00       1.00       1.00 Age 8
659       1.00       1.00       1.00 Age 9
660       1.00       1.00       1.00 Age 10
661       1.00       1.00       1.00 Age 11
662       1.00       1.00       1.00 Age 12
663       1.00       1.00       1.00 Age 13
664       1.00       1.00       1.00 Age 14
665       1.00       1.00       1.00 Age 15
666       1.00       1.00       1.00 Age 16
667       1.00       1.00       1.00 Age 17
```

```
668       1.00      1.00      1.00 Age 18
669       1.00      1.00      1.00 Age 19
670       1.00      1.00      1.00 Age 20
671       1.00      1.00      1.00 Age 21
672       1.00      1.00      1.00 Age 22
673       1.00      1.00      1.00 Age 23
674       1.00      1.00      1.00 Age 24
675       1.00      1.00      1.00 Age 25
```

4.1.9 User Supplied Vehicle Emission Profiling Fractions

Vehicle emission profiling (VEP) can affect evaporative emission system check benefits in the same way as RSD based clean-screening options. The utility assumes that, as for RSD based clean-screening, VEP clean-screening will reduce the benefits of evaporative emission control system checks by the fraction of vehicles of that vehicle age that are excused from the inspection by VEP based clean-screening. For example, if 40% of vehicles of a given age are excused from their next scheduled inspection by clean-screening, then the benefits of the evaporative system checks for that age are reduced by 40%.

Although these choices are available, there is no default fraction of excused values available in this version of the utility. Users must enter the fraction of vehicles excused from their next scheduled inspection for each age for the users choice of a VEP program. The user must assure that the user supplied fractions of vehicles excused from their next scheduled inspection will be consistent with the user supplied effectiveness values (described above). Only the set of fractions of vehicles excused from their next scheduled inspection corresponding to the VEP program choice made by the user will be overridden. This should present no difficulties, since that will be the scenario used by the utility to calculate the effect of the VEP program on the I/M credits. EPA's current guidance regarding effectiveness values for VEP is given in a separate document, "Description and Documentation for Interim Vehicle Clean-screening Credit Utility," (EPA 420-P-98-008).

A separate record is entered for each of 25 (Records 621 through 645) ages. The format for each excused fraction record is (I3,1X,F10.3). This means that the first 3 characters contain the record number, the next character is a blank followed by a number (including a decimal) within the next 10 spaces, indicating the excused fractions that are to be used for the VEP program selected. Record 621 overrides the excused fraction for vehicles of age 1. Record 622 overrides the excused fraction for vehicles of age 2, etc. Record 645 overrides the excused fraction for vehicles of age 25.

The following is an example input of the VEP clean-screening excused fraction data. The example assumes that 40% of vehicles are excused from their next scheduled inspection for all ages. The records include some added comments (in comment records and also outside the format and not read by the utility) to provide clarity.

```
000  --------- Format
```

```
621       0.40 Age 1
622       0.40 Age 2
623       0.40 Age 3
624       0.40 Age 4
625       0.40 Age 5
626       0.40 Age 6
627       0.40 Age 7
628       0.40 Age 8
629       0.40 Age 9
630       0.40 Age 10
631       0.40 Age 11
632       0.40 Age 12
633       0.40 Age 13
634       0.40 Age 14
635       0.40 Age 15
636       0.40 Age 16
637       0.40 Age 17
638       0.40 Age 18
639       0.40 Age 19
640       0.40 Age 20
641       0.40 Age 21
642       0.40 Age 22
643       0.40 Age 23
644       0.40 Age 24
645       0.40 Age 25
```

4.2 Using Clean-Screening I/M Credits with MOBILE5

MOBILE5 uses two external data files which contain the I/M tailpipe credits whenever an I/M program is specified in the user input. The benefit of I/M program options can be adjusted by altering the numbers contained in those data files. The remote-sensing I/M credit utility takes advantage of that fact by adjusting the default I/M credit files to reflect the user supplied information about the use of clean-screening in the inspection programs. Therefore, any current version of MOBILE5 (MOBILE5a, March 1993, MOBILE5a_H, February 1995, or MOBILE5b, September 1996) can be used to evaluate clean-screening options.

The first step is to describe the clean-screening program to be modeled in sufficient detail to create an input file for the remote-sensing I/M credit utility. For some proposed programs, it may be necessary to estimate or assume some of the necessary input data. However, the inputs should reflect, as near as possible, the actual expected performance of the clean-screening program element.

Once the clean-screening program design has been determined, the necessary input data must be collected together in the input data file. An example input data file is provided with the clean-screening I/M credit utility which shows the format for all of the necessary input parameters. The user should carefully read this User Guide to identify the necessary data and to

properly locate the data in the input file. The input data file is a simple ASCII text file that can be changed using any standard editor or word processor. However, the user must save any changes in a text format. The Remote-Sensing I/M Credit Utility cannot read input files that are saved in a word processing format.

The next step is to use the remote-sensing I/M credit utility to create an alternative set of I/M credit data files. The input file designates the names of the default I/M credit files to be used and the names of the altered (clean-screening) I/M credit files output by the remote-sensing utility. These filenames can include "path" information if the default I/M credit files are not located in the local directory. If a path is not specified, the default I/M credit files must be in the local directory when the remote-sensing utility is run. The new I/M credit files created by the utility which have been adjusted to reflect the effects of clean-screening will be in the same directory as the remote-sensing utility is run. These files can be written to a different directory if a path is specified in the input file.

The remote-sensing utility is run by simply invoking its name (RSDNEW.EXE) at the DOS prompt. The utility will prompt the user on the screen for the name of the input file. No further user input is required. The processing is quite lengthy, and some time will pass. There will be some diagnostic information on the screen during processing. When completed without errors, the remote-sensing utility will display a completion message on the screen.

Once the processing has been completed, the new I/M credits, adjusted for clean-screening, will be in the filenames indicated by the user in the input file. Although these files can be renamed to the MOBILE5 default I/M credit filenames, there will be no output in MOBILE5 which indicates that alternate I/M credits were used. It may be less confusing to access these alternate I/M credits using the alternate credit option in MOBILE5 described in the MOBILE5 User Guide Section 2.2.5.4. In this case, each input file for MOBILE5 would indicate which set of alternate credits was used in the two input records following the I/M Descriptive Record(s).

Since the effect of clean-screening is contained in the alternate I/M credit files, there should be no need to change any of the normal MOBILE5 input parameters (other than those to access the use of alternate I/M credits) to reflect the use of clean-screening. It is very important, therefore, to carefully choose the right combination of factors in the remote-sensing I/M credit utility that properly reflect the features of the clean-screening program elements.

If either a functional check of the evaporative pressure or purge system is included as part of the I/M program, the benefits of these programs must also be replaced with adjusted values. These are contained in an external data file created by this utility and can be used in MOBILE5a_H or MOBILE5b. MOBILE5a does not allow the use of alternate benefits for the pressure/purge checks.

In MOBILE5a_H, the alternate pressure/purge credits are read automatically from a file named PPEFF.D located in the same directory as the model is run. These credits are read when the Program Type in the I/M Descriptive Record is set to four (4), indicating a retest-base hybrid

program. As long as the I/M credit file supplied to the model contains the appropriate clean-screening adjusted I/M credits, the model will properly calculate both the exhaust and evaporative benefits for the program. The appropriate clean-screening adjusted pressure/purge credit file should be renamed to PPEFF.D and made available in the local directory when modeling. The user will need to be careful about which files are being used, because MOBILE5a_H will not be able to detect and warn the user about inappropriate combinations of credits. The credits generated by the utility will have an extra record at the beginning of the PPEFF.D data file. This record contains a brief description of the credits included in the file. MOBILE5b will read and echo this information in the descriptive output of the model (see below). However, MOBILE5a_H is not designed to read this descriptive record and an error will occur. If you intend to use MOBILE5a_H, then you must edit this data file to remove the first (description) record from the data file before using it with MOBILE5a_H.

In MOBILE5b, the exhaust emission credits are provided as described for RSD programs above. However, the credits for the evaporative emissions pressure and purge system check must be made available in a file named PPEFF.D located in the same directory as the model is run. These credits are read when the Program Type in the Pressure or Purge Check Descriptive Record is set to four (3), indicating a Retest-base Hybrid program. The appropriate clean-screening adjusted pressure/purge credit file must be renamed to PPEFF.D and made available in the local directory when modeling. You will need to be careful about which files are being used, because MOBILE5b will not be able to detect and warn the user about inappropriate credits. However, the record describing the altered PPEFF.D file, located in the first record of the file, will be echoed in the descriptive output of MOBILE5b. It will be located just below the description of the ATP or just below the I/M program if no ATP is included.

APPENDIX A

List of Records for RSD Utility

000 comments

001 fleet coverage

1 commitment to level of effort RSD program
2 commitment to specific fleet coverage RSD program
3 commitment to a number of failures RSD program (cannot be used with Program #5)

002 I/M program design

1 basic remote-sensing program
2 test-and-repair remote-sensing program
3 retest hybrid remote-sensing
4 remote sensing only program
5 clean-screening remote-sensing program

005-008 - no user input; indicates name & location of standard I/M credit data input files

015-018 - no user input; indicates location and name of the resulting remote-sensing adjusted I/M credit data output files

Input Files

005 1981 & newer model year credits
006 1981 & newer model year retest-hybrid credits
007 pre-1981 model year credits
008 pre-1981 model year retest-hybrid credits
009 Standard pressure/purge credits
010 Retest-hybrid pressure/purge credits

Output Files

011 adjusted standard pressure/purge credits
012 adjusted retest-hybrid pressure/purge credits
015 adjusted 1981 & newer model year credits
016 adjusted 1981 and newer model year only for retest-hybrid credits
017 adjusted pre-1981 model year credits
018 adjusted pre-1981 model year only for retest-hybrid credits

024 the age at which vehicles first become eligible for targeting by remote-sensing, 1 to 24 (default = 1 year)
031 the CO cutpoints to be applied to remote-sensing measurements for 1974 and older model year vehicles, default = 3%
032 the CO cutpoints to be applied to remote-sensing measurements for 1975 through 1980 model year vehicles, default = 3%
033 the CO cutpoints to be applied to remote-sensing measurements for 1981 and newer model year vehicles, default = 3%
041 the test and repair effectiveness for HC emissions, default = 0.5
042 the test and repair effectiveness for CO emissions, default = 0.5
043 the test and repair effectiveness for NOx emissions, default = 0.5

Option 1: Data Section (level of effort)

021 the # of vehicles in the fleet (in inspection area)
022 the # of valid measurements per month that are made using RSD
023 the # of times a vehicle must be failed by RSD before it can be targeted for I/M inspection; default 1, range 1-11

Option 2: Data Section (specific fleet coverage)

201-225
the # of vehicles for each of last 25 model years that are eligible for RSD targeting and the # of vehicles of that age that actually receive RSD; the ratio of the two #s is the fleet coverage by model year

Option 3: Data Section (# of failures)

301-325 The # of vehicles which normally fail I/M annually for each of the past 25 model years and the # of additional vehicles which are targeted by RSD and also fail the confirmatory I/M test

The program contains default benefits for RSD. However, the user also has the option of specifying benefits for option 3 based on a measure of the average excess emission levels of vehicles failing the remote-sensing cutpoint chosen. Such values would presumably come from an operating I/M program using RSD. This measure is the ratio of the average excess emissions of vehicles found at that remote-sensing cutpoint divided by the average emissions of all vehicles with excess emissions. There are 15 records for each of the three pollutants (HC, CO, and NOx) corresponding to RSD cutpoints from 0.5% to 7.5%. These records are the ratio of the average IM240 excess emissions identified per vehicle to the average excess emissions per vehicle in the fleet as a whole for a particular CO RSD cutpoint. Each of the 15 records has three model year groupings (1974 and older, 1975-80, and 1981 and newer).

701-715 values for HC

801-815 values for CO
901-915 values for NOx

Program #5: Clean-screening Programs

034 Coverage for pre-1975 model year vehicles (default=2) Yes:1, No:2
035 Coverage for 1975-1980 model year vehicles (default=2) Yes:1, No:2
036 Coverage for 1981-1985 model year vehicles (default=2) Yes:1, No:2
037 Coverage for 1986-1989 model year vehicles (default=2) Yes:1, No:2
038 Coverage for 1990 and newer model year vehicles (default=2) Yes:1, No:2

039 Selection of Clean-screening Program choice (default=1) range 1-8 where:

Choice 1: RSD using 0.5/200/1000 CO/HC/NOx cutpoints and scanning 2 times
2: RSD using 0.5/200/1500 CO/HC/NOx cutpoints and scanning 2 times
3: RSD using 0.5/200/2000 CO/HC/NOx cutpoints and scanning 2 times
4: RSD using 0.5/200 CO/HC cutpoints (no NOx) and scanning 2 times
5: Vehicle Emission Profile with overall 30% excused (100% coverage)
6: Vehicle Emission Profile with overall 40% excused (100% coverage)
7: Vehicle Emission Profile with overall 50% excused (100% coverage)
8: Alternate clean-screening scenario (user supplied effectiveness and fractions)

044 Indicates the RSD clean-screening IM240 cutpoint effectiveness to be used.

621-645 contain the user supplied clean-screening fraction of vehicles excused from inspection by age for the current choice of vehicle emission profiling program. (choices 5-8)

651-675 contains the user supplied clean-screening effectiveness by age and pollutant for the current choice of vehicle emission profiling program. (choices 5-8)

951-962 contains the user supplied clean-screening effectiveness by model year grouping, RSD cutpoint and pollutant for RSD clean-screening program options. (choices 1-4)

971-995 contains the user supplied clean-screening fraction of vehicles excused from inspection by age and RSD cutpoint. (choice 1-4)

APPENDIX B

Example Clean-screening Input Files

Example #1: RSD Based Clean-screening with Commitment to Level of Effort

```
000
000 Example #1: RSD Based Clean-screening with Commitment to Level of Effort
000             assuming IM240 phase in level effectiveness
000
000 CONTROL SECTION
000 ---------------
001           1 Option (may be 1, 2, or 3) Commitment to Level of Effort
002           5 Program Type (may be 1, 2, 3, 4, or 5 if Option is not 3) Clean-screening
000
000 INPUT AND OUTPUT FILENAMES
000 ----------------------------------------
000 5<-40 characters total, same as MOB5->44
005 IMDATAT.D                               1981 & newer model year vehicles credits              default IMDATA.D
006 IMDATAT.D                               '81 & newer mod. yr veh. Retest-Hybrid cr.            default HYBRID.IMC
007 TECH12.D                                pre-1974 & 1975-1980 mod. yr veh. cr.                 default TECH12.D
008 TECH12.D                                pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr.        default TECH12.D
009 PPEFFM5.D                               standard pressure/purge effectiveness array           default PPEFFM5.D
010 PPEFF.D                                 retest-based hybrid pressure/purge effectiveness      default PPEFF.D
011 PP.D                                    CHANGED standard pressure/purge effectiveness         default PPM5RSD.D
012 PPH.D                                   CHANGED retest-based hybrid press/purge effect        default PPHYRSD.D
015 IM.D                                    CHANGED 1981 & newer model year vehicles credits      default RSDDATA.D
016 IMH.D                                   CHANGED '81 & newer mod. yr veh. Retest-Hybrid cr.    default RSDDATA.H
017 TEC.D                                   CHANGED pre-1974 & 1975-1980 mod. yr veh. cr.         default TECDATA.D
018 TECH.D                                  CHANGED pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr. default TECDATA.H
000
000 GENERAL DATA SECTION
000 -----------
000 5<-11ch->15
021     2400000 No. of veh. in RSD program        default 1000000
022       12000 Valid veh. measurements per month default 50000
023           2 No. of times a veh. must be scanned (1-11) default 2 for clean-screening
000
000 Clean-screening Choices (may be 1-8)
000 Choice 1: RSD using 0.5/200/1000 CO/HC/NOx cutpoints and scanning 2 times
000        2: RSD using 0.5/200/1500 CO/HC/NOx cutpoints and scanning 2 times
000        3: RSD using 0.5/200/2000 CO/HC/NOx cutpoints and scanning 2 times
000        4: RSD using 0.5/200 CO/HC cutpoints (no NOx) and scanning 2 times
000        5: Vehicle Emission Profile with overall 30% excused (100% coverage)
000        6: Vehicle Emission Profile with overall 40% excused (100% coverage)
000        7: Vehicle Emission Profile with overall 50% excused (100% coverage)
000        8: Alternate clean-screening scenario (user supplied effectiveness and fractions)
```

```
000 -----------
034           2 Clean-screening for Pre-1975 model year vehicles (default=2)
035           2 Clean-screening for 1975-80 model year vehicles (default=2)
036           2 Clean-screening for 1981-85 model year vehicles (default=2)
037           2 Clean-screening for 1986-89 model year vehicles (default=2)
038           2 Clean-screening for 1990 and newer model year vehicles (default=2)
039           3 Clean-screening choice (default=8, user supplied effectiveness and fractions)
044           1 Clean-screening IM240 phase in cutpoint effectiveness (default=1)
000
```

Example #2: RSD Based Clean-screening with Commitment to Specific Fleet Coverage

```
000
000 Example #2: RSD Based Clean-screening with Commitment to Specific Fleet Coverage
000             assuming IM240 final cutpoint level effectiveness
000
000 CONTROL SECTION
000 ---------------
001           2 Option (may be 1, 2, or 3) Commitment to Specific Fleet Coverage
002           5 Program Type (may be 1, 2, 3, 4, or 5 if Option is not 3) Clean-screening
000
000 INPUT AND OUTPUT FILENAMES
000 ----------------------------------------
000 5<-40 characters total, same as MOB5->44
005 IMDATAT.D                                1981 & newer model year vehicles credits              default IMDATA.D
006 IMDATAT.D                                '81 & newer mod. yr veh. Retest-Hybrid cr.            default HYBRID.IMC
007 TECH12.D                                 pre-1974 & 1975-1980 mod. yr veh. cr.                 default TECH12.D
008 TECH12.D                                 pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr.        default TECH12.D
009 PPEFFM5.D                                standard pressure/purge effectiveness array           default PPEFFM5.D
010 PPEFF.D                                  retest-based hybrid pressure/purge effectiveness      default PPEFF.D
011 PP.D                                     CHANGED standard pressure/purge effectiveness         default PPM5RSD.D
012 PPH.D                                    CHANGED retest-based hybrid press/purge effect        default PPHYRSD.D
015 IM.D                                     CHANGED 1981 & newer model year vehicles credits      default RSDDATA.D
016 IMH.D                                    CHANGED '81 & newer mod. yr veh. Retest-Hybrid cr.    default RSDDATA.H
017 TEC.D                                    CHANGED pre-1974 & 1975-1980 mod. yr veh. cr.         default TECDATA.D
018 TECH.D                                   CHANGED pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr. default TECDATA.H
000
000 OPTION #2 DATA SECTION
000 Number of vehicles eligible for clean-screening (two valid readings)
000 Total------Sent-------
000 5<-11ch->1516<-11c->26
201       10000       1500 Total veh., veh. sent to IM via RSD, age  0- 1
202       10000       1500 Total veh., veh. sent to IM via RSD, age  1- 2
203       10000       1500 Total veh., veh. sent to IM via RSD, age  2- 3
204       10000       1500 Total veh., veh. sent to IM via RSD, age  3- 4
205       10000       1500 Total veh., veh. sent to IM via RSD, age  4- 5
206       10000       1500 Total veh., veh. sent to IM via RSD, age  5- 6
207       10000       1500 Total veh., veh. sent to IM via RSD, age  6- 7
208       10000       1500 Total veh., veh. sent to IM via RSD, age  7- 8
209       10000       1500 Total veh., veh. sent to IM via RSD, age  8- 9
210       10000       1500 Total veh., veh. sent to IM via RSD, age  9-10
211       10000       1500 Total veh., veh. sent to IM via RSD, age 10-11
212       10000       1500 Total veh., veh. sent to IM via RSD, age 11-12
```

```
213       10000       1500 Total veh., veh. sent to IM via RSD, age 12-13
214       10000       1500 Total veh., veh. sent to IM via RSD, age 13-14
215       10000       1500 Total veh., veh. sent to IM via RSD, age 14-15
216       10000       1500 Total veh., veh. sent to IM via RSD, age 15-16
217       10000       1500 Total veh., veh. sent to IM via RSD, age 16-17
218       10000       1500 Total veh., veh. sent to IM via RSD, age 17-18
219       10000       1500 Total veh., veh. sent to IM via RSD, age 18-19
220       10000       1500 Total veh., veh. sent to IM via RSD, age 19-20
221       10000       1500 Total veh., veh. sent to IM via RSD, age 20-21
222       10000       1500 Total veh., veh. sent to IM via RSD, age 21-22
223       10000       1500 Total veh., veh. sent to IM via RSD, age 22-23
224       10000       1500 Total veh., veh. sent to IM via RSD, age 23-24
225       10000       1500 Total veh., veh. sent to IM via RSD, age 24-25
000
000 Clean-screening Choices (may be 1-8)
000 Choice 1: RSD using 0.5/200/1000 CO/HC/NOx cutpoints and scanning 2 times
000        2: RSD using 0.5/200/1500 CO/HC/NOx cutpoints and scanning 2 times
000        3: RSD using 0.5/200/2000 CO/HC/NOx cutpoints and scanning 2 times
000        4: RSD using 0.5/200 CO/HC cutpoints (no NOx) and scanning 2 times
000        5: Vehicle Emission Profile with overall 30% excused (100% coverage)
000        6: Vehicle Emission Profile with overall 40% excused (100% coverage)
000        7: Vehicle Emission Profile with overall 50% excused (100% coverage)
000        8: Alternate clean-screening scenario (user supplied effectiveness and fractions)
000 -----------
034           2 Clean-screening for Pre-1975 model year vehicles (default=2)
035           2 Clean-screening for 1975-80 model year vehicles (default=2)
036           2 Clean-screening for 1981-85 model year vehicles (default=2)
037           2 Clean-screening for 1986-89 model year vehicles (default=2)
038           2 Clean-screening for 1990 and newer model year vehicles (default=2)
039           3 Clean-screening choice (default=8, user supplied effectiveness and fractions)
044           2 Clean-screening IM240 final cutpoint effectiveness (default=1)
000
```

Example #3: VEP Based Clean-screening

```
000
000 Example #3: VEP Based Clean-screening
000
000 CONTROL SECTION
000 ---------------
001           1 Option (must choose 1 but has no effect)
002           5 Program Type (may be 1, 2, 3, 4, or 5 if Option is not 3) Clean-screening
000
000 INPUT AND OUTPUT FILENAMES
000 ----------------------------------------
000 5<-40 characters total, same as MOB5->44
005 IMDATAT.D                               1981 & newer model year vehicles credits              default IMDATA.D
006 IMDATAT.D                               '81 & newer mod. yr veh. Retest-Hybrid cr.            default HYBRID.IMC
007 TECH12.D                                pre-1974 & 1975-1980 mod. yr veh. cr.                 default TECH12.D
008 TECH12.D                                pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr.        default TECH12.D
009 PPEFFM5.D                               standard pressure/purge effectiveness array           default PPEFFM5.D
010 PPEFF.D                                 retest-based hybrid pressure/purge effectiveness      default PPEFF.D
011 PP.D                                    CHANGED standard pressure/purge effectiveness         default PPM5RSD.D
012 PPH.D                                   CHANGED retest-based hybrid press/purge effect        default PPHYRSD.D
015 IM.D                                    CHANGED 1981 & newer model year vehicles credits      default RSDDATA.D
016 IMH.D                                   CHANGED '81 & newer mod. yr veh. Retest-Hybrid cr.    default RSDDATA.H
017 TEC.D                                   CHANGED pre-1974 & 1975-1980 mod. yr veh. cr.         default TECDATA.D
018 TECH.D                                  CHANGED pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr. default TECDATA.H
000
000 Clean-screening Choices (may be 1-8)
000 Choice 1: RSD using 0.5/200/1000 CO/HC/NOx cutpoints and scanning 2 times
000        2: RSD using 0.5/200/1500 CO/HC/NOx cutpoints and scanning 2 times
000        3: RSD using 0.5/200/2000 CO/HC/NOx cutpoints and scanning 2 times
000        4: RSD using 0.5/200 CO/HC cutpoints (no NOx) and scanning 2 times
000        5: Vehicle Emission Profile with overall 30% excused (100% coverage)
000        6: Vehicle Emission Profile with overall 40% excused (100% coverage)
000        7: Vehicle Emission Profile with overall 50% excused (100% coverage)
000        8: Alternate clean-screening scenario (user supplied effectiveness and fractions)
000 -----------
034           2 Clean-screening for Pre-1975 model year vehicles (default=2)
035           2 Clean-screening for 1975-80 model year vehicles (default=2)
036           2 Clean-screening for 1981-85 model year vehicles (default=2)
037           2 Clean-screening for 1986-89 model year vehicles (default=2)
038           2 Clean-screening for 1990 and newer model year vehicles (default=2)
039           8 Clean-screening choice (default=8, user supplied effectiveness and fractions)
000
```

```
000 Variable VEPX containing the alternate clean-screening effectiveness
000 by age and age for the clean-screening choice (5-8). Required Input
000
000       HC        CO        NOx
000  --------- --------- --------- Format
651       0.50      0.50      0.50 Age 1
652       0.50      0.50      0.50 Age 2
653       0.50      0.50      0.50 Age 3
654       0.50      0.50      0.50 Age 4
655       0.50      0.50      0.50 Age 5
656       0.50      0.50      0.50 Age 6
657       0.50      0.50      0.50 Age 7
658       0.50      0.50      0.50 Age 8
659       0.50      0.50      0.50 Age 9
660       0.50      0.50      0.50 Age 10
661       0.50      0.50      0.50 Age 11
662       0.50      0.50      0.50 Age 12
663       0.50      0.50      0.50 Age 13
664       0.50      0.50      0.50 Age 14
665       0.50      0.50      0.50 Age 15
666       0.50      0.50      0.50 Age 16
667       0.50      0.50      0.50 Age 17
668       0.50      0.50      0.50 Age 18
669       0.50      0.50      0.50 Age 19
670       0.50      0.50      0.50 Age 20
671       0.50      0.50      0.50 Age 21
672       0.50      0.50      0.50 Age 22
673       0.50      0.50      0.50 Age 23
674       0.50      0.50      0.50 Age 24
675       0.50      0.50      0.50 Age 25
000
000 Variable ACSCRN containing the alternate clean-screening fraction excused
000 by age for clean-screening choice (5-8). Required Input
000  --------- Format
621       0.50 Age 1
622       0.50 Age 2
623       0.50 Age 3
624       0.50 Age 4
625       0.50 Age 5
626       0.50 Age 6
627       0.50 Age 7
628       0.50 Age 8
629       0.50 Age 9
```

```
630       0.50 Age 10
631       0.50 Age 11
632       0.50 Age 12
633       0.50 Age 13
634       0.50 Age 14
635       0.50 Age 15
636       0.50 Age 16
637       0.50 Age 17
638       0.50 Age 18
639       0.50 Age 19
640       0.50 Age 20
641       0.50 Age 21
642       0.50 Age 22
643       0.50 Age 23
644       0.50 Age 24
645       0.50 Age 25
000
```

Example #4: RSD Based Clean-screening with Commitment to Level of Effort and With Alternate Effectiveness and Excused Fractions

```
000
000 Example #4: RSD Based Clean-screening with Commitment to Level of Effort
000             with user input of RSD effectiveness and excused fractions.
000
000 CONTROL SECTION
000 ---------------
001           1 Option (may be 1, 2, or 3) Commitment to Level of Effort
002           5 Program Type (may be 1, 2, 3, 4, or 5 if Option is not 3) Clean-screening
000
000 INPUT AND OUTPUT FILENAMES
000 -----------------------------------------
000 5<-40 characters total, same as MOB5->44
005 IMDATAT.D                               1981 & newer model year vehicles credits              default IMDATA.D
006 IMDATAT.D                               '81 & newer mod. yr veh. Retest-Hybrid cr.            default HYBRID.IMC
007 TECH12.D                                pre-1974 & 1975-1980 mod. yr veh. cr.                 default TECH12.D
008 TECH12.D                                pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr.        default TECH12.D
009 PPEFFM5.D                               standard pressure/purge effectiveness array           default PPEFFM5.D
010 PPEFF.D                                 retest-based hybrid pressure/purge effectiveness      default PPEFF.D
011 PP.D                                    CHANGED standard pressure/purge effectiveness         default PPM5RSD.D
012 PPH.D                                   CHANGED retest-based hybrid press/purge effect        default PPHYRSD.D
015 IM.D                                    CHANGED 1981 & newer model year vehicles credits      default RSDDATA.D
016 IMH.D                                   CHANGED '81 & newer mod. yr veh. Retest-Hybrid cr.    default RSDDATA.H
017 TEC.D                                   CHANGED pre-1974 & 1975-1980 mod. yr veh. cr.         default TECDATA.D
018 TECH.D                                  CHANGED pre-'74 & '75-'80 mod. yr veh. Retest-Hyb. cr. default TECDATA.H
000
000 GENERAL DATA SECTION
000 -----------
000 5<-11ch->15
021     2400000 No. of veh. in RSD program        default 1000000
022     2400000 Valid veh. measurements per month default 50000
023           2 No. of times a veh. must be scanned (1-11) default 2 for clean-screening
000
000 Clean-screening Choices (may be 1-8)
000 Choice 1: RSD using 0.5/200/1000 CO/HC/NOx cutpoints and scanning 2 times
000        2: RSD using 0.5/200/1500 CO/HC/NOx cutpoints and scanning 2 times
000        3: RSD using 0.5/200/2000 CO/HC/NOx cutpoints and scanning 2 times
000        4: RSD using 0.5/200 CO/HC cutpoints (no NOx) and scanning 2 times
000        5: Vehicle Emission Profile with overall 30% excused (100% coverage)
000        6: Vehicle Emission Profile with overall 40% excused (100% coverage)
```

```
000        7: Vehicle Emission Profile with overall 50% excused (100% coverage)
000        8: Alternate clean-screening scenario (user supplied effectiveness and fractions)
000 -----------
034           2 Clean-screening for Pre-1975 model year vehicles (default=2)
035           2 Clean-screening for 1975-80 model year vehicles (default=2)
036           2 Clean-screening for 1981-85 model year vehicles (default=2)
037           2 Clean-screening for 1986-89 model year vehicles (default=2)
038           2 Clean-screening for 1990 and newer model year vehicles (default=2)
039           3 Clean-screening choice (default=8, user supplied effectiveness and fractions)
000
000 Variable CLEANX containing the clean-screening effectiveness
000 by pollutant, model year group and choice for Choices #1-4.
000
000 Choice 1: 0.5/200/1000 HC/CO/NOx cutpoints
000        2: 0.5/200/1500 HC/CO/NOx cutpoints
000        3: 0.5/200/2000 HC/CO/NOx cutpoints
000        4: 0.5/200 HC/CO cutpoints (no NOx cutpoint)
000
000      HC        CO        NOx
000  --------- --------- --------- Format
951       0.98      1.00      0.85 Choice #1, Pre-1986 model years
952       1.00      1.00      0.88 Choice #1, 1986-1989 model years
953       1.00      1.00      1.00 Choice #1, 1990 and newer model years
954       0.98      1.00      0.85 Choice #2, Pre-1986 model years
955       1.00      1.00      0.88 Choice #2, 1986-1989 model years
956       1.00      1.00      0.92 Choice #2, 1990 and newer model years
957       0.98      1.00      0.85 Choice #3, Pre-1986 model years
958       1.00      1.00      0.85 Choice #3, 1986-1989 model years
959       0.82      0.71      0.92 Choice #3, 1990 and newer model years
960       0.98      1.00      0.85 Choice #4, Pre-1986 model years
961       1.00      1.00      0.83 Choice #4, 1986-1989 model years
962       0.82      0.71      0.69 Choice #4, 1990 and newer model years
000
000 Variable CSCRN containing the clean-screening fraction exampted
000 by age for Choices #1-4.
000
000 Choice 1: 0.5/200/1000 HC/CO/NOx cutpoints
000        2: 0.5/200/1500 HC/CO/NOx cutpoints
000        3: 0.5/200/2000 HC/CO/NOx cutpoints
000        4: 0.5/200 HC/CO cutpoints (no NOx cutpoint)
000
000  Choice #1 Choice #2 Choice #3 Choice #4
000  --------- --------- --------- --------- Format
```

```
971      0.614     0.694     0.724     0.834 Age 1
972      0.553     0.633     0.663     0.773 Age 2
973      0.492     0.572     0.602     0.712 Age 3
974      0.431     0.511     0.541     0.651 Age 4
975      0.370     0.450     0.480     0.590 Age 5
976      0.309     0.389     0.419     0.529 Age 6
977      0.248     0.328     0.358     0.468 Age 7
978      0.187     0.267     0.297     0.407 Age 8
979      0.157     0.237     0.267     0.377 Age 9
980      0.128     0.208     0.238     0.348 Age 10
981      0.099     0.179     0.209     0.318 Age 11
982      0.069     0.149     0.179     0.289 Age 12
983      0.040     0.120     0.150     0.260 Age 13
984      0.025     0.105     0.135     0.245 Age 14
985      0.010     0.090     0.120     0.230 Age 15
986      0.010     0.075     0.105     0.215 Age 16
987      0.010     0.075     0.105     0.215 Age 17
988      0.010     0.075     0.105     0.215 Age 18
989      0.010     0.075     0.105     0.215 Age 19
990      0.010     0.075     0.105     0.215 Age 20
991      0.010     0.075     0.105     0.215 Age 21
992      0.010     0.075     0.105     0.215 Age 22
993      0.010     0.075     0.105     0.215 Age 23
994      0.010     0.075     0.105     0.215 Age 24
995      0.010     0.075     0.105     0.215 Age 25
000
```