SECTION 3. BAR-97 SOFTWARE SPECIFICATION

3.1 OVERVIEW

Section 3 specifies the software requirements for BAR-97 emission inspection systems (EIS). It includes inspection procedures, sequences, decisions, responses and prompts, as well as necessary information to be loaded, security issues, lockouts, file structures, etc. It also contains requirements for communication with the BAR's Vehicle Information Database (VID).

3.2 EIS SOFTWARE COMPONENTS

3.2.1 General

The program software used in the EIS shall consist of a process control system as well as data look-up files. The software consists of inspection test procedures and criteria; necessary station, technician, and vehicle information; security measures, utilities and ancillary modules. Its features include vehicular emission measurements of HC, CO, CO_2, NO and O_2, engine RPM measurements, exhaust dilution determinations, bar code scanning, interface with a dynamometer, communication to and from the VID, etc.

The software shall ensure the EIS accurately operates within specified standards and records and transmits valid test data. The EIS shall identify inaccuracies and prohibit vehicle inspection until the inaccuracies are corrected.

The EIS shall allow performing official two-speed idle test (TSI) and related program functions such as, calibration, Manual Testing Mode, etc. without dynamometer and NOx measurement device being present.

Manufacturers shall permit BAR access and provide the necessary tools to view to all parameters that are used for 'self diagnostics' if the parameters are not 'hard coded' in the software. Parameters include items such as:

- Variables for calibration frequencies.
- Variables for allowable bench drift i.e. how much drift does the EIS allow prior to determining there is a problem.
- Variables for determining how often or severe a problem must be prior to locking the unit out.
- Variables for 'self correction' i.e. if an EIS was on a more frequent calibration schedule, but the problem that caused the more frequent calibration schedule was no longer present.

The variables shall be accessed through the QA/State menu.
When data is being stored or accessed, the computer shall display a message indicating that the disk is in operation and the EIS shall not be moved or disturbed. Following each

disk read/write operation, the hard disk read/write head shall be moved to a safe position and parked.

3.2.2 Boot-up Configuration

On each POWER ON, the EIS shall automatically self-diagnose all computer systems, including memory checking, hard disk and loading of all necessary operating software without technician intervention. If any corruption is found on the hard disk during the hard disk check and if check files are saved (usually saved as *.chk files), then the check files must be deleted so that the hard disk will not contain an excessive number of these files. Upon satisfactory computer component checkout (including hard disk data structures), the application software shall present a menu of available EIS operations. All offered features shall be menu-driven. For smog check related features, context-sensitive, on-line help shall be provided which can be accessed preferably with a single keystroke.

3.2.3 Software Modifications and Software Update Certification

Periodic software updates will be necessary. Software updates may be required by the BAR or the manufacturer. In either case, the manufacturer is responsible for installing the software in their respective EIS units throughout the state. The cost of the software update is the responsibility of the EIS owner if the software update is required by the BAR, and is the responsibility of the manufacturer if they require the update. (Software update costs are not required to be included as part of the EIS cost.)

Updates to the software specifications will be provided to the manufacturers by the BAR. The manufacturers shall provide the software code to the BAR upon each update. The software version number is to be indicated on the EIS status screen, on each vehicle test record and the VIR. The version number shall consist of a four digit numeric code to be made up of the last two digits of the year, followed by a two-digit version number.

All software updates shall cause the software version number to change. There will be a separate field in the test record indicating the software version currently in use and another field used to indicate the version number that the software will be updated to when its activation date is reached. This will permit the BAR to search the records prior to the update activation date to determine how many EIS units have been updated by looking at the update field. The update field in the test record shall go blank when the update is activated.

Areas in the software where changes or additions might be required include: preconditioning procedures and emission test sequences (as applicable for ASM and two-speed idle tests), various lookup tables, functional tests, diagnostic and repair procedures, data communication procedures, criteria affecting emission standards selection or referral of failing vehicles to the Referee/Test-Only Center, vehicle exemptions, capability to read on-board diagnostics fault codes and vehicle pass/fail criteria. Other areas not

specifically mentioned may also be impacted at some point, but we do not expect to request changes in all these areas at once.

To maintain the integrity of California's I/M program, QA and BAR field personnel will be instructed to lock out EISs that have unauthorized modifications or are running unapproved software versions. The following criteria apply to software and hardware updates:

a) Only BAR-approved software shall be used in an EIS. BAR intends to accommodate software developed by third parties as long as system security and integrity are not compromised. In addition, the BAR may initiate the development of software updates by third parties for use in all EISs . If BAR initiates development of a software update, manufacturers shall cooperate with BAR and/or a BAR-approved third party. (This section does not prohibit manufacturers from charging reasonable fees for software updates or from requiring nondisclosure agreements when software updates are developed by third parties.)

b) All proposed software updates must be thoroughly tested by the manufacturer before being submitted to the BAR. Update disks as well as electronically transmitted updates shall be encrypted in a manner approved by the BAR. The EIS shall be capable of accepting software updates via CD, or floppy disk.

c) All proposed software updates generated by the manufacturer shall be submitted to the BAR with a written description of the reason for the update, such as the problem that the update corrects.

d) All submitted software updates, including manufacturer-generated updates, must be submitted to BAR for testing and approval as follows:

    1. Software updates must be submitted on a mutually agreed upon medium.
    2. Each new software version submitted to the BAR, including minor revisions, must have a new and unique software version number.
    3. All proposed software updates must be accompanied by a cover letter with the following information:
        i. A description of all of the changes contained in the proposed software update, including manufacturer-initiated modifications.
        ii. A timeline of when the update is expected to be installed (start to finish) and how many units will be updated.
        iii. If any hardware modifications or special procedures are needed to perform the software update, describe the procedures for performing the update.

4. All submitted software updates for the EIS must be accompanied by a data disk containing at least 74 total records for both ASM and Two-Speed Idle tests as shown in Table 1 below. BAR may require the completion of BAR supplied 'test scripts' instead of the tests listed below. BAR will determine if the 'test scripts' must be completed instead of the tests listed below prior to software submittal.

TABLE 1 - REQUIRED TEST RECORDS

TEST RECORDS	# OF RECORDS	
	ASM	TSI
PASS	5	5
FAIL (HC, CO, NO)	5	0
FAIL (HC, CO)	2	5
FAIL (HC, NO)	2	0
FAIL (CO, NO)	2	0
FAIL (ECS Visual)	2	4
FAIL (Functional)	2	4
FAIL GP (HC, CO, NO)	5	0
FAIL GP (HC)	3	4
FAIL GP (CO)	3	4
FAIL GP (NO)	3	0
FAIL GP (HC, CO) W/ REPAIRS	3	5
FAIL GP (HC, NO)	3	0
FAIL GP (CO, NO)	3	0
TAMPER (ECS Visual)	5	5
TOTAL RECORDS	48	38

i. The data disks shall also contain at least 20 complete calibration records - (10 complete three-day calibrations; 5 EIS gas calibration; 3 dynamometer calibration and 2 fuel cap tester calibration)

ii. The records must be generated by the EIS and should include all items required per Confidential Appendix C-2.

5. Depending on the type and number of changes contained in the proposed software update, the BAR may require testing at BAR-approved beta sites prior to release of the software. BAR will perform a preliminary review of the proposed software prior to releasing it for beta site testing.

e) Pursuant to Health and Safety Code §44036, manufacturers are allowed six months from the date the BAR issues its proposed specifications for periodic software updates, to obtain approval that the updates meet the proposed specifications and to install the updates in all EIS subject to the updates. During the first 30 days of the six-month period, the manufacturers shall be permitted to review and to comment upon the proposed specifications. However, a shorter period of time may be required by the BAR upon finding that a previously-installed update did not meet the specification. A manufacturer's failure to furnish or install software updates as so specified is cause for the BAR to decertify the manufacturer's EIS Certification or to issue a citation and civil penalty up to $1,000 per day that the manufacturer fails to furnish or install the software and hardware updates by the specified period. *(The BAR may allow additional time to review and comment and/or submit software updates if they are more complex.)*

f) Software updates must correct all previously identified software problems.

g) The software must be able to run on all certified BAR97 hardware configurations in the field for that manufacturer.

3.2.4 Running Changes and Other Software Modifications

Any changes to design characteristics, component specifications and any modifications to the software must be approved by BAR. It will be the manufacturer's responsibility to confirm that such changes have no detrimental effect on the performance of the EIS.

3.2.5 Virus Detection Software

Each EIS unit shall contain a virus detection program, subject to BAR approval, which shall verify the integrity (i.e. check for infection/corruption) of each update disk or

decompressed file before it is applied to the EIS or allowed in memory. Infected/corrupted software shall be blocked from installation.

In lieu of this requirement, the EIS manufacturer may submit for BAR's consideration written procedures clearly illustrating how the EIS manufacturer intends to meet the intent of the VIRUS PROTECTION PROGRAM requirement. These procedures shall demonstrate how the integrity of the EIS software and update software or decompressed file shall be protected under all circumstances.

3.2.6 Directory and File Structure

(This information is confidential and may only be released with prior written consent from the BAR Engineering Section.)

3.2.7 Vehicle Look-Up Table (VLT)

a) The Vehicle Lookup Table is the BAR's version of the EPA/Sierra Lookup Table (ESLT). The VLT provides basic vehicle descriptions as well as ASM testing parameters, including single-axle dynamometer compatibility data. The VLT includes emission cutpoints exception information for some vehicles.

b) The table will be periodically revised on a "by-record" basis. The EIS shall send the version date and the number of records in its VLT file to the VID during any "Begin-Test" or "Data-Refresh" communications session.

c) When a "VLT Update" file is received from the VID, the EIS shall store the file to the hard drive until a period of relative inactivity (e.g. between Smog Check inspections). VLT.DAT file update strategies shall be proposed by each EIS manufacturer and be approved by BAR. Each VLT update record will be preceded by a single character and shall be processed as follows:

"C" = replace record (same row ID),
"A" = append record (new row ID),
"D" = delete record (same row ID).

d) The VLT Update file may appear to be corrupted if either of the following conditions exist:

1. The version date sent by the EIS does not match any dates stored in the "VLT Update History" table in the VID (second consecutive occurrence).
2. The number of records in the EIS's VLT.DAT does not match the appropriate number of records for that version date (determined at the VID).

If possible corruption is detected by the VID, the VID will send a lockout to the EIS. The EIS, upon receiving the response bit, shall display the following prompt:

DISPLAY PROMPT:

THE VLT DATABASE IS CORRUPT. CALL SERVICE.

If the VLT is corrupt, a lockout shall be set. This lockout can only be cleared by the VID upon replacing the file and the VID has verified that the VLT data has been replaced.

e) The EIS shall be able to use an Extended Test Parameters Table in conjunction with the VLT. This table will contain additional parametric variables to be used during either the ASM test sequence or TSI test sequence. Having these values in an accessible and renewable table will allow for vehicle specific adjustments to the test cycle without the need to update the software. The table will use a reference ID number that will link the table rows to rows in the VLT and there will be a one-to-many relationship with the VLT. This table will be periodically revised by overwriting.

3.2.8 Repair Action Information

The EIS shall display a list of all repair categories and prompt the technician to select the category or categories of the system(s) which were repaired. The technician must be able to return to the list of major categories after each subcategory has been completed without having to hit more than two keys.

All repair actions shall be documented on the vehicle inspection report (VIR), and stored in the repair record. The technician shall be required to sign on the VIR to document the repairs that have been performed to reduce emissions. The tampered vehicle repair cost shall be printed on the VIR and recorded in the *Tampered Repairs (Parts and Labor) Cost* field of the repair record. If further repairs are needed, the estimated cost of the additional repairs shall be printed on the VIR and recorded in the *Estimated Cost of Additional Repairs* field of the repair record.

3.2.9 Display

a) **Readability**

The display, when in the test mode, shall be readable at a minimum distance of eight feet in a building that meets OSHA lighting standards for a garage environment. Display contrast and brightness shall be adjustable.

b) **BAR Messages**

BAR messages shall be transmitted by the VID to the EIS during all communication sessions except during the network diagnostic routine (loopback). BAR messages will be in text file format. All new messages shall automatically display once immediately after the technician selects Smog Check√√ from the main menu. The messages shall default to print and the technician must press a function key to continue. The EIS shall save the most recent 100 messages and provide an option for later recall and print.

c) **Testing Messages**
During the emissions test, the EIS shall display the word TESTING on the screen. The EIS shall also display messages, if applicable, test mode, vehicle speed, dynamometer load deviation, test time, excessive exhaust dilution, low flow, driver acceleration violations, and engine RPM violations.

d) **Information Not Permitted During Testing**
The EIS shall not display the emission readings during the inspection. (However, during manual mode testing, the readings shall be displayed.)

e) **Print Screen Capability**
The EIS shall have a PRINT feature, which prints any current text or graph displayed on the screen, by depressing no more than three keys. The print feature shall always be active; however, there shall be no print capability during emissions testing.

f) **Engine RPM**
The EIS shall have the capability to display the engine speed up to four digits during the emissions test.

3.2.10 **Pretest/Training Mode**
The EIS shall have a PRETEST/TRAINING MODE feature that will allow technicians and trainees, respectively, go through a Pretest and/or a Training Mode inspection.

The Pretest feature shall allow technicians (trainees are restricted) to pre-screen vehicles for gross polluter status by performing an inspection without officially labeling the vehicle as a gross polluter. The Pretest is not an official test and therefore the EIS shall not issue certificates for passing vehicles. The Pretest shall be performed in the same manner as a Smog Check inspection except as noted. During Pretest, the EIS shall display a message on the screen that the inspection is a "PRETEST INSPECTION" and shall print "PRETEST" on the VIR. For additional VIR information, refer to Appendix C, "Vehicle Inspection Report" for Pretest sample VIRs.

If the "Invalid Station Type" response bit (bit 53) is received from the VID, the EIS shall display the following prompt, and allow the Pretest to continue.

DISPLAY PROMPT:

THE PRETEST MAY CONTINUE, BUT THIS VEHICLE MUST BE REFERRED TO A "REFEREE/TEST-ONLY CENTER" FOR CERTIFICATION.

During Pre-Test, the EIS shall not prompt for repair information in accordance with §3.6.20, 3.6.21 and 3.6.22 during Pre-Test.

The Training Mode capability will be used by the manufacturers for training purchasers of the EIS, by EIS owners to train new employees, or for schools to train students. The training mode shall not require the use of a technician's access code or allow access to secured areas of hardware or software and will not communicate to the VID. The display shall show a message throughout the inspection that this is a training exercise and not an official test (no certificates shall be issued). The EIS shall print TRAINING on the VIR.

The training mode test results shall be recorded and transmitted to the VID at the next required communication session (i.e. next Smog Check, data file refresh, etc.). Do not make an "end of test call" to the VID.

3.2.11 **Inspection Cost Survey**

Once a month, the EIS shall query during an inspection for the cost of a smog check inspection. The EIS shall display the following prompt:

DISPLAY PROMPT:

ENTER INSPECTION FEE CHARGED FOR THIS TEST (EXCLUDING CERTIFICATE).

ASM: _____
TSI: _____

Programming Criteria:

The EIS shall provide two five-character numeric fields (XX.XX) to enter the fees the station charges for the ASM and TSI inspections. The EIS shall store the inspection cost information in the inspection cost data file and transmit the file to the VID upon next VID communication transaction.

3.2.12 **Configuration Information**

The EIS shall receive configuration information from the VID. The following items will be in the configuration information file:

1) Drive configuration information (Y/N). See §3.6.9 b).

Note: The EIS shall record the current status (Y/N) of the Drive Configuration to the Drive Configuration routine activated field of the test record.

2) Collect second-by-second information (Y/N). If "Y," then the EIS shall collect and send the secxsec data as per §3.6.12 c). If "N," then the EIS shall discontinue collecting and sending the secxsec data.

3) ASM activation (Y/N/B). [B = Basic area configuration]

If "Y," then all vehicles shall receive either an ASM or TSI inspection as per this specification.

If "N," then the EIS shall allow the technician to select an ASM or TSI test. The EIS shall display the ASM/TSI test selection prompt prior to any prompts related to dynamometer compatibility. Note: the software shall be able to perform a TSI test without a dynamometer or NO_x measuring device installed in the EIS.

If "B", then the EIS either perform a TSI inspection or abort the test.

When the configuration is set to "B" the EIS shall perform a TSI test under the following conditions:

1. VID returns anything other than "A" in the *Required Test Type* field of the test record.
2. Off-line test.

When the configuration is set to "B" the EIS shall abort the test under the following conditions:

1. VID returns an "A" in the *Required Test Type* field of the test record.

If an "A" is received in the *Required Test Type* field of the test record the EIS shall display the following prompt then abort the test:

DISPLAY PROMPT:

THE VEHICLE UNDER TEST MUST BE TESTED AT AN "ENHANCED AREA STATION," THE SMOG CHECK WILL BE ABORTED.

Note: The EIS shall record the current status (Y/N/B) of the ASM activation to the ASM testing enabled field of the test record.

4) RPM limits (low/high, low/high). The EIS shall use the limits in the configuration file for all ASM tests, except when an extended parameters record is used. The order of the RPM limits shall be as follows. The first two numbers shall be the lower limit for engines less than or equal to 3.0L. The next two numbers shall be the upper limit for engines less than or equal to 3.0L. The next two numbers shall be the lower limit for engines greater than 3.0L. The last two numbers shall be the upper limit for engines greater than 3.0L. All limits shall be multiplied by 100 to determine the actual limit. The lower limit applies to manual transmissions only; automatic transmissions shall use 100 RPM for the lower limit. See §3.6.12.a.12, & Appendix C-4.
Example: if the engine size = 5.0L then use the appropriate lower limit in the configuration file times 100 as the lower RPM limit and the appropriate upper limit in the configuration file times 100 as the upper RPM limit.

5) Dynamometer scale lockout percentage thresholds (low/high). The EIS shall use these limits to determine if the dynamometer scale is out of calibration. See §3.6.12.a.7 & Appendix C-4.

6) Equivalent Test Weight percentage thresholds (low/high). See §3.6.12 a. 4.

7) Perform OBD II check (Y/N). If "N", then only perform the visual portion of the OBDII system check. If "Y", then perform the OBDII check as listed in section 3.6.19.4.3.

Note: The EIS shall record the current status (Y/N) of the Perform OBD II check to the Check OBD II field of the test record.

8) Fast Pass (Y/N). If ‘Y’, the EIS shall perform a ‘fast pass’ during the ASM test if all the 10-second average emission readings are simultaneously below the applicable standards. If ‘N’, the EIS shall use the final 10-second average emission readings for the overall emission results. The EIS shall default to ‘N’ if the *fast pass field* is not filled with ‘Y’ or ‘N’ in the configuration file. See §3.6.12.d & §3.6.12.e

Note: The EIS shall record the current status (Y/N) of the Fast Pass to the Fast Pass field of the test record.

3.2.13 **VLT Exceptions**

During the "begin test" communication to the VID, if there is a match with the VIN and license plate number, a Vehicle Specific VLT (which provides unique information for the

vehicle under test) may be sent to the EIS from the VID. When sent, the information in the VSVLT shall be used instead of the information in the EIS resident VLT. The VSVLT will have the same layout as the VLT. The technician must enter vehicle information not received from the VSLT.

In most cases, exception vehicles are vehicles that have been identified by the State Referee as having special features, such as an engine change. These vehicles are also identified with a Referee Label Number.

3.3 SOFTWARE MODULES

3.3.1 Technician and Station License Numbers and Other Numbers

a) **General:**

The technician's license number and access code shall reside in both the EIS and the VID. The EIS shall determine the validity of the technician's access code, and the VID shall confirm its validity at initial contact.

In addition, the EIS shall not be allowed to go into the inspection mode unless valid entries have been made for station number, PEF value, calibration gas values, certificate numbers, and at least one licensed technician.

The EIS shall have the capacity to store at least 99 technician access codes and 99 corresponding technician license numbers. Only the VID can add, change or delete the technician's access code and corresponding license number. Station and technician license numbers begin with two alpha characters which are followed by six numeric characters.

b) **Technician Access Codes:**

The EIS shall require the technician to enter a special access code before an inspection can begin. The access code shall neither be displayed nor printed on the VIR. This special access code number shall be linked to the technician's license number and is described in the Confidential Appendix C-2.

c) **Technician License Numbers:**

A technician's license number reflects the type of license the technician possesses. The EIS shall automatically abort the inspection and display a message indicating that the technician has not obtained the proper license number and/or endorsement from the BAR.

The two alpha characters in the technician license will be one of the following: EA, EO, EB, EI or GU . A description of these licenses can be found in the test record layout in Confidential Appendix C-2.

BAR may require update training prior to performing certain test or repair related activities. A special identifier, not shown on the technician's badge or as part of the license number, will be referred to as an endorsement. Specific endorsements will be developed by the BAR as the need arises. Currently, only the "A" (ASM), "G" (Gaseous Fuel), "B" (Both ASM and Gaseous Fuel) and "N" (None) endorsements exist. Records of these endorsements will reside in the VID and the EIS (refer to Confidential Appendix C-2).

d) **Station License Number:**
The station license number shall be entered into the EIS during initialization. Only valid station license prefixes may be entered into the EIS.

Station license prefixes beginning with an R and C indicate that the station is licensed to test and repair all classes of vehicles; therefore, the EIS must allow tests on light, medium- and heavy-duty vehicles.

Station license prefixes beginning with a T indicate that the station is licensed to test, but not repair, all classes of vehicles; therefore, the EIS must only allow tests on light, medium and heavy-duty vehicles.

Station license prefixes beginning with a D or F indicate that it is a fleet station and licensed to test and repair only those vehicles registered to their fleet.

Station license prefixes beginning with a G indicate that it is a government fleet station licensed to test and repair government fleet vehicles.

Station license numbers that begin with H or K are only licensed to test and repair vehicles over 8500 pounds.

Station license numbers that begin with P or V are only licensed to test vehicles over 8500 pounds.

Station license prefixes beginning with a S indicate that it is a training facility. Training facilities shall be blocked from performing official smog checks; however, training facilities are allowed to perform pretests, and training mode inspections.

Station license prefixes beginning with a Q, Y or Z shall be reserved for future expansion.

Valid entries for the second alpha character of the station license are A-N (A-Z for government fleet stations). The remaining 6 digits are numeric and unique to each station. The station license number shall be placed in the *Station License*

Number field of the test record and on the VIR. This field must be populated in the test record for every valid test record sent to the VID.

Programming Criteria:

Government fleet stations with license numbers that begin with the alpha character G, shall only be required to make one front-end call to the VID. If the VID has a match, the VID shall transfer the vehicle data to the EIS. However, if a match is not found as a result of the front-end call to the VID, the EIS shall not require the technician to initiate a second call to the VID. The EIS shall allow the inspection to proceed without making a second initial call. The test will default to government fleet vehicle and a certificate will not be issued. (Note: Provisions regarding certificate numbers and certificates purchased as well as lockouts associated with certificates do not apply to government fleet stations.)

Provisions regarding certificate numbers and certificates purchased as well as lockouts associated with certificates do not apply to training facilities.

e) **Test Record Number**
The EIS shall give each valid test a consecutive number. A valid test consists of a completed test with an overall pass or fail (including a tamper or gross polluter identification) test result that shall be transmitted to the VID. The record number shall be written to *Test Record Number* field of the test record. This field is numeric and has a length of 6 digits. When the number reaches 999999, the number shall be reset to 000001. This field must be populated in the test record for every valid test record sent to the VID.

f) **EIS Number**
The EIS number shall be unique for each EIS unit in the state of California. The first two characters of the EIS number are alpha. These two characters shall be assigned to each manufacturer upon certification of that manufacturer's EIS unit. The following 6 digits shall be unique to each EIS made by a manufacturer. The EIS number shall be written to the *EIS Number* field of the test record. This field must be populated in the test record for every valid emissions test record sent to the VID. Print the EIS number on the VIR.

g) **Loaded Software Version Number**
This field shall contain the version number of the software that is currently being used by the EIS. The loaded software version number shall be written to the *Loaded Software Version Number* field of the test record and printed on the VIR. This field must be populated in the test record for every valid test record sent to the VID.

h) **Update Software Version Number**
This field shall contain the version number of the update software that is currently loaded but not being used by the EIS. *Update Software Version Number* field of the test record must be populated if the EIS has update software loaded. At a predetermined date, the update software shall become the loaded software version, and the old version shall be discarded. After the update software version turns into the loaded software version, the *Update Software Version Number* field shall be blank.

i) **VID Identification**
The VID-ID is a record identifier generated by the VID. The VID shall assign an ID number to a test record which shall be transmitted to the EIS at the time of the begin test call. The ID will be written to the *VID-ID* field of the test record. The VID-ID shall not be modified by the EIS and shall be transmitted back to the VID during end-of-test contact.

j) **DMV ID Number**

When a certificate is issued, the DMV-ID number (described in Confidential Appendix C-3) shall be printed on the VIR, and written to the *DMV-ID* field of the test record for every passing inspection.

3.3.2 EIS Lockout Reasons

The EIS shall be prohibited from performing an inspection for any of the following reasons:

- Clock Lockout
- Warm-up in progress
- Warm-up failure
- Dynamometer warm-up in progress (See Note 3)
- Dynamometer calibration required (See Note 3)
- Dynamometer calibration failure (See Note 3)
- Dynamometer failure (See Note 3)
- Gas calibration required
- Gas calibration failure
- Gas analyzer failure
- Fuel cap tester failure
- Fuel cap tester out of calibration
- Oxygen sensor out of calibration
- Dyno lift failure
- Leak check required
- Leak check failure
- EIS tampering
- Out of certificates (see Note 2)
- Hard disk is full
- Floppy disk or disk mechanism failure
- Hard disk or disk mechanism failure
- QA/State EIS lockout
- EIS initialization (data missing, incorrect or incomplete)
- No communication with VID in XXX days and XXX tests (see Note 1)
- Station license suspended
- Station license revoked
- Station license expired
- Failure to pay for certificate numbers purchased
- Failure to pay for communications services
- Certificate sequencing error (see Note 2)
- Calibration Gas Cylinder Violation
- State disk drive tampering
- VLT Corrupt

- Dynamometer scale failure (See note 3)
- Excessive Number of Aborts

Notes:

1. This lockout shall be set whenever (xxx inspection) fifty inspections (running total) have been performed by the EIS within five consecutive days without communicating to the VID. The VID sets the no contact limit and number of inspections allowed. The lockout can be cleared by QA/State personnel or by the VID HELP DESK in accordance with pre-established procedures. See Confidential Appendix C-2 for additional detail.

2. Not applicable for government fleet stations, or training facilities.

3. Dynamometer failures shall only prevent ASM inspections; two-speed idle inspections will be allowed to continue. See §3.9 a) for additional detail.

3.3.3 Fleet File Number

This field shall serve two purposes:

a) To record the file or identification number of fleet or military personnel vehicles.

b) When applicable, to identify a vehicle under test as a government fleet or military personnel vehicle, and as such, to prevent issuance of a certificate upon passage of the inspection.

This field shall contain the government fleet file number, PFR file number or military personnel identification number. The entry can be identified by the first character of the number. The data shall be recorded in the *File Number Storage* field of the test record.

3.3.4 Military Personnel Vehicle (Out-of-State)

Before transmitting the VIN/license plate number to the VID, if the vehicle has an out-of-state license plate, the EIS shall prompt the technician to ask if the consumer is seeking California DMV registration as follows:

DISPLAY PROMPT:

IS THE CONSUMER SEEKING CALIFORNIA DMV REGISTRATION? (YES/NO)

<u>Programming Criteria</u>:

1) If YES (consumer is seeking California DMV registration), continue the inspection.

2) If NO, determine if the consumer is in California on military assignment.

DISPLAY PROMPT:

IS THE CONSUMER HERE ON MILITARY ASSIGNMENT? (YES/NO)

3) If YES, the inspection shall continue and the EIS shall build a military personnel identification number and print it on the VIR. The EIS shall store this number in the *File Number Storage* field of the test record. The EIS shall not issue a certificate.

1. Military Personnel Identification Number

Character	Description
1	"M"
8	Last 7 characters of VIN

2. DISPLAY PROMPT:

NO CERTIFICATE SHALL BE ISSUED FOR THIS VEHICLE.

4) If NO, no inspection is required and the test shall be aborted.

3.3.5 **Waiver and Hardship Extension**

If a vehicle has a previous waiver or hardship extension on record, as indicated by the VID, then the technician shall be prompted to inform the consumer that no repair cost minimum applies if the vehicle fails the inspection. The EIS shall display the following message:

DISPLAY PROMPT:

THIS VEHICLE HAS A PREVIOUS WAIVER OR HARDSHIP EXTENSION ON RECORD. THE VEHICLE IS NOT ELIGIBLE FOR ANOTHER WAIVER OR HARDSHIP EXTENSION. COST LIMITS DO NOT APPLY.

If the vehicle has a previous waiver or hardship extension on the record, the EIS shall print the following appropriate message on the VIR:

THIS VEHICLE HAS A PREVIOUS WAIVER ON RECORD.
OR

THIS VEHICLE HAS A PREVIOUS HARDSHIP EXTENSION ON RECORD.

THE VEHICLE SHALL BE REFERRED TO THE REFEREE/TEST-ONLY STATION FOR ISSUANCE OF A CERTIFICATE OF COMPLIANCE.

In addition, the EIS shall write "W" for waiver or "H" for hardship to the *Previous Waiver/Hardship Extension Issued* field of the test record and the EIS shall also print the WAIVER/HARDSHIP EXTENSION ELIGIBILITY MESSAGE on the VIR. The EIS shall prohibit issuance of a certificate of compliance if the vehicle has a hardship extension even if the vehicle passes the inspection.

3.3.6 **Emissions Recall Notice from DMV Records**

The EIS receives emissions-related recall registration block from the VID. This information shall be stored in the *Manufacturer Recall ID (DMV)* and *Manufacturer Date of Recall (DMV)* fields of the vehicle test record. If a repair record exists for the vehicle under inspection, the information shall also be written to the *Manufacturer Recall ID (DMV)* and *Manufacturer Date of Recall DMV)* fields of the repair record.

If information from the VID indicates that a DMV-installed emissions-related recall registration block exists on the test record, and no evidence was provided during the inspection to indicate compliance, then the EIS shall print the following message on the VIR:

DMV HAS PLACED AN EMISSIONS-RELATED BLOCK ON YOUR VEHICLE REGISTRATION. THE EMISSIONS-RELATED RECALL NUMBER IS XXXXXXXX (MFR'S RECALL ID). PLEASE CONTACT YOUR DEALERSHIP TO COMPLY WITH THE EMISSIONS RECALL REQUIREMENT.

3.3.7 **Applicable Model Years**

1. The EIS shall not accept any vehicle model year older than 1966, or newer than the current calendar year plus two. Any attempt to make such an entry shall cause the EIS to display one of the following prompts:

   DISPLAY PROMPT:

   DO NOT TEST VEHICLES OLDER THAN 1966.

   DO NOT TEST VEHICLES NEWER THAN THE CURRENT YEAR PLUS TWO.

2. The EIS shall display the following prompt anytime the technician enters a model year that is less than five years old. Example: the current year is 1999, display the prompt for 2001, 2000, 1999, 1998, 1997, and 1996.

   VEHICLES LESS THAN FIVE YEARS OLD ARE EXEMPT FROM BIENNIAL SMOG CHECKS. DO YOU WISH TO CONTINUE? (Yes/No)

   Programming Criteria:

   1. If "YES", the EIS shall continue with the inspection. If “NO”, the EIS shall abort the inspection.

3.3.8 **Vehicle Information Entry**

The full name of each vehicle make must be displayed and printed on the VIR, but only the first five characters of each make name shall be recorded on the test record. Based on the VIN, license plate number (and vehicle registration zip code), the VID (given a match) shall down-load the vehicle make, model name, model year, engine size, number of cylinders, transmission type, certification type, vehicle type, inspection reason, fuel type, vehicle test parameters and, if applicable, GVWR, fleet file number, referee label number, engine make and engine year. Since the VID does not always have complete information or the EIS to VID communication may have not been successful, the technician may have to enter some or all of this information manually. (See §3.6.6.g)

For each inspection the technician shall always enter the following information: odometer reading, and dual exhaust (if applicable).

3.3.9 **Underhood Inspection**

The technician shall be required to make an entry for each of the items on the list provided in §3.6.18 before proceeding to the next item. However, if the technician fails to make an entry for every item on the list, then a message shall be displayed indicating that an error was made. Edit capability shall be provided for all entries prior to

continuing the inspection. A HELP screen shall also be provided to advise the technician to refer to the vehicle's underhood emissions control system label as the primary source of information to determine what emission control devices are required on a particular vehicle or else use a current emissions control application guide.

3.3.10 Emission Standards

The emissions standards category (ESC) tables (Appendix A) shall reside in the EIS and receive updates from the VID.

The EIS shall look into the VLT for emission cutpoints. If not available, the EIS shall use the ESC table.

The ESC tables shall also have a version number. Upon implementing the new ESC table, the old version shall be purged. Additional standards categories may be added at a future date.

Based on the vehicle information entered, the EIS shall determine the emissions test standards for the vehicle being tested. For all ASM tests that do not have emission standards in the VLT or VSVLT, the proper ESC category shall be determined as follows:

> For vehicles that have a test weight (equivalent test weight, inertia weight class, measured test weight) less than or equal 3750 lbs. and the GVWR is less than 8501 pounds use the appropriate ESC record (based on model year, vehicle type, and GVWR) from TABLE1.DAT. If the vehicle test weight is greater than 3750 pounds, or the GVWR is greater than 8500 pounds use the appropriate ESC record from TABLE4.DAT. If the GVWR is not available select the appropriate table based on the vehicle test weight.

For each vehicle, the ESC will contain HC, CO, and NO Pass/Fail and Gross Polluter values and average emissions for non-polluting vehicles for ASM and two-speed idle tests. Print these emissions values on the VIR. The ESC tables also contain $CO + CO_2$ dilution thresholds, GVWR and engine speed limits. Emission standard category values and the criteria for selecting categories shall be designed in a manner that allows for easy modification or addition.

Minimum dilution limits shall be determined before the Dilution Correction Factor (DCF) is applied to the emission measurements. Dilution measurements shall be based on the sum of CO and CO_2. The EIS shall prevent testing if the uncorrected $CO + CO_2$ value or the engine speed signal are outside the BAR specified thresholds. (Use the value on the ESC table for the minimum dilution limits, except that CNG- and LPG-powered vehicles shall use the table limits minus two. For example, if the minimum $CO + CO_2$ was 7, the minimum for CNG-powered vehicles would be 5.)

The ESC for the vehicle under test shall be written to the *Emission Standards Category* field of the test record, and the ESC Version number for the vehicle under test shall be written to the *ESC Version Number* field of the test record.

3.3.11 **NO Humidity Correction Factor**

Nitric oxide (NO) readings shall be multiplied by the following factor to correct for ambient humidity effects on NO generation in engine combustion.

$$K_h = e^{[0.004977*(H-75)-0.004447*(T-75)]}$$

where K_h = NO Humidity Correction Factor (Note cap HCF at 2.31; if greater than 2.31 use 2.31

H = Absolute humidity, grains of water per pound of dry air,

T = Temperature degrees Fahrenheit

$$H = \frac{(43.478) \times R_a \times P_d}{P_B - \left(P_d \times \frac{R_a}{100}\right)}$$

R_a = Relative humidity (RH) of the ambient air, percent

P_d = Saturated vapor pressure, mm Hg, at the ambient dry bulb temperature. P_d vs. temperature data may be extracted from such sources as the Handbook of Chemistry & Physics (CRC Press).

P_B = Barometric pressure, mm Hg

The following factors shall be written to the test record in the ATMOSPHERIC CONDITIONS section: Relative *Humidity*, *Ambient Temperature*, *Barometric Pressure*, *Humidity Correction Factor*.

3.3.12 **Dilution Correction Factor**

The EIS shall apply a DCF to the HC, CO, and NO inspection emissions results. The EIS shall look in the VLT for the minimum dilution threshold of CO + CO2. If the minimum dilution threshold does not exist in the VLT, the EIS shall default to 6%, except for vehicles running on CNG or LPG which shall default to 4%. This dilution correction accounts for any exhaust sample dilution, intentional or unintentional, occurring during inspection. The EIS shall calculate the DCF using the following procedure, and shall preselect the formula appropriate to the vehicle's fuel type. If the calculated DCF exceeds 3.0, a default value of 3.0 shall be used. If the DCF falls below 1.0, then a default value of 1.0 shall be used.

a) Calculate "x" using the EIS measurements of CO and CO_2:

$$x = \frac{[CO_2]_{meas.}}{[CO_2]_{meas.} + [CO]_{meas.}}$$

where $[CO_2]_{meas.}$ and $[CO]_{meas.}$ are the final readings of each mode of the inspection (for example, ASM 5015, ASM 2525, 2500 RPM and idle).

b) Calculate the $[CO_2]_{adj.}$ using the following formulas.

<u>For Gasoline</u>

$$[CO_2]_{adj.} = \left[\frac{x}{4.644 + 1.88x}\right] 100$$

<u>For Methanol or Ethanol:</u>

$$[CO_2]_{adj.} = \left[\frac{x}{4.73 + 1.88x}\right] 100$$

<u>For Compressed Natural Gas (CNG):</u>

$$[CO_2]_{adj.} = \left[\frac{x}{6.64 + 1.88x}\right] 100$$

<u>For Liquid Propane Gas (LPG):</u>

$$[CO_2]_{adj.} = \left[\frac{x}{5.39 + 1.88x}\right] 100$$

c) Calculate the "Dilution Correction Factor" as follows:

$$Dilution\ \ Factor = \frac{[CO_2]_{adj.}}{[CO_2]_{meas.}}$$

Corrected HC = Observed HC x DCF

Corrected CO = Observed CO x DCF
Corrected NO = Humidity Corrected NO x DCF

The DCF shall NOT be applied to the CO_2 reading.

The EIS shall apply the DCF to the final emission readings of the inspection to calculate the dilution-adjusted values. The EIS shall then compare the dilution-adjusted values against the vehicle's emission standards to determine the pass/fail or gross polluter status of the vehicle. The dilution-adjusted values shall be the final emission readings for the test vehicle. They shall be printed on the VIR as AMOUNT MEASURED and shall be stored in the test record. The EIS shall record the DCFs on the *DCF - Dilution Correction Factor (ASM5015 or TSI-2500 RPM)* and *DCF - Dilution Correction Factor (ASM2525 or TSI-Idle RPM)* fields on the test record. The values recorded shall be the calculated DCF values, not the default values.

3.3.13 Engine RPM Detection

Based on the vehicle identification information entered by the technician, the EIS may assist the technician in determining which vehicles require a primary pick up, which require that an alternate counting algorithm be used, and which require the use of an auxiliary piece of equipment. Prompts may be provided to assist the technician in locating an RPM signal on vehicles equipped with distributorless ignition systems (DIS).

The EIS shall record the engine RPM simultaneously with the emissions readings. If the EIS does not read engine RPM in the proper range, the EIS shall prohibit continuation of the inspection until proper RPM range has been achieved. (Manufacturers may propose an error tolerance factor to be used when testing vehicles with unstable RPM.)

For 1996 and newer vehicles, the OBD-II SAE standardized connector link shall be capable of providing the tachometer signal. See §3.6.11 for "RPM Signal."

3.4 EIS ACCESSORY RECOGNITION

3.4.1 Bar Code Scanner

The EIS shall detect the presence of the bar code scanner automatically at POWER ON. During the inspection, if the bar code scanner cannot successfully scan, the technician's badge license number (after each attempt), the VIN (after each attempt), the VIN and license plate numbers from the DMV registration document, or the bar code labels from the calibration gas cylinders, a message shall be displayed advising the technician that the bar code is not readable and the technician shall have the option of trying again or entering the necessary information manually. To help ensure the accuracy of manual entry, all bar-coded information (VIN, license plate, etc.) must be entered twice (dual entry method in which entry is not displayed). Dual entry method shall be two-in-a-row correctly entered and both entries must match before the data is accepted. The EIS shall provide prompts on how to manually enter all bar-coded information.

3.4.2 Modem

The modem shall be connected to a fully operational dial-up connection during all times of operation. The modem must be IBM-PC and MS-DOS compatible and show full ASCII file transmission compatibility. The manufacturer must provide all necessary software and protocol for the modem.

3.5 SMOG CHECK MENUS

The following menus are required. The BAR reserves the right to require modification of any menu if we feel it does not meet the minimum requirements.

3.5.1 Main Menu

The main menu shall display the following options:

1. SMOG CHECK √√
1. REPAIR-ONLY SOFTWARE FUNCTION
3. MANUAL TESTING MODE
4. EIS CALIBRATION MENU
5. STATUS PAGE
6. NETWORK COMMUNICATIONS DIAGNOSTICS
7. PRETEST or TRAINING MODE
8. RECALL PREVIOUS VEHICLE TESTS
9. QA FUNCTIONS
10. STATION MANAGER MENU
11. RECALL BAR MESSAGE

A detailed description of each menu item follows.

3.6 SMOG CHECK √√

The EIS shall initiate, run and terminate the I/M inspection sequence in accordance with the BAR-97 EIS specifications.

3.6.1 **Technician License Number Entry**

The license number shall be obtained by scanning the technician's badge. It must match a license number stored internally in the EIS. The EIS shall not allow license numbers from wall-mounted licenses. The technician's badge contains a bar-coded license expiration date. Whenever a technician scans the badge, the EIS shall verify the license expiration from the expiration date stored in the Technician Information Table. If the license has expired, the EIS shall prohibit the technician from performing an inspection. (If the expiration date in the Technician Information Table is blank**,** the EIS shall capture the expiration date from the technician's badge and write it to the appropriate location in the Technician Information Table.)

DISPLAY PROMPT:

SCAN THE BAR CODE ON YOUR TECHNICIAN BADGE OR PRESS --- (function key) **FOR MANUAL ENTRY.**

<u>Programming Criteria</u>:

1) If the expiration date from the bar code differs from the expiration date within the EIS, then the date within the EIS takes precedence. If a technician whose license number has expired initiates an inspection, the EIS shall not allow the inspection and shall display the following message:

   DISPLAY PROMPT:

   THE TECHNICIAN LICENSE HAS EXPIRED. YOU CANNOT PERFORM AN INSPECTION OR REPAIR. CONTACT YOUR LOCAL BAR FIELD OFFICE.

2) The validity of a technician's license number and access code will be verified by the VID at the time of initial contact with the VID. If a technician scans a bar-coded technician license number that is not stored in the Technician Information Table, the EIS shall display the following message:

   DISPLAY PROMPT:

   THE TECHNICIAN LICENSE NUMBER IS NOT IN THE EIS. CONTACT YOUR LOCAL BAR FIELD OFFICE.

3) The VID shall install a lockout for licenses that have expired, been suspended or revoked. If the technician's license expiration date information doesn't reside on the EIS, the VID shall send this information to the EIS upon initial contact. If a technician that has an expired license, been suspended or revoked initiates an inspection, the EIS shall display the following message:

DISPLAY PROMPT:

TECHNICIAN LICENSE HAS BEEN EXPIRED, SUSPENDED OR REVOKED. YOU CANNOT PERFORM SMOG CHECK TESTS OR REPAIRS. CONTACT YOUR LOCAL BAR FIELD OFFICE.

4) In cases where the badge cannot be successfully scanned, the technician shall be given the option of manual entry via the following prompt:

DISPLAY PROMPT:

ENTER YOUR TECHNICIAN LICENSE NUMBER.

5) The bar code scanner shall be used whenever possible. To help ensure the accuracy of manual entry, the license number must be entered correctly twice (dual entry method). Both entries must match before proceeding with an inspection.

DISPLAY PROMPT:

BOTH ENTRIES ARE NOT THE SAME - TRY AGAIN.

6) After the technician's license number has been manually entered, the EIS shall display the following message:

DISPLAY PROMPT:

YOU USED MANUAL ENTRY. IF YOUR BAR CODE SCANNER IS NOT WORKING, PLEASE GET IT REPAIRED. IF YOU DO NOT HAVE A TECHNICIAN BADGE LICENSE, PLEASE CONTACT YOUR LOCAL BAR FIELD OFFICE. BAR WILL INVESTIGATE FREQUENT USE OF MANUAL ENTRY.

7) Technician license numbers shall be two alpha characters followed by six numeric characters. The following technicians are authorized to perform enhanced ASM inspections if they have an ASM update training certification and license

endorsement stored in the Technician Information Table. The initial two alpha characters are as follows (where nnnnnn represents the numeric portion):

EAnnnnnn	Advanced Emission Specialist
EOnnnnnn	Test-Only Technician

The EIS and VID shall also accept a license number that begins with a GU. This license number is only a placeholder for government fleet technicians. The government fleet technicians shall enter the number assigned to them by the BAR. Since bar code scanners are optional for government fleets, manual entry of GU license numbers must be allowed and the display prompt in Item 6) above should not be displayed. Government fleet technicians shall be allowed to perform tests only on government fleet vehicles. There will be no certificate issued to these vehicles. The format is as follows (where nnnnnn represents the technician's personal ID number):

GUnnnnnn	Government Unlimited Technician (Government fleet only)

If accepted by the VID and/or EIS, the technician license number shall be written to the *Test Technician License Number* field of the test record.

If an ASM test is required and the technician does not have an ASM endorsement, the EIS shall display the following prompt:

DISPLAY PROMPT:

TECHNICIAN IS NOT LICENSED TO PERFORM AN ASM INSPECTION. THE SMOG CHECK IS ABORTED.

8) Technician license numbers with the following two alpha characters shall not be allowed to perform enhanced inspections.

EBnnnnnn	Basic Area Technician
EInnnnnn	Intern Technician

9) A technician who is licensed to perform inspections only in the Basic Area shall not be allowed to perform tests on Enhanced Area vehicles. In this case, upon connecting to the VID, the VID shall determine, based on the technician's license number and endorsement status, whether or not a technician is licensed to inspect vehicles in an Enhanced Area. If a technician is not licensed to inspect vehicles in an Enhanced Area, the VID shall return the appropriate response to the EIS. The EIS shall display the following message:

DISPLAY PROMPT:

TECHNICIAN IS NOT LICENSED TO PERFORM AN INSPECTION ON AN "ENHANCED AREA VEHICLE" AND THE SMOG CHECK IS ABORTED.

10) The VID shall transmit technician license numbers, expiration dates and endorsements to the EIS. The EIS, upon receiving this information from the VID, shall read and store this information in the appropriate locations within the Technician Information Table. Print the technician's name and license number on the VIR.

11) In the case of bar code entry, the EIS shall store a B (bar code scanner) in the *Technician License Input Source* field of the test record; otherwise an M shall be stored to indicate manual entry. This field must be populated for every valid test record sent to the VID.

12) The EIS shall block intern technicians from performing Smog checks, and pretests. Intern technicians shall be allowed to enter repair data in the repair only software menu.

3.6.2 **Technician Access Code Entry**

After entry of the technician's license number, the EIS shall require manual entry of the technician's access code.

DISPLAY PROMPT:

ENTER YOUR TECHNICIAN ACCESS CODE.

<u>Programming Criteria</u>:

1. Do not display actual entries on the screen, instead use X's.

2. The access code must match the code stored internally in the Technician Information Table. The EIS shall allow three attempts to enter a valid access code. Following each of the first two attempts, the following message shall be displayed.

   DISPLAY PROMPT:

   YOUR ACCESS CODE IS NOT VALID - TRY AGAIN.

3. After the third unsuccessful attempt, the EIS shall display the following message:

DISPLAY PROMPT:

THE ACCESS CODE ENTERED IS NOT VALID. CONTACT THE LOCAL BAR FIELD OFFICE. THE TEST IS ABORTED DUE TO ACCESS CODE FAILURE.

3.6.3 **Vehicle Identification Number (VIN) and License Plate Number Entry**
The VIN and vehicle license plate number entry shall follow immediately after successfully entering technician access code (i.e., prior to any other data entry). The following display prompts can be displayed on one screen with the ability to scroll through the list and select the appropriate option.

DISPLAY PROMPT:

SCAN THE BAR CODE ON THE DMV REGISTRATION DOCUMENT. PRESS (function key) **IF NOT AVAILABLE.**

a) If the technician scans the DMV bar-coded VIN and license plate (scanned entries cannot be edited), the EIS shall proceed to §3.6.3 g).

b) If the (function key) is pressed, the EIS shall prompt the technician:

DISPLAY PROMPT:

SCAN THE BAR CODE ON THE VEHICLE FOR THE VIN. IF THE BAR CODE IS NOT AVAILABLE, ENTER THE VIN MANUALLY.

IF THE VIN EXCEEDS 17 CHARACTERS ENTER THE LAST 17 CHARACTERS ONLY.

If manual entry is used, the VIN must be entered using dual manual entry to ensure accuracy. Both VIN entries must match before moving on to the license plate entry. The EIS shall automatically convert letter "I" to number "1" and letter "O" to number "0" as entered by the technician.

DISPLAY PROMPT:

BOTH ENTRIES ARE NOT THE SAME - - TRY AGAIN.

INVALID CHARACTER ENTERED - - TRY AGAIN.

If fewer than three characters are entered, the EIS shall display the following message:

DISPLAY PROMPT:

AT LEAST THREE CHARACTERS MUST BE ENTERED - - TRY AGAIN.

c) After manual entry of the VIN, the EIS shall prompt the technician to manually enter (dual manual entry) the license plate number:

DISPLAY PROMPT:

ENTER THE LICENSE PLATE NUMBER MANUALLY. DO NOT ENTER SYMBOLS OR SHAPES (I.E., DIAMONDS, HEXAGONS, ETC.)

d) If fewer than two (2) characters are entered, the EIS shall display the following message:

DISPLAY PROMPT:

AT LEAST TWO CHARACTERS MUST BE ENTERED - - TRY AGAIN.
The license plate number must be entered using dual manual entry to ensure accuracy. Both entries must match before proceeding to the next screen. If both entries are not the same, the EIS shall display the following message:

DISPLAY PROMPT:

BOTH ENTRIES ARE NOT THE SAME - - TRY AGAIN.

e) If the vehicle has no license plate, the EIS shall allow the technician to enter NONE. The EIS shall store N in the *License Plate Number* field and print NONE on the VIR. If a repair record exists for this vehicle, the license number shall also be stored in the *License Plate Number* field of the repair record. In addition the EIS shall store XX (unknown) in the *License Plate Issuing State* field of the test record.

DISPLAY PROMPT:

IF THE VEHICLE HAS NO LICENSE PLATE, ENTER "NONE" FOR THE LICENSE PLATE NUMBER.

<u>Programming Criteria</u>:

1. The bar code scanner shall be used whenever possible. To help ensure the accuracy of manual entry, the VIN and/or license plate number must be entered using dual manual entry.

2. If fewer than 17 characters are entered, the EIS shall display the following message:

   DISPLAY PROMPT:

   THE VIN ENTERED HAS FEWER THAN 17 CHARACTERS. VERIFY THAT THE VIN ENTERED MATCHES THE VEHICLE'S ACTUAL VIN.

3. The license plate number shall not contain special characters; valid characters are 0-9 and A-Z and shall be limited to 7 characters.

4. The data shall be written to the *VIN* and *License Plate Number* fields of the test record. If a repair record exists for this vehicle, the data shall also be written to the *VIN* and *License Plate Number* fields of the repair record. Print the VIN and license plate number on the VIR.

5. The VIN and license plate number entries are mandatory for every test record. If there is no entry, the EIS shall display the following message:

   DISPLAY PROMPT:

   NO VALUE HAS BEEN ENTERED - - TRY AGAIN.

6. The DMV bar-coded registration document (provided by the motorist) contains a bar code using either code 39 or 128 symbologies. The bar-code scanner must be able to automatically discriminate between the symbologies to ensure that the current information shall be automatically read.

   The bar code format for the DMV registration document is defined in Appendix C-5.

f) The EIS shall automatically store the source of entry for both VIN and license plate number in the test record as follows:

   1. For VIN Input Source field:

D = Bar code on DMV registration document
V = Bar code on vehicle
M = Manual entry

This field must be populated in the test record for every valid test record sent to the VID. The EIS shall write the input source in the *VIN Input Source* field of the test record.

2. For License Plate Input Source field:

D = Bar code on DMV registration document
M = Manual entry

This field must be populated for every valid test record sent to the VID. The EIS shall write the input source in the *License Plate Input Source* field of the test record.

g) The EIS shall prompt the technician for the vehicle issuing state license plate:

DISPLAY PROMPT:

SELECT THE LICENSE PLATE ISSUING STATE.
Programming Criteria:

1. The EIS shall display a list containing the names and abbreviations of the 50 states, District of Columbia, Puerto Rico, Guam, American Samoa, Mexico, Canada, Armed Forces Plate and various locations. (A complete listing of acceptable abbreviations for the issuing state is in the Confidential Appendix C-2.)

2. The cursor shall default to California. However, under no circumstances shall the "California" selection be entered into the test record automatically, it must be confirmed by the technician.

3. The technician shall be allowed (by scrolling through the list) to select the one that applies for the vehicle under test. The EIS shall display the following message:

DISPLAY PROMPT:

SELECT AND ENTER THE "ISSUING STATE" OF THE LICENSE PLATE.

4. If the vehicle issuing state is unknown, the EIS shall display the following message (on the same screen as the above prompt):

   DISPLAY PROMPT:

   IF THE ISSUING STATE IS UNKNOWN, SELECT "XX" FOR UNKNOWN FROM THE LIST OF ISSUING STATES.

   Upon selecting XX, the EIS shall display the following message:

   DISPLAY PROMPT:

   YOU HAVE SELECTED XX (UNKNOWN). IS THIS CORRECT? (YES/NO)

   If Y is selected, continue the inspection. If N is selected, display the issuing state list and message:

   DISPLAY PROMPT:

   SELECT AND ENTER THE "ISSUING STATE" OF THE LICENSE PLATE.

5. The EIS shall write the issuing state abbreviation in the *License Plate "Issuing State"* field of the test record. The issuing state field must be populated for every valid test record sent to the VID. The EIS shall print the full name of the issuing state on the VIR. If there is no license plate or the issuing state is unknown, then "Unknown" shall be entered on the VIR in place of the issuing state.

3.6.4 Network Communications

(This information is confidential and may only be released with prior written consent from the BAR Engineering Section.)

3.6.5 EIS Initiated Actions

After connecting to the VID, the EIS shall transmit the following data:

- Technician information
- VIN, license plate number, and issuing state
- Test records, if applicable
- Repair records, if applicable
- Calibration records, if applicable
- Certificate purchase request, if applicable

- QA/State inspection records, if applicable
- Request current lockout status
- Inspection cost survey data, if applicable
- VLT version date and number of records

a) **Transmit VIN/License Plate**
After the VIN, vehicle license plate number and issuing state has been entered, the EIS shall display the following message:

DISPLAY PROMPT:

SEARCHING FOR VEHICLE INFORMATION, PLEASE WAIT.

Programming Criteria:

1. If a vehicle match is found, the VID shall transmit to the EIS applicable information for the vehicle under test, in addition to any other pending transactions.

2. Once a match has been made and the vehicle data or previously failed test data has been transferred from the VID to the EIS unit, the EIS shall not allow changes or corrections to either the VIN or license plate number or issuing state. If changes or corrections must be made to VIN, license and/or issuing state, the test shall be aborted.

3. If NO MATCH is found on the first attempt (note: attempts are counted by the EIS unit) for a California-licensed (non-government fleet vehicle or non-government "G" station) vehicle, then the EIS shall prompt the technician as follows:

   DISPLAY PROMPT:

   NO VEHICLE MATCH HAS BEEN FOUND. VERIFY THAT THE VIN AND LICENSE PLATE HAVE BEEN ENTERED CORRECTLY. RE-ENTER THE VIN AND LICENSE PLATE AND PRESS --------- (function key) **TO PROCEED.**

4. The EIS shall allow the technician to completely re-scan or re-enter the VIN and/or vehicle license plate number. The EIS shall prompt the technician to press a function key to initiate a second call to the VID.

5. If no changes to the VIN or vehicle license plate number are required, the EIS shall prompt the technician to press a function key to initiate a second

call to the VID. However, if the station is a government "G" station, the EIS shall continue WITHOUT making a second begin-test call to the VID.

6. If NO MATCH is found on the second attempt for a California-licensed vehicle, or on the first attempt for a vehicle with an out-of-state license plate number, then the EIS shall proceed with the inspection by prompting the technician to enter required information manually (see Item # 8). For a California-licensed vehicle, the EIS must be able to differentiate between the first and the second NO MATCH message. (A Government Fleet Station is not required to make a second call for a no match condition.)

7. The EIS shall display a message alerting the technicians of their responsibility to advise the consumer that NO MATCH was found with the DMV record or test was performed off-line and that the consumer should retain the VIR for reference during the registration process. This message shall also be printed on the VIR.

   DISPLAY PROMPT:

   NO MATCH HAS BEEN FOUND OR TEST HAS BEEN PERFORMED OFF-LINE. THE CONSUMER IS RESPONSIBLE FOR RETAINING THE VIR FOR REFERENCE THROUGHOUT THE VEHICLE REGISTRATION PROCESS.

8. If a NO MATCH message occurs, the EIS shall enable the technician to enter the test vehicle's description (year, make, model, engine size, etc.) according to §3.6.7.

b) **Transmit Test and/or Repair Records**
All records (inspection, hands-on, training, aborted) that the EIS has created in accordance with the test and/or repair record shall be transmitted to the VID.

DISPLAY PROMPT:

TRANSMITTING DATA, PLEASE WAIT.

<u>Programming Criteria</u>:

1. The first record transmitted will be the oldest. After successful transmission, each record shall be moved (see Appendix C-2). The EIS shall retain a minimum of one thousand (1,000) of the most recent records by overwriting the oldest record.

2. If successful communications cannot be achieved (the EIS has not communicated with the VID), then the EIS shall display the following message.

   DISPLAY PROMPT:

   CANNOT ACCESS NETWORK. PROCEED WITH THE INSPECTION.

c) **Transmit Calibration Records**
All calibration records that the EIS has created pursuant to Calibration Test Data shall be transmitted to the VID.

DISPLAY PROMPT:

TRANSMITTING DATA, PLEASE WAIT.

Programming Criteria:

1. The EIS shall transmit all calibration records to the VID. The first record transmitted will be the oldest. After successful transmission, the EIS shall delete all of the calibration records from the calibration data file and each record shall append the historical calibration data file. The EIS shall retain a minimum of one hundred (100) of the most recent records by overwriting the oldest record.

d) **Transmit Certificate Numbers Purchase Request**
The EIS shall transmit certificate numbers purchase requests to the VID. The EIS shall allow the Station Manager or Owner through the Station Manager Menu to place a certificate numbers purchase order and transmit it to the VID.

3.6.6 **Network Responses**
As the low level communication interface protocol makes contact with the VID and establishes a session, the VID will respond with stored transactions and messages (appropriate response bits) which are waiting for transmission to the EIS. These messages are:
- SYSTEM DATE/TIME UPDATE
- LOCKOUT STATUS
- TECHNICIAN(S) TO BE ADDED/CHANGED/DELETED
- PURCHASED SMOG CERTIFICATE NUMBERS
- BAR MESSAGES
- COMMUNICATIONS TRANSACTIONS

- VEHICLE DATA
- PREVIOUS FAILED TEST DATA
- PREVIOUS REPAIR INFORMATION
- VLT ROW ID NUMBER
- VLT UPDATE
- EMISSIONS-RELATED RECALL INFORMATION
- EMISSIONS-RELATED RECALL BLOCK (DMV)
- EMISSIONS-RELATED TSB INFORMATION
- EMISSIONS STANDARDS CATEGORY (ESC) TABLES (1,3 and 4) UPDATE
- PREVIOUS ODOMETER READING
- INSPECTION REASON
- REQUIRED TEST TYPE
- VEHICLE SPECIFIC VLT (VSVLT)
- CONFIGURATION UPDATE
- MESSAGE UPDATE
- ADVISE UPDATE
- EXTENDED PARAMETERS UPDATE

The automatic transaction and message updates will occur on every session initiated by the EIS except during communications diagnostic transactions. The communications interface will provide the EIS application with the appropriate status information to determine which transactions have occurred following VID session initiation.

a) **Receive SYSTEM DATE/TIME UPDATE**

The communication software shall reset the current EIS date/time settings each time contact is made with the VID (except during network diagnostics or loopback). The VID shall pass, via the communication software, the current date/time settings to the EIS. Upon receiving the date and time settings, the date and time received shall serve as the date stamp (date of test) and time stamp (test start time) for the inspection in progress. The EIS shall use the received date and time settings to update the EIS clock. (If the EIS uses other clocks, the EIS shall be required to update the appropriate system clock.) The inspection start date and time stamp for an inspection shall be set in the test record following the receipt of the System Date/Time Update by the EIS just after the initial VID contact. If communication attempts fail for the initial VID contact, the date and time stamp shall be set using the EIS clock.

The date of the test, test start-time and test-end time shall be recorded in the test record in the following fields, as appropriate: *Date of Test*, *Test Start Time* and *Test End Time*. Each of these fields must be populated in the test record for every valid test record. Print the date of the test and test end time on the VIR.

b) **Receive LOCKOUT/TAMPER STATUS**

The status (on/off) of the lockouts and/or tampers shall be transmitted by the VID to the EIS. If a lockout(s)/tamper(s) is set, then subsequent inspections shall be prohibited until the applicable lockout(s)/tamper(s) has been cleared. The VID shall return the state of the following lockout/tamper conditions to the EIS:

- QA/State EIS Lockout
- Cabinet Tampering (see Note 1)
- State Disk Drive (see Note 1)
- Station License Expired
- Station License Suspended
- Station License Revoked
- Failure to Pay for Certificate Numbers Purchased
- Failure to Pay for Communication Services
- Certificate Sequencing Error
- Calibration Gas Cylinder Violation
- No communication with VID in XXX days and XXX tests
- Clock lockout
- VLT Corrupt (self-correcting - cleared upon VID verification of VLT data replacement)
- Excessive Number of Aborts
- Dynamometer scale failure

Note:

A tamper is set by the EIS and sent to the VID upon the next communication to the VID. Once the tamper condition has been received by the VID, it can only be cleared via the VID.

If a lockout/tamper has been set, the EIS shall display one or more of the messages shown below:

DISPLAY PROMPT:

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A QA/STATE INSTALLED LOCKOUT BEING SET. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A CABINET TAMPER. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A STATE DISK DRIVE TAMPER. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED SINCE STATION LICENSE HAS EXPIRED. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED SINCE STATION LICENSE HAS BEEN REVOKED. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED SINCE STATION LICENSE HAS BEEN SUSPENDED. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A FAILURE TO PAY FOR CERTIFICATE NUMBERS PURCHASED. CONTACT BAR ACCOUNTING OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A FAILURE TO PAY FOR COMMUNICATION SERVICES. CONTACT MCI HELP DESK FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A CERTIFICATE OUT OF SEQUENCE ERROR. CONTACT MCI HELP DESK FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A CALIBRATION GAS CYLINDER LOCKOUT. CONTACT LOCAL BAR FIELD OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A LOCKOUT FOR TOO MANY SMOG INSPECTIONS WITHOUT VID CONTACT. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE VLT DATABASE IS CORRUPT. CALL FOR SERVICE.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A CLOCK FAILURE. CALL FOR SERVICE.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO EXCESSIVE NUMBER OF ABORTS. CONTACT LOCAL BAR OFFICE FOR FURTHER INSTRUCTIONS.

THE SMOG CHECK CANNOT BE PERFORMED DUE TO A DYNAMOMETER SCALE FAILURE. CALL FOR SERVICE.

c) **Receive TECHNICIAN(S) TO BE ADDED/CHANGED/DELETED**
The EIS shall receive the entire Technician Information File for the station (not individual technician file) from the VID. Technician(s) to be added, changed, or deleted shall be transmitted by the VID to the Technician Information File on the EIS. If the technician already exists (as determined by technician license number), the data received for said technician shall serve as an update. The EIS shall not allow changes to the Technician Information File from the EIS. Technician information can only be changed from the VID. Upon receiving the technician information from the VID, the EIS shall not be required to validate the technician information received from the VID.

Upon receiving technician data from the VID (during initial contact), if the technician's license number that is performing the inspection has been suspended, revoked or expired, the EIS shall allow the technician to complete the inspection in progress and then display the following message:

DISPLAY PROMPT:

THE TECHNICIAN LICENSE NUMBER AND ACCESS CODE HAVE BEEN UPDATED BY THE VID. PLEASE CHECK AND IF THERE ARE PROBLEMS, CONTACT YOUR LOCAL BAR FIELD OFFICE.

The EIS shall prohibit the technician from starting another test. The EIS shall display the updated list of technician license numbers and shall provide an option to print the list, if desired. During screen display or printing of the technician information, the EIS shall not display the actual technician access codes (hidden) so that they cannot be viewed by an unauthorized person(s).

d) **Receive PURCHASED SMOG CERTIFICATE NUMBERS**
Certificate numbers, if applicable, shall be transmitted during initial or end-of-test contacts or data refresh. The numbers shall be received in multiples of 50 (50 per lot) and shall be stored in the certificate inventory until needed. The limit of certificate lots that can be purchased (for a single transaction) via the EIS-initiated purchase in the station manager's menu is one (i.e., 50 certificates). Upon receiving the certificate numbers from the VID, the EIS shall not be required to validate the certificate numbers received from the VID.

The EIS shall display a CERTIFICATES RECEIVED message and shall print a receipt per the example shown below:

ELECTRONIC CERTIFICATE NUMBER PURCHASE RECEIPT

Date: MM/DD/YYYY Time: HH:MM
Station: Station License #
EIS ID: EIS #

Certificate numbers have been issued to this station via electronic transfer. If purchase has not been pre-paid, usage of these certificate numbers will be revoked immediately if payment is not received.

Range of Cert #	Total Cert #.	Cost/Cert.	Total Cost
AA000001-AA000050	50*	$8.25*	$412.50

Note: List each range of fifty certificates. (*These values are provided as an example. Actual values are variable and subject to change.)

e) **Receive BAR MESSAGES**
BAR messages shall be transmitted by the VID to the EIS during all communication sessions except during the network diagnostic routine. BAR messages will be in text file format. All new messages shall automatically display once immediately after the technician selects Smog Check√√ from the main menu. The messages shall default to print and the technician must press a function key to continue. The EIS shall save the most recent 100 messages and provide an option for later recall and print. If the message(s) is not displayed due to power interrupt, aborted test, printer jam, etc., the message(s) shall be displayed the next time the technician selects Smog Check √√ from the main menu. It is the responsibility of the EIS unit to verify that all BAR messages received are displayed AND given the option to print.

Prior to displaying a BAR message(s), the EIS shall display the following prompt:

DISPLAY PROMPT:

BAR MESSAGES HAVE BEEN RECEIVED. BAR RECOMMENDS THAT THE MESSAGE BE PRINTED FOR FUTURE REFERENCE.

f) **Receive COMMUNICATIONS TRANSACTION**
The communications data stream, as received from the VID, shall contain the command response status such as NO MATCH, PREVIOUS FAILED TEST RESULTS, REFEREE/TEST-ONLY CENTER (restriction), GROSS POLLUTER, ENHANCED AREA INSPECTION, etc. Data that may be received by the EIS, in addition to the aforementioned, is defined in subsequent sections.

1. If, as a result of the VID response, the vehicle is identified as having a PREVIOUS FAILED TEST RESULT, the EIS shall alert the technician of the failed test results (see subsection (h) for display prompts).

2. If, as a result of the VID response, the vehicle is identified as requiring inspection at a REFEREE/TEST-ONLY CENTER (response bit 53), the EIS shall display the following message:

   DISPLAY PROMPT:

   PLEASE REFER THIS VEHICLE TO A "REFEREE/TEST-ONLY CENTER." THE SMOG CHECK WILL BE ABORTED.

2. If, as a result of the VID response, the vehicle is identified as, requiring inspection at a REFEREE/TEST-ONLY CENTER (response bit 71), the EIS shall display the following message:

   THE SMOG CHECK MAY CONTINUE, BUT NO CERTIFICATE WILL BE ISSUED. A CERTIFICATE CAN ONLY BE ISSUED AT A REFEREE/TEST-ONLY CENTER.

3. If, as a result of the VID response, the vehicle is identified as a GROSS POLLUTER, the EIS shall display the following message:

   DISPLAY PROMPT:

   THE VEHICLE UNDER TEST HAS BEEN IDENTIFIED AS A GROSS POLLUTER.

   THE SMOG CHECK MAY CONTINUE, BUT NO CERTIFICATE WILL BE ISSUED. A CERTIFICATE CAN ONLY BE ISSUED AT A "REFEREE/TEST-ONLY CENTER."

5. If, as a result of the VID response, the vehicle is identified as having been issued a previous waiver, the EIS shall display the following message:

   DISPLAY PROMPT:

   THIS VEHICLE HAS A PREVIOUS WAIVER ON RECORD. THE VEHICLE IS NOT ELIGIBLE FOR ANOTHER WAIVER. COST LIMITS DO NOT APPLY.

6. If, as a result of the VID response, the vehicle is identified as having been issued a previous hardship extension, the inspection can be performed but a certificate will not be issued and the EIS shall display the following message:

   DISPLAY PROMPT:

   THIS VEHICLE HAS A PREVIOUS HARDSHIP EXTENSION ON RECORD. THE VEHICLE IS NOT ELIGIBLE FOR ANOTHER HARDSHIP EXTENSION. COST LIMITS DO NOT APPLY.

   THE SMOG CHECK MAY CONTINUE, BUT NO CERTIFICATE WILL BE ISSUED. A CERTIFICATE CAN ONLY BE ISSUED AT A "REFEREE/TEST-ONLY CENTER."

7. If response bit 72 is received, display the text named 72_NOCRT in MESSAGE .DAT and continue on with the test. When response bit 72 is received, the EIS shall not issue a certificate if the vehicle passes the Smog Check.

8. If response bit 73 is received, display the text named 73_NOCRT in MESSAGE .DAT and continue on with the test. When response bit 73 is received, the EIS shall not issue a certificate if the vehicle passes the Smog Check.

9. If response bit 74 is received, display the text named 74_NOCRT in MESSAGE .DAT and continue on with the test. When response bit 74 is received, the EIS shall not issue a certificate if the vehicle passes the Smog Check.

10. If response bit 75 is received, display the text named 75_INFOR in MESSAGE .DAT and continue on with the test. Response bit 75 is for information only, do not block certificate issuance for passing vehicles, or automatically abort the Smog Check.

11. If response bit 76 is received, display the text named 76_INFOR in MESSAGE .DAT and continue on with the test. Response bit 76 is for information only, do not block certificate issuance for passing vehicles, or automatically abort the Smog Check.

12. If response bit 77 is received, display the text named 77_INFOR in MESSAGE .DAT and continue on with the test. Response bit 77 is for

information only, do not block certificate issuance for passing vehicles, or automatically abort the Smog Check.

13. If a vehicle has been identified as having either a Gross Polluter, Previous Hardship extension, Referee/Test Only Center inspection, or response bit(s) 72-77 was received, the EIS shall save the information (VIN and restriction type as a minimum) to a file in the EIS before displaying the test restriction information to the technician. This file will contain the 50 most recent records. Prior to continuing with either an off-line or no-match inspection, the EIS shall search this file for a match. The match criteria are based on a match with the VIN. If a match is found, the EIS shall display the appropriate message (per section 3.6.7.a) and a certificate shall not be issued (except for response bits 75-77 which shall not block certificate issuance). In addition, the EIS will still need to search for matches in prior test records for any test restrictions.

g) **Receive VEHICLE DATA**

The following vehicle data in the proper test record format, if available, shall be sent from the VID to the EIS. The EIS shall allow this data set to be verified (if applicable) and confirmed/changed by the technician on a vehicle data review screen (items with an asterisk cannot be changed by the technician. If the "Edit bit" is set, items with a (+) cannot be changed.

- + Model year
- + Vehicle type
- Government fleet BAR file number (if applicable)
- PFR fleet BAR file number (if applicable)
- + GVWR (if applicable)
- + Vehicle make
- + Vehicle model name
- + Number of cylinders
- + Engine size (in liters)
- + Transmission type
- + Certification type
- Referee label number (if applicable)
- * Registration due date (See Note 1)
- Emissions inspection type
- + Fuel type
- + Body Type (if applicable)
- + Engine make (if applicable)
- + Engine year (if applicable)
- + VLT Row ID Number
- * Previous odometer reading (See Note 1)

- * Previous failed test results (if applicable)
- * Date of failed test (if applicable)
- * "Gross Polluter" status (if applicable)
- * "Referee/Test-Only Center" (if applicable)
-* Previous waiver (if applicable)
- * Previous hardship extension (if applicable)
- * Response bit 71-77

GENERAL NOTE: The following vehicle data shall be entered during each Smog Check by the technician, as applicable:

- Current Odometer Reading
- Exhaust Configuration

Note 1. Do not display.
Asterisk (*) can never be modified by technician.

h) **Receive PREVIOUS FAILED TEST DATA**
Failed vehicle test results from the previous Smog Check inspection (in accordance with the test record) within the past 91 days, shall be sent from the VID to the EIS and shall be displayed to the technician. The EIS shall display the following test result information relative to a vehicle that has failed a previous Smog Check inspection on the screen, and shall provide an option to print.

- Date of Previous Test	mmddyyyy
- Failed Visual Inspection	Yes/No
- Failed Tailpipe Emissions	Yes/No
- Failed Functional Checks	Yes/No

i) **Receive VLT ROW ID NUMBER**
A VLT Row ID Number for the vehicle under test shall be sent from the VID to the EIS for use during the inspection. The VLT Row ID number is stored in the *VLT Row ID Number* field of the test record and shall be printed on the VIR. If there is no previous test record, the EIS shall search the EIS resident VLT in accordance with §3.6.7 h).

j) **Receive EMISSIONS-RELATED RECALL INFORMATION**
Emissions related recall information, if available from the vehicle manufacturers, shall be sent to the EIS from the VID for use during the inspection. The EIS shall display, and provide the option to print, emission-related recall information in the following format:

Example:

**** EMISSION-RELATED RECALL INFORMATION****

Model Year:	*1982*	*Engine Family:*	*FAD1.6V6FBC2*
Make:	*AUDI*	*Recall Initiated:*	*06/01/90*
Engine Size:	*1.6L*	*Recall #:*	*GL*
Model:	*4000*	*Source:*	*MFR/CARB*
Class:	*PC*		

Affected Vehicles:
ALL

Defects:
AIR/FUEL CHECKING PROCEDURES ON EMISSION LABEL ARE NOT CONSISTENT WITH INSTRUCTIONS IN THE REPAIR MANUAL.

Fix:
REPLACE LABEL. NEW LABEL SHOULD BE WHITE WITH BLACK LETTERS AND SHOULD NOT HAVE AIR/FUEL MIXTURE CHECKING PROCEDURE.

The EIS shall provide the option to scroll through multiple recall notices allowing the technician the option of printing either all of the recall notices or an individual recall by depressing no more than two keys.

The EIS shall also display a prompt to the technician as follows:

DISPLAY PROMPT:

EMISSIONS-RELATED RECALL INFORMATION SHOULD ONLY BE USED, IF APPLICABLE, ON VEHICLES THAT FAIL THE SMOG CHECK INSPECTION AND ARE NOT REQUIRED TO BE PERFORMED IN ORDER TO ISSUE A SMOG CHECK CERTIFICATE.

k) **Receive EMISSIONS-RELATED RECALL BLOCK (Provided by DMV)**
If information from the VID indicates that a DMV emissions-related recall BLOCK exists on the vehicle test record (i.e. *Manufacturer Recall ID (DMV)* and *Manufacturer Date of Recall (DMV)* fields are populated), the VID shall transmit the manufacturer's recall ID and the date of recall to the EIS. The technician shall check for evidence that the recall has been performed and shall enter recall compliance information into the EIS. After display of the Emissions-Related Recall Information and TSB Information (if any), the EIS shall display the following message:

DISPLAY PROMPT:

HAS THE VEHICLE COMPLIED WITH RECALL REQUIREMENTS?

If YES, the EIS shall prompt the technician to enter the following information into the EIS (if available) from the Recall Compliance Certificate or Emissions-Recall Underhood Identification Label:

DISPLAY PROMPT:

ENTER RECALL COMPLIANCE CERTIFICATE NUMBER:

ENTER ISSUE DATE OF RECALL COMPLIANCE CERTIFICATE (MMDDYYYY):

If YES and the required information is not available, the EIS shall allow the technician to press a function key to bypass this screen.

Programming Criteria:

1. Manufacturer's recall ID and recall compliance certificate number must be 1 to 8 alphanumeric characters.

2. The issue date of the recall compliance certificate number must be a valid date.

3. If available, the recall compliance certificate number and the issue date of the recall compliance certificate shall be stored in the *Recall Compliance Certificate Number* and *Issue Date of Recall Compliance Certificate* fields of the repair record. The repair record shall also be populated in the *Manufacturer Recall ID (DMV)* and *Manufacturer Date of Recall (DMV)* fields.

4. If no, then the EIS shall print the following message, including the manufacturer's recall ID, on the VIR:

   DMV HAS PLACED AN EMISSIONS-RELATED BLOCK ON YOUR VEHICLE REGISTRATION. THE EMISSIONS-RELATED RECALL NUMBER (MFR'S RECALL ID) IS XXXXXXXX. PLEASE CONTACT YOUR DEALERSHIP TO COMPLY WITH THE EMISSIONS RECALL REQUIREMENT(S).

   Note: This is not part of the Smog Check pass/fail determination.

l) **Receive EMISSIONS-RELATED TSB INFORMATION**
Emissions-related Technical Service Bulletin (TSB) information, if available, shall be sent from the VID to the EIS for use during an inspection. The TSB Information may contain multiple bulletins. The TSBs are provided as information to assist the technician during the inspection process and will also assist the technician if the vehicle subsequently fails the inspection.

Programming Criteria:

1. The TSB information shall be displayed as follows:

   i. immediately following the display of Emissions-Related Recall Information (if applicable) or after the initial contact with the VID (if the recall information is not applicable), and
   ii. prior to printing the VIR, if the vehicle subsequently fails the inspection.

2. If a match is confirmed by the VID, and a TSB is on record, the display prompt and TSB information shall be displayed as follows:
   DISPLAY PROMPT:

   TSB INFORMATION SHOULD ONLY BE USED, IF APPLICABLE, ON VEHICLES THAT FAIL THE SMOG CHECK INSPECTION AND ARE NOT REQUIRED TO BE PERFORMED IN ORDER TO ISSUE A SMOG CHECK CERTIFICATE.

   Example: *** *EMISSION-RELATED TSB INFORMATION* ***

TSB #: 81-4 *Make: AM*
Reference: Motor TSB Manual *Model(s): Concord*
Edition: 1981-83 Domestic *Model Year (range): 1981*
Page #: 23

Affected Vehicles:
ALL 1981 49-STATE HIGH ALTITUDE AMC CONCORDS WITH FOUR-CYLINDER ENGINE AND M/T.

Defects:
EGR VALVE CHANGED TO IMPROVE PERFORMANCE.

Fix:
INSTALL APPROPRIATE EGR VALVE AND FORWARD DELAY VALVE.

3. The EIS shall provide the option to scroll through multiple TSBs allowing the technician the option of printing either all of the TSBs or an individual TSB by depressing no more than two keys.

m) **Receive EMISSIONS STANDARDS CATEGORY (ESC) TABLES**
The EIS shall receive ESC Table updates with version numbers from the VID. The EIS shall receive the entire ESC Tables (not individual categories) if applicable, from the VID. Refer to §3.3.10 .

n) **Receive INSPECTION REASON**
The inspection reason will be based on a vehicle's test date and registration due date. The VID will compare the two dates and, based on the difference of days, assign the appropriate inspection reason. The registration due date will be sent down from the VID and shall be recorded in the *Registration Due Date* field of the test record.

Programming Criteria:

1. Inspection reason shall be recorded in the *Inspection Reason* field to the test record and printed on the VIR. The valid entries are listed below:

   B = Biennial: If the difference is ± 60 days or less.
   C = Change of Ownership: If the difference is more than ± 60 days.
   I = Initial Registration (Out of State): If the vehicle's license plate issuing state is other than California or unknown.
   H = Hands-on Test: For use by QA, inspectors or BAR representatives. (The visual and functional inspection will be performed the same as a change of ownership "C").
   E = Training Mode Test: For use in Training mode inspections. (The visual and functional inspection will be performed the same as a change of ownership "C").

   Q = Pretest: For use in pre-screening vehicles for gross polluter status without officially labeling the vehicle as a gross polluter. (The visual and functional inspection will be performed the same as a change of ownership "C.")

   Note: The inspection reasons listed in Table F (A-Z, and 0-9) will come from the VID and receive the same visual and functional inspection as a change of ownership "C", except reason "G", and "I" which will receive an initial inspection "I", and inspection reason "B" which will receive a biennial inspection.

Note: Inspection reasons Z, and 0 - 9 are for future use.

2. If the inspection reason is B (Biennial), the technician shall be prompted as follows:

   DISPLAY PROMPT:

   WILL THE CERTIFICATE BE USED FOR DMV CHANGE-OF-OWNERSHIP TRANSACTION? (YES/NO)

   If NO, proceed with the smog check.

   If YES, the EIS shall automatically change the inspection reason to C (change of ownership) and proceed with a change-of-ownership inspection.

3. The EIS shall automatically record the inspection reason as C (and follow inspection procedures for change of ownership inspections) for tests when there is no communication with the VID or no match.

4. If the vehicle has non-California issuing state license plate, the inspection reason shall be "I"; follow the change-of-ownership "C" inspection procedures (except "I" will also require fillpipe restrictor functional test).

5. If the inspection reason is H (hands-on test), follow special inspection procedures identified in §3.14.8 (Hands-on Test).

6. If the inspection reason is T (Training Mode) follow the special inspection procedures identified in §3.2.10 (Training Mode).

o) **Receive REQUIRED TEST TYPE**
The VID shall make the test type determination for all vehicles tested on-line when a MATCH is found. The required test type will be sent down from the VID in the test record (see Confidential Appendix C-2). For vehicles with an appropriate ESC category in TABLE4, the default inspection shall be an ASM test when there is no contact with the VID or when NO MATCH is found. However, all vehicles without an appropriate ESC category in TABLE4 shall receive a TSI inspection (with or without VID contact or a match).

p) **Receive PREVIOUS ODOMETER READING**
The odometer reading for a vehicle's previous inspection will be sent to the EIS from the VID in the proper test record format (see Confidential Appendix C-2)

and shall follow the display prompt routine and programming criteria set forth in §3.6.7.n). The previous odometer reading shall not be displayed.

3.6.7 **Vehicle Specific Data Entry/Verification**

Vehicle specific data entry or verification is required for items listed below. For all inspections, the following vehicle specific data entry is required: odometer, exhaust configuration. Manual entry of all other vehicle specific data is required when the data is not received from the VID or the VLT.

- Vehicle Model Year
- Vehicle Type
- Vehicle Make
- Vehicle Model Name
- Body Type
- Gross Vehicle Weight Rating (GVWR)
- Certification Type
- Vehicle Specific Data for VLT
- Number of Cylinders
- Vehicle Engine Size
- Transmission Type
- Vehicle Odometer Reading
- Vehicle Fuel Type Code
- Dual Exhaust

a) ***Off-line Testing: Special Features***

If there is no VID communication, the EIS shall query the test record files stored in the EIS, and the special test restriction file specified in §3.6.6.f.13. If there is a vehicle match, the EIS shall look for any test limitations placed on the vehicle. If the vehicle is required to be tested at a Referee/Test-only center (i.e., identified as a gross polluter, previous hardship extension issued, or requires a Referee/Test-only inspection), no certificate will be issued even if the vehicle passes the inspection.

If there is no vehicle match within the EIS, or the vehicle is not required to be tested at a Referee/Test-only center (i.e., identified as a gross polluter, previous hardship extension issued, or requires a Referee/Test-only inspection), the EIS shall prompt the technician as follows:

DISPLAY PROMPT:

THERE IS NO COMMUNICATION WITH THE VID. YOU MAY PROCEED WITH THE INSPECTION, BUT ANY CERTIFICATE ISSUED TO A VEHICLE THAT IS REQUIRED TO BE TESTED AT A REFEREE/TEST-ONLY CENTER SHALL BE INVALID.

LOOK AT THE CONSUMER'S DMV REGISTRATION DOCUMENT FOR ANY INSPECTION LIMITATIONS (I.E., TEST-ONLY INSPECTION REQUIRED). ASK THE CONSUMER IF THE VEHICLE HAS BEEN PREVIOUSLY IDENTIFIED AS A GROSS POLLUTER VEHICLE AT ANOTHER STATION OR HAS BEEN ISSUED A HARDSHIP EXTENSION. IF SO, ADVISE THE CONSUMER THAT THE VEHICLE CAN ONLY BE CERTIFIED AT A REFEREE/TEST-ONLY CENTER.

The following message shall also be printed on the VIR under the "Results Not Transmitted" message for passing inspections:

IF THIS VEHICLE HAS BEEN IDENTIFIED AS A GROSS POLLUTER OR HAS BEEN ISSUED A HARDSHIP EXTENSION (OR FOR OTHER REASONS REQUIRING A REFEREE/TEST-ONLY CENTER INSPECTION), THE CERTIFICATE ISSUED AS A RESULT OF THIS INSPECTION SHALL BE INVALID.

Programming Criteria:

1. If the vehicle is a previous gross polluter, the EIS shall display the following message.

   DISPLAY PROMPT:

   THE VEHICLE UNDER TEST HAS BEEN IDENTIFIED AS A GROSS POLLUTER.

   THE SMOG CHECK MAY CONTINUE, BUT NO CERTIFICATE WILL BE ISSUED. A CERTIFICATE CAN ONLY BE ISSUED AT A "REFEREE/TEST-ONLY CENTER."

2. If the vehicle has a previous hardship extension issued, the EIS shall display the following message:

   DISPLAY PROMPT:

   THIS VEHICLE HAS A PREVIOUS HARDSHIP EXTENSION ON RECORD. THE VEHICLE IS NOT ELIGIBLE FOR ANOTHER HARDSHIP EXTENSION. COST LIMITS DO NOT APPLY.

THE SMOG CHECK MAY CONTINUE, BUT NO CERTIFICATE WILL BE ISSUED. A CERTIFICATE CAN ONLY BE ISSUED AT A "REFEREE/TEST-ONLY CENTER."

3. If the vehicle requires a referee/test-only inspection (response bit 53), display the following prompt, and abort the test.

   PLEASE REFER THIS VEHICLE TO A "REFEREE/TEST-ONLY CENTER". THE SMOG CHECK WILL BE ABORTED

4. If the vehicle requires a referee/test-only inspection (response bit 71), display the following prompt, and continue on with the test.

   THE SMOG CHECK MAY CONTINUE, BUT NO CERTIFICATE WILL BE ISSUED. A CERTIFICATE CAN ONLY BE ISSUED AT A "REFEREE/TEST-ONLY CENTER."

5. If response bit 72 was set, display the text named 72_NOCRT in MESSAGE.DAT and continue on with the test. When response bit 72 is received, the EIS shall not issue a certificate if the vehicle passes the Smog Check.

6. If response bit 73 was set, display the text named 73_NOCRT in MESSAGE.DAT and continue on with the test. When response bit 73 is received, the EIS shall not issue a certificate if the vehicle passes the Smog Check.

7. If response bit 74 was set, display the text named 74_NOCRT in MESSAGE.DAT and continue on with the test. When response bit 74 is received, the EIS shall not issue a certificate if the vehicle passes the Smog Check.

8. If response bit 75 was set, display the text named 75_INFOR in MESSAGE.DAT and continue on with the test. Response bit 75 is for information only, do not block certificate issuance for passing vehicles, or automatically abort the Smog Check.

9. If response bit 76 was set, display the text named 76_INFOR in MESSAGE.DAT and continue on with the test. Response bit 76 is for information only, do not block certificate issuance for passing vehicles, or automatically abort the Smog Check.

10. If response bit 77 was set, display the text named 77_INFOR in MESSAGE.DAT and continue on with the test. Response bit 77 is for information only, do not block certificate issuance for passing vehicles, or automatically abort the Smog Check.

b) ***Vehicle Model Year***

DISPLAY PROMPT:

ENTER THE MODEL YEAR.

Programming Criteria:

1. Whenever a 1966-1973 model year is entered, the EIS shall display the following Prompt:

   NOTICE: A SMOG CHECK IS NOT REQUIRED ON 1966-1973 MODEL YEAR VEHICLES. DO YOU WANT TO CONTINUE? (Yes/No)

2. Model year entries greater than "current calendar year plus two" shall not be allowed.

3. Requires two-character model year entry. The first two digits of the year (i.e., 19 or 20) shall be automated entry, based on whether the value of the number entered by the technician is less than 40 (e.g., technician enters 40, EIS picks 19 and displays 1940; if technician enters 39, EIS picks 20 and displays 2039). If the technician determines that the first two digits established by the EIS are incorrect, (s)he may backspace and re-enter the first two characters. Four-digit model year shall be recorded in the *Vehicle Model Year* field of the test record and printed on the VIR.

4. ERROR MESSAGES:

   NO VALUE HAS BEEN ENTERED - TRY AGAIN

   MODEL YEAR IS NOT VALID - TRY AGAIN

5. The EIS shall display the following prompt anytime the technician enters a model year that is less than five model years old. Example: the current year is 1999, display the prompt for 2001, 2000, 1999, 1998, 1997, and 1996 model years.

VEHICLES LESS THAN FIVE MODEL YEARS OLD ARE EXEMPT FROM BIENNIAL SMOG CHECKS. DO YOU WISH TO CONTINUE? (Yes/No)

c) ***Vehicle Type***

DISPLAY PROMPT:

ENTER THE VEHICLE TYPE:

SELECT THE APPROPRIATE VEHICLE TYPE FROM THE LIST BELOW:

CODE	VEHICLE TYPE
P	**PASSENGER CAR**
T	**TRUCK**
M	**MOTORHOME**
G	**GOVERNMENT FLEET VEHICLE**
F	**PFR (PERMANENT-FLEET-REGISTERED) VEHICLE**

Programming Criteria:

1. The EIS shall be designed so that only P, T, M, G or F can be entered for this field and if incorrect based on other vehicle data, an error message will be displayed:

   ERROR MESSAGE:

   VEHICLE TYPE IS NOT VALID - TRY AGAIN

2. If the technician indicates that a government fleet vehicle (type G) or PFR vehicle (type F) is being inspected, the EIS shall then ask for the type of fleet vehicle (P, T or M). The actual vehicle type (P, T or M) shall be written to the *Vehicle Type* field of the test record. Print the vehicle type on the VIR.

   i. *Government Fleet Vehicle*
   The EIS shall then prompt the technician to enter the government fleet file number. The inspection and testing shall be conducted in the usual manner except that no certificate shall be issued. There shall be the display prompt:

DISPLAY PROMPT:

NO CERTIFICATE SHALL BE ISSUED FOR THIS VEHICLE.

The EIS shall display a prompt to instruct the technician to enter the government fleet file number (2 alpha and 6 numeric) following entry of the vehicle type. This number shall be printed on the VIR and shall be recorded in the *File Number Storage* field of the test record for BAR data collection purposes. The technician must enter the full eight characters. All government fleet file numbers begin with G.

ii. *PFR Vehicle*
The EIS shall then prompt the technician to enter the PFR file number. The inspection and testing shall be conducted in the usual manner, including the issuance of a certificate upon passage of the inspection. The EIS shall display a prompt to instruct the technician to enter the PFR file number (2 alpha and 6 numeric) following entry of the vehicle type. This number shall be printed on the VIR and shall be recorded in the *File Number Storage* field of the test record for BAR data collection purposes. The technician must enter the full eight characters. All PFR file numbers begin with PF.

d) ***Vehicle Make***
Display prompt for passenger cars and light-, medium- and heavy-duty trucks:

ENTER THE VEHICLE MAKE:

SELECT THE APPROPRIATE MAKE FROM THE LIST. IF THE MAKE IS NOT LISTED, TYPE IN THE FULL NAME OF THE MANUFACTURER. IF IT IS A KIT CAR OR SPECIALLY-CONSTRUCTED VEHICLE, ENTER "SPCN."

Programming Criteria:

1. If the vehicle type is P or T, display all discrete vehicle makes found for the vehicle's model year in the *Make* field of the VLT. "Not Listed" and "SPCN" should be added to the end of the list as a selection, or as a separate function available on the screen. If "Not Listed" is selected, the following prompt shall be given:

DISPLAY PROMPT FOR P or T:

ENTER THE NAME OF THE MANUFACTURER AS SHOWN ON THE DMV REGISTRATION OR TYPE IN THE FULL NAME. (THE ENGINE MAKE WILL BE ENTERED LATER.)

2. If the vehicle type is an M, the technician shall be advised to enter the name of the manufacturer from the displayed list.

   DISPLAY PROMPT FOR MOTORHOMES:

   ENTER THE NAME OF THE MANUFACTURER AS SHOWN ON THE DMV REGISTRATION OR TYPE IN THE FULL NAME. (THE ENGINE MAKE WILL BE ENTERED LATER.)

3. All vehicle make names shall be entered by a method (approved by the BAR) which maximizes user friendliness, preferably via direct cursor selection or the first few letters of the name. For example, the technician should be able to enter the first letter of the vehicle make which would cause the cursor to go to the first make on the list which would also be highlighted. If that is the correct make, the ENTER key would be pressed. If it is not the correct make, the technician would at least be close and only have to move the cursor a short distance to the right one.

4. If SPCN is entered for the vehicle make, then "R" shall be automatically entered as certification type and the following message shall be displayed:

   DISPLAY PROMPT:

   SPECIALLY-CONSTRUCTED VEHICLES (KIT CARS) MUST BE REFERRED TO THE REFEREE/TEST-ONLY CENTER UNLESS THEY ALREADY HAVE A BAR REFEREE LABEL.

5. Only the first five characters of the make name shall be recorded on the test record in the *Vehicle Make* field; however, the full name shall be displayed and printed on the VIR.

e) ***Vehicle Model Name***

DISPLAY PROMPT:

SELECT OR ENTER VEHICLE MODEL NAME

Programming Criteria:

1. If the vehicle type is P or T, display all discrete vehicle models found for the vehicle's make and model year in the *Model* field of the VLT. "Not Listed" should be added to the end of the list as a selection, or as a separate function available on the screen. If "Not Listed" is selected, the following prompt shall be given:

   DISPLAY PROMPT:

   ENTER THE NAME OF THE MODEL AS SHOWN ON THE DMV REGISTRATION OR TYPE IN THE FULL NAME. (THE ENGINE MAKE WILL BE ENTERED LATER.)

2. If the vehicle type is M or the make is SPCN, the EIS shall skip the "Model" entry, and leave the field in the test record blank.

3. The full model name shall be printed on the VIR and displayed on the screen; up to 23 characters shall be provided on the test record in the *Vehicle Model Name* field for vehicle model.

f) ***Gross Vehicle Weight Rating***

The technician shall be required to enter the GVWR only if the vehicle type is T or M, (i.e., not "P") so that emissions standards will be selected properly.

DISPLAY PROMPT:

ENTER THE GROSS VEHICLE WEIGHT RATING (GVWR) IN LBS. IF GVWR RATING PLATE IS NOT ATTACHED TO THE VEHICLE AND DMV DOCUMENT IS NOT AVAILABLE, ENTER "NONE."

Programming Criteria:

1. If the technician enters NONE, the EIS shall display:

DISPLAY PROMPT:

IF THE VEHICLE IS A SMALL SIZE TRUCK, MINI-VAN, SPORT UTILITY OR IS CERTIFIED AS LIGHT-DUTY OR RATED AS A 1/2 TON (FOR EXAMPLE: GM 10 OR 1500 SERIES, DODGE 100 OR 1500 SERIES, OR FORD 100 OR 150 SERIES), ENTER 5999 FOR GVWR.

IF THE VEHICLE IS A MEDIUM-DUTY TRUCK OR FULL SIZE VAN OR IS CERTIFIED AS A MEDIUM-DUTY OR RATED AS A 3/4 TON (FOR EXAMPLE: GM 20 OR 25 SERIES OR FORD 250 SERIES), ENTER 8499 FOR GVWR.

IF THE VEHICLE IS RATED AS A 1 TON OR LARGER OR IS CERTIFIED AS A HEAVY-DUTY, ENTER 8501 FOR THE GVWR.[1]

IF THE VEHICLE IS RATED AS A 1 TON OR LARGER, BUT APPEARS TO HAVE A GVWR LESS THAN xxxx, ENTER 8501 FOR THE GVWR. IF THE VEHICLE APPEARS TO HAVE A GVWR GREATER THAN xxxx ENTER yyyy FOR THE GVWR.[2]

a) xxxx is the highest GVWR value in the *maximum GVWR field* in the appropriate ESC category in TABLE4 and yyyy = xxxx +1. Do not display the superscripts in the prompts. If the highest GVWR value in the *maximum GVWR field* in the appropriate ESC category in TABLE4 is less than 8501, do not display the prompt with a superscript of 2. If the highest GVWR value in the *maximum GVWR field* in the appropriate ESC category in TABLE4 is greater than 8501, do not display the prompt with a superscript of 1.

2. If an appropriate ESC category in TABLE4 is not available, the EIS shall prompt the technician to test the vehicle using the two-speed idle test, rather than the ASM test procedure.

   DISPLAY PROMPT:

   USE THE TWO-SPEED IDLE TEST.

3. ERROR MESSAGES:

   NO VALUE HAS BEEN ENTERED - TRY AGAIN

   TOO MANY CHARACTERS HAVE BEEN ENTERED - TRY AGAIN

   GVWR MUST BE AT LEAST 2000 LBS - TRY AGAIN

4. The GVWR must be printed on the VIR and recorded in the *GVWR* field of the test record.

g) ***Certification Type***

DISPLAY PROMPT:

CHECK UNDERHOOD LABEL FOR CERTIFICATION TYPE:

ENTER "C" FOR CALIFORNIA OR 50-STATE CERTIFIED.

ENTER "F" FOR FEDERAL-ONLY OR 49-STATE-ONLY CERTIFIED.

ENTER "R" FOR VEHICLE WITH BAR REFEREE LABEL.

IF THE UNDERHOOD LABEL IS MISSING, AND THE VEHICLE HAS NO BAR REFEREE LABEL, DETERMINE CERTIFICATION TYPE BASED ON THE APPLICABLE EMISSION CONTROL SYSTEMS PRESENT, AND ON MANUALS. IF THE EMISSION CONTROL SYSTEMS APPEAR TO BE IDENTICAL FOR BOTH FEDERAL AND CALIFORNIA CERTIFICATION TYPES, ENTER "C" FOR CERTIFICATION TYPE. IF CERTIFICATION TYPE CANNOT BE DETERMINED OR IF THE VEHICLE IS A GREY MARKET VEHICLE, REFER THE VEHICLE TO THE REFEREE/TEST-ONLY CENTER.

Programming Criteria: (v*ehicles other than motorhomes*)

1. The EIS shall be designed so that only a C, F or R can be entered by the technician for this field. The BAR/referee label number must be six characters if the first character is an A. The BAR/referee label number must be eight full characters if the first character is an N or I. The certification type and referee label number (if applicable) shall be recorded on the test record in the *Certification Type* and *Referee Label Number* fields. Print the certification type and referee label number (if applicable) on the VIR. Valid referee label numbers only begin with the letters A, N or I.

2. If F is entered for Certification Type and vehicle is less than or equal to 3 years old, and has less than 7500 miles on the odometer, the EIS shall automatically add an "N" for Certificate of Noncompliance (refer to §3.6.24 for further information) as the last character of the certificate number. For all other circumstances, the EIS shall add a C as the last character of the certificate number.

3. If the technician enters R, the following prompt shall be displayed:

DISPLAY PROMPT:

ENTER THE BAR REFEREE LABEL NUMBER. IF THERE IS NO LABEL NUMBER, ENTER "N" FOR NONE, PRESS (function key for continue) **AND REFER THE MOTORIST TO THE REFEREE/TEST-ONLY CENTER.**

The EIS shall be designed to automatically abort the test if the technician enters N and presses continue. However, if a valid BAR Referee Number is entered, the following prompt shall be displayed:

DISPLAY PROMPT:

FROM THE BAR REFEREE LABEL, ENTER THE YEAR IN WHICH THE ENGINE WAS MANUFACTURED. IF NO YEAR IS LISTED ON THE LABEL, ABORT THE TEST AND REFER THE VEHICLE TO THE REFEREE/TEST-ONLY CENTER

ENGINE YEAR: _____

If the technician does not enter an engine year, the EIS shall abort the inspection. If the technician enters an engine year which is three or less years different than the vehicle model year (chassis year or DMV registration year), the EIS shall assume that the engine year is the same as the vehicle model year and shall select the emission standard category in the ESC table appropriate to the vehicle model year, and shall continue with the remainder of the inspection. The engine year will require a two-digit entry. However, the four-digit engine year shall be written to the *Engine Year* field of the test record. See §3.6.7 b) 3 for "year entry" programming criteria.

If the technician enters an engine year which is four or more years different than the vehicle model year (chassis year or DMV registration year), the EIS shall select the emission standard category in the ESC table appropriate to the engine year. If the engine is older than the earliest applicable ESC, then the standard in earliest applicable ESC listed shall be selected to test the vehicle.

After the technician selects an engine year, the following prompt shall be displayed:

DISPLAY PROMPT:

ENTER THE ENGINE MAKE FROM THE MFR. BLOCK ON THE BAR REFEREE LABEL.

SELECT THE APPROPRIATE MAKE FROM THE LIST BELOW. IF THE MAKE IS NOT LISTED, TYPE IN THE FULL NAME OF THE ENGINE MANUFACTURER.

A list shall be displayed, based on a query of the Vehicle Make names in the VLT. The first five characters of the engine make shall be written to the *Engine Make* field of the test record.

4. ERROR MESSAGES:

NO VALUE HAS BEEN ENTERED - TRY AGAIN

Programming Criteria: (*Motorhomes*)

1. If the vehicle being tested is a motorhome (Vehicle Type = M), and if the technician enters a C or an F, for Vehicle Certification Type, the prompt shall be as follows:

IMPORTANT NOTICE
IF THE ENGINE HAS BEEN CHANGED AND THE VEHICLE DOES NOT HAVE A BAR REFEREE LABEL, ABORT THE TEST AND REFER THE MOTORIST TO THE REFEREE/TEST-ONLY CENTER.

ENTER THE MAKE AND YEAR OF THE ORIGINAL CERTIFIED ENGINE/CHASSIS CONFIGURATION.

CERTIFIED ENGINE MAKE: (Full Name)

CERTIFIED ENGINE YEAR: (4 digits)

2. If the engine year is more than 3 years different from the vehicle model year, the test may not be continued and the following prompt shall be displayed:

THE ENGINE IN THIS VEHICLE HAS PROBABLY BEEN CHANGED. ABORT THE TEST AND REFER THE MOTORIST TO THE REFEREE/TEST-ONLY CENTER.

3. If an engine year no more than 3 years different from the model year has been entered, the EIS shall select the ESC appropriate to the engine year. If the engine is older than the earliest applicable ESC (i.e., older than 1966), then the standards in the earliest applicable ESC listed shall be selected to test the vehicle.

4. The technician may type in the full name of the engine make. However, the first five characters will be written to the *Engine Make* field of the test record. The technician shall enter the 2-digit engine year that will be written to the *Engine Year* field. Engine year entries greater than the current calendar year plus two shall not be allowed.

5. Error Messages:

   NO VALUE HAS BEEN ENTERED - - TRY AGAIN

   ENGINE YEAR IS NOT VALID - - TRY AGAIN

h) ***Vehicle Specific Data for VLT***

The EIS shall refer to the EIS-resident VLT to select the appropriate test weight and load values for vehicles. To access the VLT, the EIS shall search for a match based on the vehicle year, make and model.

Programming Criteria:

1. If a match is found based on year, make and model, the EIS shall display all possible vehicle configurations in a user-friendly manner. The technician shall select the configuration that best matches the vehicle to be tested. The BAR proposed display will include the VLT query inputs at the top of the screen:

   MODEL YEAR
   MAKE (DIVISION)
   MODEL

   The display is expected to contain the following information for each resultant listing, one-vehicle configuration per line:

   BODY TYPE
   NUMBER OF CYLINDERS
   ENGINE SIZE (DISPLACEMENT)
   TRANSMISSION TYPE
   FUEL TYPE

2. If the operator determines that none of the listings match the vehicle being tested, the EIS shall prompt the technician to enter the following information: body type, number of cylinders, engine size, and transmission type. The-body type and the number of cylinders will be used to select the appropriate weight and loading information from the VLT default table.

3. After the correct VLT record has been established, it shall be checked against the appropriate records (refer to Confidential Appendix C-2). If a match does exist, the *Pretest* field of the test record shall be filled with a Y (Yes), otherwise it shall default to N (No).

1) ***Body Type***

DISPLAY PROMPT:
SELECT THE BODY TYPE FROM THE LIST: (display pick list)

Programming Criteria:

1) The EIS shall present a pick list of the vehicle body types to assist the technician in selecting the body type appropriate for the vehicle under test. The EIS shall store the selected body type in the *Body Type* field of the test record.
2) For Motorhomes, the "Body Shape" entry in the pick list will be the same as for Full Size Van.

j) ***Number of Cylinders***

DISPLAY PROMPT:

ENTER THE NUMBER OF CYLINDERS; FOR ROTARY ENGINES, ENTER AN "R."

Programming Criteria:

1. The minimum number of cylinders is 1 and the maximum is 16. Any entries outside of 1-16 will be rejected by the system, except that for Rotary engines. For rotary engines the technician shall be prompted to enter an R and the EIS shall store R in the *Number of Cylinders* field of the test record. Print the Number of Cylinders value on the VIR.

2. If the technician enters a 1 or 2, the following message shall be displayed:

   VEHICLES POWERED BY ENGINES WITH 2 OR LESS CYLINDERS ARE EXEMPT FROM SMOG CHECK PROGRAM REQUIREMENTS.

3. ERROR MESSAGES:

   NO VALUE HAS BEEN ENTERED - TRY AGAIN

   NUMBER OF CYLINDERS ENTERED IS NOT VALID - TRY AGAIN.

k) ***Vehicle Engine Size***

DISPLAY PROMPT:

ENTER THE VEHICLE ENGINE SIZE:

ENTER THE ENGINE SIZE FOLLOWED BY ONE OF THE FOLLOWING CODES.

CODE	DESCRIPTION
I	CUBIC INCHES
L	LITERS
C	CUBIC CENTIMETERS

Programming Criteria:

1. The first five bytes shall be the engine size. The last byte shall be the unit used for the engine size, and shall be L for liters, I for cubic inches, or C for cubic centimeters. The EIS shall be designed so that only an I, L or C can be entered for the units. Liter size entries shall be in the format of XX.X. Although the internal storage on the test record in the *Vehicle Engine Size* field is to be automatically converted to liters, the display shall remain in the original units entered. Print the engine size in liters on the VIR.

   To convert from cubic inches to liters, multiply by .016387. To convert from cubic centimeters to liters, divide by 1000. Products shall be rounded to the nearest 0.1L. For example, 1550 cubic centimeters shall be 1.6L; 1549 cubic centimeters shall be rounded down to 1.5L.

2. An error message shall be displayed if the technician enters an equivalent engine size greater than 17.0L or smaller than 0.5L. The technician shall be instructed to correct the entry or abort the test. If the vehicle under test is not in the VLT and the engine size entered by the technician is greater than 10.7L, the EIS shall display the prompt:

   ENGINE SIZE IS GREATER THAN 10.7 LITERS. ARE YOU SURE THIS IS CORRECT? (YES/NO)

3. If yes, the EIS shall accept the entry and continue with the test. If no, the EIS shall revert to the Enter Engine Size screen.

4. The EIS shall make a validity check on the engine size entered by the technician for the particular year, make and model of vehicle being inspected. If the engine size is not found in the VLT, the technician shall be prompted to verify that the correct size was entered. The technician shall be allowed to change the entry or to continue after confirming that the entry is correct.

5. ERROR MESSAGES:

   NO VALUE HAS BEEN ENTERED - TRY AGAIN

   ENGINE SIZE OR ENTRY (I, L, OR C) IS NOT VALID FOR THIS YEAR, MAKE AND MODEL OF VEHICLE - TRY AGAIN.

l) ***Transmission Type***

DISPLAY PROMPT:

INDICATE THE TYPE OF TRANSMISSION:

ENTER "M" FOR MANUAL
ENTER "A" FOR AUTOMATIC

<u>Programming Criteria</u>:

1. Record in the *Transmission Type* field of the test record. Print the transmission type on the VIR.

2. ERROR MESSAGES:

   NO VALUE HAS BEEN ENTERED - TRY AGAIN

m) ***Vehicle Odometer Reading***

DISPLAY PROMPT:

ENTER THE VEHICLE ODOMETER READING EXACTLY AS SHOWN.

DO NOT MAKE ADJUSTMENTS FOR ODOMETER ROLL-OVER.

A MINIMUM OF ONE NUMERIC ENTRY IS REQUIRED. DO NOT ENTER THE TENTH'S DIGIT.

IF NO ODOMETER READING, ENTER NONE.

Programming Criteria:

1. If the vehicle has less than 7500 miles and is less than or equal to three years old, is not certified to meet California emission control regulations and the vehicle passes the inspection, the EIS shall cause the noncompliance indicator (consisting of an N) to be written to the last character of the *Certificate Number* field of the test record and printed on the VIR.

2. If the odometer reading is less than the reading received from the VID, display the following prompt:

   DISPLAY PROMPT:

   PLEASE VERIFY THE ODOMETER READING.

   IS THE ODOMETER READING CORRECT? (YES/NO)

   IF NO, ENTER THE CORRECT ODOMETER READING.

3. The EIS shall only accept an entry of all numbers or the word NONE in the odometer field. If the technician enters NONE, the EIS shall translate this to 000000 for the *Odometer Reading* field of the test record, display NONE and print NONE on the VIR.

4. If the technician enters an odometer reading higher than 99,000 miles for a vehicle five or less model years old, the following prompt shall be displayed:

MILEAGE ENTERED IS HIGH FOR THE YEAR OF THE VEHICLE. CHECK THE MILEAGE AND RE-ENTER IF INCORRECT. DO NOT ENTER 1/10ths OF MILES.

The technician shall be allowed to re-enter the mileage or use a function key to continue if the reading is correct. The EIS shall accept the second entry.

5. If the technician enters an odometer reading of less than 100,000 miles and the vehicle is 15 or more model years old, the following prompt shall be displayed:

MILEAGE ENTERED IS LOW FOR THE AGE OF THE VEHICLE. CHECK THE MILEAGE AND RE-ENTER IF INCORRECT.

The technician shall be allowed to re-enter the mileage or use a function key to continue. The EIS shall accept the second entry.

6. ERROR MESSAGES:

NO VALUE HAS BEEN ENTERED - TRY AGAIN

ODOMETER READING IS NOT VALID - TRY AGAIN

n) ***Vehicle Fuel Type Code***

DISPLAY PROMPT:

ENTER THE VEHICLE FUEL TYPE CODE:

SELECT THE APPROPRIATE FUEL TYPE CODE FROM THE LIST BELOW.

CODE	FUEL TYPE
G	**GASOLINE**
P	**LIQUID PROPANE GAS (LPG)**
N	**LIQUID/COMPRESSED NATURAL GAS (LNG/CNG)**
M	**METHANOL (greater than 20%)**
E	**ETHANOL (greater than 20%)**

Programming Criteria:

1. Entry of one of the above codes is required. The EIS shall be designed so that only a G, P, N, M or E can be entered by the technician for this prompt. The EIS shall default to gasoline.

2. If the technician selects either P or N, then the following prompt shall be displayed:

   DISPLAY PROMPT:

   IF THE VEHICLE IS BI-FUELED, ENTER "Y" FOR YES OR "N" FOR NO.

   IF YES, SELECT APPLICABLE FUEL INFO:

   PG = LPG bi-fuel engine, operating on gasoline
   PP = LPG bi-fuel engine, operating on propane
   NG = LNG/CNG bi-fuel engine, operating on gasoline
   NN = LNG/CNG bi-fuel engine, operating on LNG/CNG

3. If NO, the EIS shall accept the vehicle as not bi-fueled (runs on either P or N). The EIS shall not require the fuel cap test to be performed during the manual functional checks.

4. The first character of the test record for this field shall be the fuel type entered. The second byte will be used for bi-fuel LPG, LNG and CNG vehicles. If the technician enters P for the fuel type and indicates that the vehicle is not bi-fuel, the test record would be P. Entries shall be written to the *Fuel Type* field of the test record. Print the fuel type on the VIR.

5. ERROR MESSAGES:

   NO VALUE HAS BEEN ENTERED - TRY AGAIN

   INVALID ENTRY - TRY AGAIN

6. If the technician selects either P or N, then the EIS shall look in the technician access data file for the gaseous fuel endorsement. If a B or G exists in the endorsement field, continue on with the inspection. If a B or G does not exist in the endorsement field, then the EIS shall abort the test and display the following prompt:

   DISPLAY PROMPT:

YOUR LICENSE HAS NOT BEEN ENDORSED TO INSPECT ALTERNATIVE FUEL VEHICLES. THE TEST WILL BE ABORTED.

7. The EIS shall apply the dilution correction factor for the fuel type selected (see §3.3.12) and shall provide a function key to switch the DCF on/off. (*This programming criterion only applies to manual testing mode.*)

o) ***Dual Exhaust***

DISPLAY PROMPT:

DOES THE VEHICLE HAVE DUAL EXHAUST? (YES/NO)

Programming Criteria:

1. If the operator answers YES, then the EIS shall prompt the technician to attach the dual probe and hose assembly. Print whether the exhaust is dual or single on the VIR.

   DISPLAY PROMPT:

   YOU HAVE SELECTED DUAL-EXHAUST. CONNECT DUAL PROBE AND ASSEMBLY NOW.

2. If NO, continue the inspection.

3. ERROR MESSAGES:

   INVALID ENTRY - TRY AGAIN

3.6.8 **Review Screen**

The EIS shall display a summary of all the entered vehicle information. At this point, the technician shall be prompted to verify the data and, if necessary, correct any incorrect entries. However, the information contained from the VLT or VSVLT cannot be edited if the "Edit bit" has been set. The EIS shall display the following prompt if the VLT Edit bit has not been set.

DISPLAY PROMPT:

IS THIS DATA CORRECT? (YES/NO)

Programming Criteria:

1. If the technician changes any vehicle data, the EIS shall automatically begin prompting the technician, as necessary, to repeat the vehicle data entry process. However, the VIN, License Plate and Issuing State entries cannot be changed.

2. If the "Edit bit" has been set, the EIS shall not allow any modification to the VLT or VSVLT information, or to the VIN, License Plate and issuing state. The EIS shall display the following prompt:

   DISPLAY PROMPT:

   THE VEHICLE INFORMATION RECEIVED FROM THE VID CANNOT BE CHANGED FOR THE VEHICLE UNDER TEST.

3.6.9 Emission Test Selection

a) If an appropriate ESC category in TABLE4 is not available, the EIS shall automatically go to the two-speed idle test sequence. The default test in enhanced areas for all vehicles with an appropriate ESC category in TABLE4 shall be the ASM test. If a match was found, the test type to be used will be sent down by the VID. If the VID sends a TSI- requirement, the EIS shall perform a TSI test regardless of the vehicle type. The EIS shall not be able to override a TSI requirement from the VID. If the VID sends an ASM requirement, the EIS may override the ASM test based on the GVWR or drive train configuration (for example: an appropriate ESC category in TABLE4 is not available or nondisengagable all wheel drive.) Note: All inspections in enhanced area without communication to the VID shall default to ASM test except for vehicles without an appropriate ESC category in TABLE4. All inspections in basic area without communication to the VID shall default to TSI test (i.e. units configured without a dynamometer and NO_x measuring device). See §3.6.6 o) for "Receive Required Test Type."

   An entry shall be made in the *Test Cycle* field of the test record indicating test performed (A = ASM and T = two-speed idle). The EIS shall display the following prompt:

   DISPLAY PROMPT:

   PROCEED WITH (ASM or two-speed idle) **TEST.**

   Programming Criteria:

1. The EIS shall display the appropriate test information on the screen (test time, engine RPM, vehicle speed, etc.)

2. The technician should be able to abort the inspection by pressing the "Escape" key. If the technician presses the "Escape" key, the EIS shall display the following message:

   DISPLAY PROMPT:

   ARE YOU SURE YOU WANT TO ABORT THIS TEST? (YES/NO)

   Programming Criteria:

   1. If "NO", the EIS shall continue with the inspection.
   2. If "YES", the EIS shall prompt the technician to enter one of the following abort codes prior to aborting the test. The abort code shall be stored in the *Abort Code* field of the test record. The EIS shall print the abort reason on the VIR. The overall test result shall be recorded as an "A" (aborted) and "A" shall be recorded in the Overall Test Result field of the test record.

      DISPLAY PROMPT:

      ENTER THE CODE THAT BEST DESCRIBES THE REASON THE TEST WAS ABORTED:

      ENTER THE APPROPRIATE ESCAPE CODE FROM THE LIST BELOW:

      01 OIL SYSTEM LEAK OR THE WARNING LIGHT IS ON

      02 TRANSMISSION LEAK

      03 COOLANT SYSTEM LEAK OR THE WARNING LIGHT IS ON

      04 FUEL SYSTEM LEAK

      05 EXCESSIVE EXHAUST SYSTEM LEAK

      06 EXHAUST INACCESSIBLE

07 SAMPLE DILUTION

08 ENGINE RPM TOO HIGH

09 ENGINE RPM TOO LOW

10 EXCESSIVE ENGINE NOISE

11 MAINTENANCE WARNING LIGHT ON

12 SAFETY PROBLEMS ON VEHICLE

13 UNABLE TO KEEP VEHICLE ON THE DYNAMOMETER

14 UNABLE TO STABILIZE VEHICLE IN THE REQUIRED TIME

15 ACCELERATION VIOLATION

16 EXCESSIVE RESTARTS

17 BMW/PEUGEOT/VOLVO AUTO TRANSMISSION

18 VEHICLE SPEED VIOLATION

19 INVALID HUMIDITY

20 OTHER

3. From this point onward, the EIS shall allow the technician to abort the inspection anytime before the overall "Pass/Fail" determination has been made. However, the EIS shall create a record and store test data up to the point where the "Escape" key has been pressed and shall transmit the test record to the VID during the next required communication session (i.e. next Smog Check, data file refresh, etc.). Do not make an "end of test call" to the VID. If the inspection is aborted during the tailpipe emissions testing, the EIS shall print "Invalid" next to the emission readings (HC, CO, NO) on the VIR and record “A” in the O*verall Test Result* field of the test record.

b) **Drive Configuration Routine**

The EIS shall have a drive configuration routine that can be activated/deactivated by the VID.

When deactivated, AWD vehicles (including full-time 4WD and non-disengageable traction control) shall receive an ASM inspection except in the case of a "M" (maybe) VLT entry. In this case abort the ASM test. (see §3.6.12.2).

When activated, the EIS shall use the VLT to determine test type, and if applicable, the previous test record). The VLT entry for *Single Axle Dyno Capability* field will be N for AWD, Y for two-wheel drive, and M for maybe. The following table shows how test type shall be determined by the EIS based on the VLT entry:

VLT Entry:	Y (Yes) = 2WD	N (No) =AWD	M (Maybe)
Inspection Type:	ASM	TSI	Display Prompt

1. If the VLT entry is M, the EIS shall display the following prompt:

   DISPLAY PROMPT:

   CAN THE VEHICLE BE TESTED ON A TWO-WHEEL DRIVE DYNAMOMETER? (Yes/No)

   If yes, the EIS shall perform an ASM test.
   If no, the EIS shall select TSI and display the following prompt:

   DISPLAY PROMPT:

   SELECT THE APPLICABLE DRIVE CONFIGURATION.

A. ALL-WHEEL-DRIVE OR FULL-TIME FOUR-WHEEL-DRIVE WITHOUT TRACTION CONTROL

B. ALL-WHEEL-DRIVE OR FULL-TIME FOUR-WHEEL-DRIVE WITH TRACTION CONTROL

C. NON-DISENGAGEABLE TRACTION CONTROL

D. VEHICLE DOES NOT FIT ON THE DYNAMOMETER

E. VEHICLE IS TOO HEAVY FOR THE DYNAMOMETER

Programming Criteria:

i. The EIS shall require the selection of one item before proceeding.
ii. The EIS shall store the appropriate letter (A, B, C, D, or E) to the *Drive Configuration* field of the test record.

2. If the VLT entry is M, and the vehicle has had a previous ASM test on a 2WD dyno (based on *test cycle field* and *dyno configuration field* of the test record from the previous test record), the EIS shall display the following prompts:
DISPLAY PROMPT:

PERFORM AN ASM TEST. BE SURE TO DISABLE THE TRACTION CONTROL IF NECESSARY. PRESS (function key) **TO CONTINUE.**

YOU WILL BE PERFORMING AN ASM TEST, IF THE VEHICLE IS NOT COMPATIBLE WITH A 2WD DYNAMOMETER, ABORT THE TEST.

Programming Criteria:

i. The EIS shall require the technician to press a function key to continue.
ii. The EIS shall perform an ASM inspection. The EIS shall store the dyno type (2WD or 4WD) based on the current test in the *Dyno Configuration* field of the test record.
iii. If the vehicle has not been previously tested ASM on a 2WD dyno, then the EIS shall go to §3.6.9 b.1.

3.6.10 **Sample System Readiness**

a) The EIS shall be zeroed in accordance with §4.5 a) and b).

b) The HC hangup check will be done immediately after the EIS is zeroed and the ambient air is sampled. The zeroing is initiated after a smog check has been initiated and the initial VID contact sequence has been successfully or unsuccessfully completed. The whole zero-ambient air-HC hangup sequence runs in background while the technician is entering vehicle information. If the hangup

check is not completed before the technician is ready to start the tailpipe test, the EIS shall display the following message:

DISPLAY PROMPT:

HC HANGUP CHECK IN PROGRESS.

If the hangup check is not successfully completed in 150 seconds from the start of the hangup check, the EIS shall display the following message:

DISPLAY PROMPT:

POSSIBLE DIRTY PROBE, HOSE OR FILTER.

c) The EIS shall not allow the inspection to continue before the system passes the HC hangup check.

3.6.11 **RPM Signal**

The EIS shall prompt the technician to select the RPM pick-up type to be used while performing the emissions test (either ASM or two-speed idle). See §3.3.13 for "Engine RPM Detection."

DISPLAY PROMPT:

SELECT RPM PICK-UP DEVICE:

1. **CONTACT**
2. **NON-CONTACT**
3. **OBD II PORT**
4. **OTHER**

<u>Programming Criteria</u>:

1) The EIS may provide additional prompts or submenus to guide the technician for proper RPM pickup connection.

2) Beginning with the 1996 model year vehicles, the EIS shall be prompted to detect engine RPM via the OBD port.

3) The technician shall be given the opportunity to select another RPM pick-up device and continue with the current inspection (without causing test to abort), if the engine RPM is not detected.

4) RPM shall be displayed during the emissions test. Instability shall be immediately detected and displayed on the screen.

DISPLAY PROMPT:

UNSTABLE RPM SIGNAL - - CHECK OR CHANGE PICK UP

5) A stable RPM signal is required to complete the emissions test. Manufacturers may propose an error tolerance factor to be used when testing vehicles with unstable RPM signal.

6) For other RPM pick-up device, the EIS manufacturer may develop a unique engine RPM pick-up. If the EIS manufacturer provides this option, a written explanation/procedure regarding this option must be submitted to BAR for approval.

3.6.12 **ASM (Loaded-Mode) Emissions Testing Sequence**

a) **General Procedure for Both ASM5015 and 2525 Test Modes:**

1. **Safety Checks**: The EIS shall prompt the technician to perform any equipment manufacturer-required safety checks.

2. **Auxiliary Rolls**: The EIS shall prompt the technician to determine if the vehicle being tested requires auxiliary rolls.

DISPLAY PROMPT:

IS THE VEHICLE EQUIPPED WITH AWD OR FULL-TIME 4-WHEEL DRIVE OR NON-DISENGAGEABLE TRACTION CONTROL? (YES/NO)

<u>Programming Criteria</u>:

1) If YES and according to the information stored in the station information that the emissions inspection system is not equipped with an AWD dynamometer, then the prompt shall read:

DO NOT INSPECT -- REFER THE VEHICLE TO A STATION WITH AN AWD DYNO.

2) If YES and the dynamometer is an AWD dynamometer, then the EIS shall engage, or if manual, prompt the technician to engage the auxiliary rolls.

3) If NO, the EIS shall proceed with a 2WD dyno configuration.

3. **Drive Axle Weight Measurement and Vehicle Alignment**: The measured drive axle weight will be used to calculate the vehicle loading (the effect of tire loss and the amount of horsepower to be applied based on vehicle test weight) and to determine the appropriate emission standard category. The EIS shall prompt the technician to capture the drive axle weight of the test vehicle and shall display the following message:

MEASURE THE DRIVE AXLE WEIGHT OF THE TEST VEHICLE.

Programming Criteria:

1) If the drive axle weight is not measured with the vehicle on the dynamometer, prompt the driver to measure the drive axle weight. (This information shall be electronically transferred from the weighing device to the EIS.)

2) Prior to measuring an axle, the EIS must see less than 100 pounds before taking the weight measurement.

3) If the drive axle weight is measured on the dynamometer, prompt the driver to:

   a. Drive the vehicle onto the dynamometer,
   b. Squarely center the tires on the scale.
   c. For scales integrated with the vehicle lift, slowly spin wheels to center vehicle on dynamometer.
   d. Measure and record the drive axle weight.
   e. Laterally stabilize, restrain, and chock the vehicle.

4) If the vehicle is to be measured on a four-wheel drive dynamometer, both axles must be weighed.

5) When the drive axle or non-drive axle is measured, the EIS must see a minimum of 500 pounds before continuing on with the inspection.

4. **Vehicle Test Weight (VTW) Selection:** Select a test weight based upon the following criteria:

Programming Criteria:

1. Use the ETW value in the VLT when available. If the ETW is not available, use the inertia weight class value (IWC) in the VLT, ~~or~~ the vehicle's measured drive axle weight, or the appropriate default weight. See below for specific test weight determination when the ETW is not available.

2. If the ETW is not available in the VLT and the GVWR is less than 8501 pounds, the EIS shall determine the correct Vehicle Test Weight based on one of the following formulas.

   a. If ABS(ADAXWT - MDAXWT) <= (XX * ADAXWT)

   where:
   ADAXWT = Average Drive Axle Weight taken from the appropriate VLT record.
   MDAXWT = Measured Drive Axle Weight from the EIS scale.
   ABS = Absolute Value
   XX = 10% until updated by the Low % Threshold field of the configuration information record.

   If yes, then use the IWC in the appropriate VLT record. If no, proceed with step b.

   b. If ABS(ADAXWT - MDAXWT) > (XX * ADAXWT)

   Query the technician to determine if the vehicle is carrying an excess load.

   DISPLAY PROMPT:

   DOES THE VEHICLE APPEAR TO HAVE AN EXCESS LOAD GREATER THAN 500 POUNDS? (YES/NO) (e.g., load of bricks or camper)

   1) If the technician answers "YES," then the IWC from the appropriate VLT record will be assumed to

be correct since weighing the whole vehicle will produce inaccurate results.

2) If the technician answers "NO" and:

ABS(ADAXWT - MDAXWT) <= (YY * ADAXWT)

where:
YY = 30% until updated by the High % Threshold field of the configuration information record.

then the technician shall be prompted to validate the vehicle weight.

DISPLAY PROMPT:

BASED UPON THE DRIVE AXLE WEIGHT OF THIS VEHICLE, THE TOTAL VEHICLE INERTIA IS ASSUMED TO BE [IWC**]. IS THIS WEIGHT CORRECT? (YES/NO)**

i). If the technician answers "YES" then use the IWC from the appropriate VLT record.

ii). If the technician answers "NO" then prompt the technician to measure the non-drive axle weight.

VTW= [MDAXWT] + [Measured Non-Drive Axle Weight

3) ABS(ADAXWT - MDAXWT) > (YY * ADAXWT)

then the IWC in the applicable VLT record is incorrect. To determine the correct VTW, prompt the technician to measure the non-drive axle weight.

VTW = [MDAXWT] + [Measured Non-Drive Axle Weight]

4) If the ETW, IWC or the measured VTW is less than 2000lbs., the EIS shall use 2000lbs. for the VTW.

3. If an ETW is unavailable and the GVWR is greater than 8500 lbs. the EIS shall use 6000 lbs. for the VTW.

5. **Vehicle Test Weight Data Source:** The EIS shall automatically record the source of entry for the vehicle test weight data in the *Vehicle Test Weight Input Source* field. The entries are as follows:

V = VLT Match (VLT *Equivalent Test Weight*)
D = VLT Default (VLT *Inertia Weight Class)*
M = Measured Weight
F = 2000 lb. default (when the vehicle test weight is less than 2000 lb.)
G = 6000 lb. default (when an ETW is not available and the GVWR is greater than 8500 lbs.)

6. **Restrain the Vehicle:**

DISPLAY PROMPT:

IS THE VEHICLE A FRONT-WHEEL DRIVE? (YES/NO)

<u>Programming Criteria:</u>

1) If Yes (the vehicle is a front-wheel drive vehicle) or the vehicle is being tested on a four-wheel drive dynamometer, the EIS shall:

a. Prompt the driver to laterally stabilize, restrain and chock the vehicle on the dynamometer if it has not already been done.

DISPLAY PROMPT:

FRONT-WHEEL DRIVE VEHICLE: LATERALLY STABILIZE, RESTRAIN AND CHOCK.

b. Verify that the restraints are engaged prior to proceeding to the next step.

Note: Provisions must be made to ensure that restraints which control side-to-side movement are used on all front-

wheel drive vehicles and that the vehicles are not just tied to some fixed object. If the restraint system does not control forward to backward movement, the EIS must prompt the technician to place wheel chocks or equivalent.

2) If No (the vehicle is a rear-wheel drive vehicle), prompt the driver to restrain the vehicle.

DISPLAY PROMPT:

REAR-WHEEL DRIVE VEHICLE: RESTRAIN

7. **Axle weight scale calibration verification.**

Each time the EIS measures a drive axle weight, the EIS shall determine if the axle weight is directly comparable to the axle weight listed in the VLT. An axle weight is directly comparable to the VLT axle weight if the vehicle has an ETW listed in the appropriate VLT record.

For each directly comparable drive axle weight (CDAX), the EIS shall determine the measured weight error (DAXERR) according to the following equation:

$$DAXERR = \frac{CDAX - ADAXWT}{ADAXWT} * 100$$

where ADAXWT is the drive axle weight taken from the appropriate VLT record.

The EIS shall maintain a record of the last 30 DAXERRs in the file DAXERR.DAT. If the average of these 30 DAXERRs is greater than XX or less than YY (where YY is assumed to be a negative number), then the EIS shall lock out for inspection until the axle weight scale calibration can be verified by a field service representative. If DAXERR.DAT does not contain 30 records (new EIS or the record was recently cleared), the EIS shall not lock out for drive axle weight scale calibration. The dynamometer scale lockout can be cleared in the service menu, or by the VID. Anytime the dynamometer scale lockout is cleared the EIS shall clear the DAXERR.DAT file.

The field service representative shall, in the process of calibrating the drive axle weight scale, clear out the DAXERR records.

Note: CONFIG.DAT contains the values for XX, and YY.

Anytime the DAXERR is within 80% of the lockout limits (XX, and YY), the EIS shall display the following warning prompt:

DISPLAY PROMPT:

THE AXLE SCALE APPEARS TO BE OUT OF CALIBRATION. IF THE PROBLEM PERSISTS THE EIS WILL BE LOCKED OUT.

Note: Prior to displaying the above prompt, the DAXERR file must have 30 records in it

8. **Horsepower Applied During the ASM Cycle**: During the ASM test, the torque will remain constant during each mode of the test. The torque to apply will be derived from the dynamometer-applied horsepower for both the 5015 and the 2525 portions of the test using the following equation:

$$Torque = 5252 \times [applied\ hp\ @\ 15\ mph]\ /\ [roll\ RPM]$$

$$Torque = 5252 \times [applied\ hp\ @\ 25\ mph]\ /\ [roll\ RPM]$$

Dynamometer-applied horsepower for each mode of the ASM loaded-mode test must be calculated using measured vehicle weights if the drive axle weight differs by more than 10% from the value listed in the *Average Drive Axle Weight* field of the VLT. Otherwise, calculate the loading using the appropriate weights located in the VLT.

9. **Structured Test Drive and Free-Form Test Drive Calculation for Power Applied**

$\text{PAU POWER}_{@\ \text{OBS MPH}} = \text{ACC POWER}_{@\text{OBS MPH/S}} + \text{TRLHP}_{@\text{OBS MPH}} - \text{GTRL}_{@\text{OBS MPH}} - \text{LHP}_{@\text{OBS MPH}}$,

where:
$\text{PAU POWER}_{@\ \text{OBS MPH}}$ = Power applied by the PAU to accurately simulate a vehicle during a transient cycle

$\text{ACC POWER}_{@\text{OBS MPH/S}}$ = Power required to accelerate or decelerate vehicle inertia in excess of dynamometer base inertia = Obsmph * 5280 / 3600 *ACC FORCE / 550

Where:
ACC FORCE = E MASS * ACCELERATION (MPH/SEC) * 5280 / 3600
Obsmph = Observed vehicle speed

E MASS = The portion of the vehicle mass that must be simulated electrically
E MASS = (VEHICLE WEIGHT - BASE INERTIA) / 32.2
Multiply vehicle weight by 1.015 if two-wheel drive vehicle (for non-drive wheel rotating inertia)

$TRLHP_{@OBS\ MPH}$ = Power absorbed by drag on the vehicle = AV * (Obsmph) + BV * $(Obsmph)^2$ + CV * $(Obsmph)^3$

Where:
AV = (AVPF / 50) * TRLHP@50
BV = (BVPF / 2500) * TRLHP@50
CV = (CVPF / 125000) * TRLHP@50

Where:
TRLHP@50 = Track road load horsepower at 50 mph
AVPF = 0.35
BVPF = 0.1
CVPF = 0.55

$GTRL_{@OBS\ MPH}$ = Power absorbed at the tire/dyno roll interface = At * (Obsmph) + Bt * $(Obsmph)^2$ + Ct * $(Obsmph)^3$

$PLHP_{@OBS\ MPH}$ = Dynamometer parasitic loss horsepower

Programming Criteria:

1) If the applied dynamometer horsepower must be calculated, use the following procedure:

Calculate the curve coefficients necessary to properly characterize the tire/roll interface losses.

A_t = (0.xx/50) x (GTRL@50mph)
B_t = (0.yy/2500) x (GTRL@50mph)
C_t = (0.zz/125000) x (GTRL@50mph)
A_{t8} = (0.76/50) x (-.378193 + (0.0033207 x DAXWT))
B_{t8} = (0.33/2500) x (-.378193 + (0.0033207 x DAXWT))
C_{t8} = (-0.09/125000) x (-.378193 + (0.0033207 x DAXWT))
A_{t20} = (0.65/50) x (.241645 + (.0020844 x DAXWT))
B_{t20} = (0.48/2500) x (.241645 + (.0020844 x DAXWT))
C_{t20} = (-0.13/125000) x (.241645 + (.0020844 x DAXWT))

Where:

- A_t, B_t, C_t are curve coefficients necessary to properly characterize the tire/roll interface losses.
- A_{t8}, B_{t8}, and C_{t8} are curve coefficients when using twin 8.625-inch diameter rolls.
- A_{t20}, B_{t20}, and C_{t20} are curve coefficients when using twin 20-inch diameter rolls.
- DAXWT is the measured drive axle weight.

Coefficients for other roll diameters shall be supplied by dynamometer manufacturers and submitted to BAR for approval.

2) Using the curve coefficients established above, determine the GTRL for 15 mph and 25 mph using the following equation:

$$GTRL_{@Obmph} = (A_t \times (Obmph)) + (B_t \times (Obmph)^2) + (C_t \times (Obmph)^3)$$

Where GTRL@Obmph = Generic Tire/Roll Interface losses at the observed mph

3) Using the measured drive axle weight (MDAXWT), calculate the applied horsepower as follows:

a. For 8.65" diameter rolls:

THP5015 = VTW/227
THP2525 = VTW/248

HP50158 = THP5015 – $GTRL_{@\text{ for 8.65 rolls}}$

HP25258 = THP2525 – $GTRL_{@\text{ for 8.65 rolls}}$

b. For 20" diameter rolls:

THP 5015 = ETW/227 + $GTRL_{@15\text{ for 8.65" rolls}}$ - $GTRL_{@15\text{ for 20" rolls}}$
THP 2525 = ETW/248 + $GTRL_{@25\text{ for 8.65" rolls}}$ - $GTRL_{@25\text{ for 20" rolls}}$

10. **Cooling Fan**: The EIS shall prompt the technician to turn on the fan and to place it in position if the ambient temperature is above 72°F. (The EIS

may provide the option of automatically turning on the fan from a remote location.)

11. **Probe and Tachometer Hookups**: The EIS shall prompt the technician to insert the sample probe into the tailpipe and attach the selected RPM pick up device pursuant to §3.6.11.

12. **Gear Selection**: The technician shall be prompted, as appropriate, on transmission type:

    i. Automatic Transmissions

    DISPLAY PROMPT:

    PLACE THE TRANSMISSION IN DRIVE. IF THE ENGINE RPM EXCEEDS _____, PLACE THE TRANSMISSION IN OVERDRIVE.

    Programming Criteria:

    The EIS shall prompt the technician to place the transmission in drive. Engine RPM during the test mode shall not exceed the following:

    a. Engine size less than or equal to 3.0L: RPM may not exceed the appropriate upper limit (times 100) in the configuration file (CONFIG.DAT). If the RPM limit in the configuration file is empty, the EIS shall default to 3000 RPM.

    b. Engine size greater than 3.0L: RPM may not exceed the appropriate upper limit (times 100) in the configuration file (CONFIG.DAT). If the RPM limit in the configuration file is empty, the EIS shall default to 2500 RPM.

    ii. Manual Transmissions

    DISPLAY PROMPT:

    PLACE THE TRANSMISSION IN SECOND GEAR.

    KEEP ENGINE RPM BETWEEN ____ AND ____.

    Programming Criteria:

The EIS shall prompt the technician to test the vehicle in second gear unless the following criteria cannot be met, then select a gear that will maintain the following engine speeds.

a. Engine size less than or equal to 3.0L: Greater than or equal to the appropriate lower limit (times 100) in the configuration file, less than or equal the appropriate upper limit (times 100) in the configuration file. If the RPM limit in the configuration file is empty, the EIS shall default to 3000 RPM for the upper limit, and 1500 RPM for the lower limit.

b. Engine size larger than 3.0L: Greater than or equal to the appropriate lower limit (times 100) in the configuration file, less than or equal to the appropriate upper limit (times 100) in the configuration file. If the RPM limit in the configuration file is empty, the EIS shall default to 2500 RPM for the upper limit, and 1250 RPM for the lower limit.

13. **Tire Drying**: The EIS shall prompt the technician as follows:

DISPLAY PROMPT:

DO THE TIRES NEED DRYING? (YES/NO)

Programming Criteria:

1) If YES, the EIS shall allow the technician to run the vehicle at any speed below 30 mph after selection of the transmission gear (engine speed may not exceed 3000 RPM). When the roll speed exceeds 1 mph, the screen shall display the following delay message which shall include the seconds that must be waited until the test mode can begin.

DISPLAY PROMPT:

ONCE THE TIRES ARE DRY, YOU MUST WAIT ____ SECONDS PRIOR TO BEGINNING THE 5015 TEST MODE.

The EIS shall increment the above second timer one second at a time until the rolls are brought to a stop (speed reaches 1 mph or

less). If the vehicle speed exceeds 30 mph or the engine exceeds 3000 RPM during tire drying, the timer shall increment twice a second until the speed is brought below 30 mph or the engine speed below 3000 RPM. When the rolls come to a stop, the above timer shall decrement once every second until the time reads zero before the EIS allows the driver to start the 5015 mode.

2) If NO, the EIS shall proceed to the next step in the testing procedure.

3) The response (Y=Yes, N=No) shall be written to the *Tire Drying* field of the test record. This field shall be filled for all ASM test records. (For two-speed test records, the field shall remain blank.)

b) **ASM Pre-Emissions Test Conditions**
The following conditions must be present before the EIS begins the test sequence:

Programming Criteria:

1. The dilution threshold is within the limits.

2. The EIS does not detect a "low-flow" condition.

3. The engine idle speed is between 400 and 1250 RPM.

4. The dynamometer rolls are not turning (speed <1 mph). If the roll speed exceeds this limit, or the engine speed exceeds 1250 RPM, display the following delay message and increment the displayed seconds by two times the number of seconds the roll or engine speed are outside limits.

   DISPLAY PROMPT:

   DELAY TESTING, YOU MUST WAIT ____ SECONDS.

5. Once the roll or engine speed are within the limits, decrement the time by one second at a time until the number of seconds reaches zero. In addition, the EIS shall not start the test sequence until the dynamometer remains stopped for twice the time that the rolls were turning.

6. Once all conditions have been met, display the following prompt:

   DISPLAY PROMPT:

TESTING CAN BEGIN.

c) **ASM (Loaded Mode) Emissions Testing Sequence**

Second-by-second data recording shall start from the time the roll speed exceeds 1 mph during the acceleration into the ASM 5015 mode (Mode 1) until the roll speed decelerates to 1 mph at the conclusion of the ASM 2525 mode (Mode 2). This data will be collected, based on the data in CONFIG.DAT. If the test is restarted at any time during the test sequence, the previously stored second-by-second record shall be deleted. The second-by-second data shall be written to the second-by-second data record. The emission levels, without the DCF adjustment, shall be recorded in the second-by-second data record.

The emissions data (HC, CO, CO_2, NO and O_2 second-by-second readings) for both the ASM 5015 and ASM 2525 modes shall be time-aligned with the vehicle speed readings to account for the delay caused by the transport time needed to get the exhaust gas from the vehicle's tailpipe to the analyzers/sensors. This transport time may be different from the probe to the optical bench and from the probe to the NO and O_2 sensors, and shall be accounted for. The transport times shall be determined by the EIS manufacturer by measuring the transport times of at least thirty EIS's in their final production configuration. These times shall be averaged and used as fixed numbers to be added to the figures based on the response times. Time-alignment shall be done before any corrections (e.g., DCF) are applied. The time-alignment shall be based on the average of the three most recent calibration records' T_{90} times for the appropriate gas. Do not use a fixed response time for the various sensors' response times.

d) **5015 Test Mode (ASM Test Mode 1)**

The EIS shall prompt the technician to accelerate the vehicle to 15 miles per hour. The EIS shall display the 5015 test speed with applicable speed limits (or drive trace graphical display), test time, engine RPM, and other appropriate test mode information. The dynamometer shall smoothly apply the load once the vehicle speed exceeds 10 mph.

The maximum duration for the 5015 test mode is 100 seconds. The beginning of the mode is defined as the time that the vehicle accelerates from rest to >1 mph. The emissions averaging portion of the test shall not begin unless:

- Roll speed is at 15 ±1 mph for two consecutive seconds.

- Engine speed is within required engine RPM range. The required engine RPM limits are found in the configuration file. If the limits are not in the configuration file, use the following default ranges: 100 - 2500 or 100 - 3000 for automatic transmissions depending on engine size; 1250 - 2500

or 1500 - 3000 for manual transmission depending on engine, refer to §3.6.12 .

- Load and dilution ($CO + CO_2$) fall within specifications. (If dyno horsepower loading and dilution remain out of specification for more than two seconds, restart test according to the restart procedures listed in 3.6.12.h..)

The emissions averaging portion may last up to 90 seconds. However, the moving 10-second emissions averaging shall extend to 90 seconds (+ EIS system response time).

If the vehicle has not stabilized in accordance with the above criteria within 25 seconds, the EIS shall prompt the technician to restart the test according to the restart procedures listed later. If the vehicle stabilizes in more than ten seconds and less than 25, the corresponding amount of time beyond 10 seconds shall be subtracted from the 90 seconds emissions-averaging portion of the test.

If the instantaneous dynamometer loading, as measured by the dynamometer load cell, differs from the command load by more than ±0.25 hp or ±2% for more than two consecutive seconds during the emissions averaging portion of the ASM test, the EIS shall set a dynamometer loading error. This shall cause the test mode to restart according to the restart procedures.

If, at any time during the emissions-averaging portion of the test mode, the above criteria fall outside the acceptable ranges, the EIS shall display one of the following appropriate messages to prompt the driver to correct the problem. In the event of a RPM range violation, the RPM must be monitored as follows: If the engine RPM is above the upper limit or below limit but above 100 RPM for more than five seconds, the test shall restart. If the engine RPM is below 100 RPM for more than 2 seconds, the test shall restart.

DISPLAY PROMPT:

OUTSIDE TEST SPEED LIMIT

OUTSIDE ENGINE RPM RANGE

DYNO LOADING ERROR

OUTSIDE DILUTION SPECIFICATION

As soon as the emission averaging portion of the test mode has begun, start monitoring the vehicle's acceleration every 0.5 seconds. If at any time the acceleration exceeds the limits in the VLT, *Acceleration Excursion Limit* field, the EIS shall display the following message to prompt the driver that the acceleration is out of range:

DISPLAY PROMPT:

OUTSIDE THE MAXIMUM ACCELERATION LIMIT

Emissions resulting from transient throttle shall not be included in the 10-second averaging data. In addition, if an acceleration violation occurs, that time-aligned data must not be used for emissions averaging. Instead, the emissions averaging will continue five seconds after the time aligned acceleration violation ceased. (Time alignment is determined by subtracting EIS response time and transport time.) If this event occurs near the end of the test (meaning another 10-second average cannot be completed), the last full 10-second average will be the ending result for the mode.

When ten seconds have passed since the emissions-averaging portion of the test mode began, the EIS shall keep track of the number of acceleration excursions. The data shall be recorded in the *Acceleration Violations ASM Mode 1* field of the test record. If the number of acceleration excursions exceeds five or the cumulative time exceeds five seconds, then the EIS shall prompt the technician to restart the test according to the restart procedures listed in 3.6.12.h.. Each violation, regardless of the length, is considered one unique violation.
If, at any time during the emissions averaging portion of the test mode, the vehicle speed deviates by more than one mph from the target speed for more than five seconds at any one time, the test shall terminate.

If the *fast pass field* in the configuration file is set to ‘Y’ the vehicle shall pass the 5015 test mode when the 10-second average readings for HC, CO and NO are all below the applicable standards for the vehicle. Once passing readings have been achieved for all three gases, the 5015 mode shall terminate and the EIS shall proceed to the next phase of the test. If the *fast pass field* in the configuration file is set ‘N’, the EIS shall use the final 10-second average readings for HC, CO, and NO to determine pass or fail for the mode. However, emissions resulting from transient throttle shall not be included in the 10-second averaging data. In the event an acceleration violation occurs during the final 10 second average, the last full 10-second average will be the end result for the mode.

For a 5015 test, 25 valid 10 second moving averages are required for a failing

test. For a 2525 test, 15 valid 10 second averages are required for a failing test. If the vehicle has passing emissions, only one valid 10-second average is required. Therefore, the minimum test time in either mode for a vehicle that has passing emissions is 2 sec + 10 sec AVE + EIS response time. Otherwise, the test shall be restarted according to the restart procedures listed in 3.6.12.h.

The emissions reading used to make the pass/fail or gross polluter determination shall be recorded in the test record and on the VIR.

e) **2525 Test Mode** (ASM Test Mode 2)
At the conclusion of the 5015 test mode, the EIS shall prompt the driver to accelerate the vehicle to 25 mph. The EIS shall display the 2525 test speed with applicable speed limits (or drive trace graphical display), test time, engine RPM and other appropriate test mode information. The dynamometer shall change to the 2525 test mode settings as soon as the 5015 test mode has been completed.

The 2525 test mode procedures are the same as those for the 5015 test mode, except for the following:

1. Maximum test duration equals 75 seconds.
2. Vehicle speed is stabilized at 25 mph ±1 mph for two consecutive seconds.
3. Vehicle speed stabilization must be achieved within 20 seconds.
4. Maximum emissions-averaging duration is 65 seconds.
5. Fifteen valid 10-second moving averages constitutes a valid test.

The number of acceleration excursions shall be recorded in the *Acceleration Excursion Violations ASM Mode 2* field of the test record.

If the *fast pass field* in the configuration file is set to 'Y' the vehicle shall pass the 2525 test mode when the 10-second average readings for HC, CO and NO are all below the applicable standards for the vehicle. Once passing readings have been achieved for all three gases, the 2525 mode shall terminate and the EIS shall proceed to the next phase of the test. If the *fast pass field* in the configuration file is set 'N', the EIS shall use the final 10-second average readings for HC, CO, and NO to determine pass or fail for the mode. However, emissions resulting from transient throttle shall not be included in the 10-second averaging data. In the event an acceleration violation occurs during the final 10 second average, the last full 10-second average will be the end result for the mode.

For a 5015 test, 25 valid 10 second moving averages are required for a failing

test. For a 2525 test, 15 valid 10 second averages are required for a failing test. If the vehicle has passing emissions, only one valid 10-second average is required. Therefore, the minimum test time in either mode for a vehicle that has passing emissions is 2 sec + 10 sec AVE + EIS response time. Otherwise, the test shall be restarted according to the restart procedures listed in 3.6.12.h..

The emissions reading used to make the pass/fail or gross polluter determination shall be recorded in the test record and on the VIR.

f) **Fast Pass/Fast Fail**
An algorithm may be included at a later date for both modes.

g) **Augmented Braking**
Augmented braking shall be "ON" and operational during the ASM test mode. The EIS is not required to provide a method to disengage the augmented braking during the ASM testing mode. Augmented braking for the ASM test consists of applying the maximum safe load with the dynamometer to bring the rolls to a complete stop. Augmented braking shall automatically occur when any of the following conditions are met:

1. The conclusion of the 2525 mode
2. The test mode meets conditions for restart
3. The test mode meets conditions for abort

The EIS shall include a way to disengage the augmented braking if the technician chooses. The augmented braking shall default to the engaged position.

h) **Restart Procedures**
Bring the rollers to a full stop. Record the time that had elapsed since the beginning of the 5015 mode (when wheels started turning). Reset the test timer to zero. The EIS shall prohibit the restart of the test until the vehicle has idled (speed <1250) twice the original elapsed time from the start of the ASM 5015 (roller speed >1 mph). Upon restart, the previously captured second-by-second data shall be deleted and new second-by-second data collected.

DISPLAY PROMPT:

TEST MODE MUST BE RESTARTED BECAUSE:

1. Conditions Causing Test Mode Restart (both modes):

i. Vehicle and/or equipment unable to stabilize with required stabilization time
ii. Acceleration violation according to the requirements stated in the test sequence
iii. Dynamometer load outside of specification for at least two consecutive seconds
iv. Sample dilution
v. Engine speed below 100 RPM for more than two seconds.
vi. Engine speed outside of range more than five seconds during one excursion.
vii. Inadequate number of valid ten-second average readings.
viii. "Low Flow" displayed on the screen for more than three seconds.

The EIS shall count the number of restarts during the test procedure. The count shall be written to the *ASM Restart Counter* field of the test record. The maximum number of restarts is two, otherwise the test will be aborted. ASM tests with no restarts will record zero in the appropriate field, two-speed idle tests will leave the field blank. Conditions for restart:

a) the dyno roll speed is < 1mph
b) the engine is idling between 400-1250 RPM
c) the EIS must wait twice the elapsed test time

Note: If the technician violates criteria a) and/or b) during the "wait time" the EIS will add the remaining "wait time" to the duration of the new violation "wait time".

2. Conditions Causing Test Mode Abort (both modes):

i. Safety-related issues
ii. Equipment failure
iii. Power loss
iv. Any of the restart conditions listed above occurring more than twice
v. Technician violates the speed tolerance for more than five seconds

Anytime the test is aborted, the EIS shall display the following prompt:

DISPLAY PROMPT:

TEST MODE ABORTED DUE TO: Display the appropriate abort reason.

i) **End of ASM Emissions Test Mode**
At the completion or termination of the ASM two-mode inspection, the EIS shall display the following message:

DISPLAY PROMPT:

END OF ASM EMISSIONS TEST

j) **Optional ASM Testing Sequences**
Based on information in the *Optional ASM Test Sequence* field of the VLT, one of the following test sequences may be performed instead of the standard ASM test (ASM Test Sequence #1). Store the ASM test sequence identifier to the *Test Sequence* field of the test record.

Optional ASM Test Sequence #2
If the VLT reference for the vehicle being tested has a "2" in the *Optional ASM Test Sequence* field, the EIS shall perform a standard ASM with the following exceptions:

- If the vehicle still fails emissions testing after 100 seconds (5015 mode), increase speed to 20 mph, then reduce speed to 10 mph, and then increase speed to 15 mph. The technician will have 10 seconds to start the speed deviation cycle (the vehicle must pass 16 mph within 10 seconds), or the test must be restarted per the restart conditions (see §3.6.12.h). Maximum duration of the speed deviation procedure is 20 seconds (the 20-second counter will start once the vehicle passes 16 mph). If the speed deviation cycle is not completed within 20 seconds, the test must restart per the restart conditions. Make the next pass/fail decision based on average emissions over a 10-second averaging period that begins 12 seconds after roll speed has returned to the 15-mph window. Store the final emission readings to the test record.

- Maximum duration for the 5015 mode is 180 seconds (without restarts).

- The standard ASM 2525 mode follows the modified 5015 mode with no modifications to the 2525 mode.

k) **Special Test Sequence Prompt**
Prior to displaying any messages about dynamometer compatibility, the EIS shall look to the Advice Code field of the VLT. When the VLT Advice Code field is filled with a number other than zero, the EIS shall go to ADVICE.DAT file and display the appropriate message (i.e. if the Advice Code field is filled with 12,

display record number 12 of ADVICE.DAT prior to displaying any messages about dynamometer compatibility). If the Advice Code field of the VLT is zero filled, do not display any message from ADVICE.DAT prior to any dynamometer related prompts.

l) **Extended Parameters**

The extended parameters table is to be used whenever the Parameters Table Row ID field in the VLT has a number other than zero, and an ASM test is indicated (i.e. vehicle is compatible with a 2WD dyno, technician selected ASM test if the option was given, etc.). The Extended Parameters table is not to be used for the test parameters when a TSI test is to be performed (i.e. test record indicates a TSI is to be performed, vehicle is not compatible with a 2WD dyno an appropriate ESC category in TABLE4 is not available, etc.). The Extended Parameters fields are to be used as follows:

Advice Code:

When this field is filled with a number other than zero, the EIS shall go to ADVICE.DAT file and display the appropriate message (i.e. if the Advice Code field is filled with 10, display record number 10 of ADVICE.DAT prior to starting the emissions test). If the Advice Code field is zero filled, do not display any message from ADVICE.DAT prior to starting the emissions test.

Pretest RPM:

This field contains the maximum RPM that the vehicle can idle at prior to starting the ASM test.

Mode 1 Test:

This field will determine if the mode is to be an ASM mode, idle mode, or the mode is to be skipped. The field will be filled as follows:
A = ASM mode
T = Idle mode
N = Mode not performed

Mode 1 Pass/Fail:

This field will determine if the emissions for this mode will be used for pass/fail decision. The field will be filled as follows:
Y = use emissions for pass/fail
N = do not use emissions for pass/fail

Mode 1 Load:

This field contains the number that the vehicle test weight is divided by to determine the horsepower for the mode.

$$HP = \frac{VTW}{XXX} - GTRL@8.65$$

Mode 1 roll speed - low limit:

This field contains the dynamometer low roll speed limit in MPH for the emissions test.

Mode 1 roll speed - high limit:

This field contains the dynamometer high roll speed limit in MPH for the emissions test.
Note: Roll speed may be commanded up to 60 mph.

Mode 1 engine speed limit - low limit:

This field contains the low RPM limit that is to be used during the emissions test.
Note: Automatic and manual transmissions are to use this limit.

Mode 1 engine speed limit - high limit:

This field contains the high RPM limit that is to be used during the emissions test.

Mode 1 test duration:

This field contains the maximum test duration for this mode (i.e. this is the same clock as the 100 second maximum duration clock is to the standard 5015 test).

Mode 1 emission duration:

This field contains the maximum emissions averaging duration for this mode (i.e. this is the same clock as the 90 second emissions clock is to the standard 5015 test).

Mode 1 stabilization duration

This field contains the time the vehicle must be stabilized within (i.e. this is the same clock as the 25 second stabilization clock is to the standard 5015 test).

Mode 1 sampling duration:

This field contains the emissions averaging time for this mode (i.e. this is the same clock as the 10 second averaging clock is to the standard 5015 test).

Mode 1 Valid number of averages:

This field contains the number of moving averages that constitute a valid test (i.e. this is the same number as the 25 ten-second moving averages is to the standard 5015 test).

Mode 1 Acceleration Excursion limit:
This field contains the maximum acceleration limit for this mode.

Note: Mode 2 and Mode 3 are handled the same way as Mode 1.
The EIS shall use the parameters from the standard test sequence for any parameters that are not listed in the Extended Parameters Table (i.e. number of restarts, number of acceleration violations, etc.).

Preconditioning Advice Code:
When this field is filled with a number other than zero, the EIS shall go to ADVICE.DAT file and display the appropriate message (i.e. if the Advice Code field is filled with 11, display record number 11 of ADVICE.DAT prior to starting the preconditioning). If the Preconditioning Advice Code field is zero filled, do not display any message from ADVICE.DAT prior to starting preconditioning.

Preconditioning Engine speed - low limit:
This field contains the low RPM limit that is to be used during preconditioning.

Preconditioning Engine speed - high limit:
This field contains the high RPM limit that is to be used during preconditioning.
Preconditioning duration:
This field shall contain the amount of time the vehicle is to be preconditioned. If this field is zero filled, do not perform preconditioning.

Note: preconditioning is to be performed when the preconditioning duration field has a number other than zero, and the vehicle fails any emission cutpoint that is used for a pass/fail decision. If preconditioning is performed, store a "4" to the *Preconditioning Procedure* field of the Test Record. If preconditioning is performed, do not save the first set of emission results to the test record. After preconditioning is performed, the EIS shall run all three modes again.

The results of the first loaded mode that is used for a pass/fail decision shall be stored to the 5015/TSI 2500 RPM fields of the test record. Results of the second loaded mode that is used for a pass/fail decision shall be stored to the 2525/TSI-idle RPM fields of the test record. Results of the first idle test that is used for a pass/fail decision shall be stored to the First try 2500 RPM fields of the test record. Results of the second idle test that is used for a pass/fail decision shall be

stored to the First try idle fields of the test record. There will never be three loaded mode tests run in a row that are used for a pass/fail decision, or three idle tests run in a row that are used for a pass/fail decision. The maximum number of modes is three.

The emission cutpoints will be provided in the VLT when using extended parameters. The first loaded mode that is used for a pass/fail decision will use the emission cutpoints from the 5015 emission fields of the VLT (i.e. 5015 HC - A, 5015 CO - A, etc.). The second loaded mode that is used for a pass/fail decision will use the emission cutpoints from the 2525 emission fields of the VLT (i.e. 2525 HC - A, 5015 CO - A, etc.). The first idle test that is used for a pass/fail decision will use the emission cutpoints from the 2500 RPM emission fields of the VLT (i.e. 2500 HC, 2500 CO, etc.). The second idle test that is used for a pass fail decision will use the emission cutpoints from the idle RPM emission fields of the VLT (i.e. Idle HC, Idle CO, etc.).

When the emission results are printed on the VIR, the EIS shall print "N/A" instead of the average values listed in the VLT.

Example test sequences are as follows:

Example # 1
Mode 1 = idle test - store results to the First try 2500 RPM fields of the test record, use emission cutpoints from the 2500 RPM emission fields of the VLT.
Mode 2 = loaded mode test - store results to the 5015/TSI 2500 RPM fields of the test record, use emission cutpoints from the 5015 emission fields of the VLT.
Mode 3 = loaded mode test - store results to the 2525/TSI idle RPM fields of the test record, use emission cutpoints from the 2525 emission fields of the VLT.

Example # 2
Mode 1 = loaded mode test - store results to the 5015/TSI 2500 RPM fields of the test record, use emission cutpoints from the 5015 emission fields of the VLT.
Mode 2 = loaded mode test - sampling duration set to zero (pass/fail decision is not made on this mode) - do not save the results to the test record, do not use emission cutpoints from the VLT.
Mode 3 = loaded mode test - store results to the 2525/idle RPM fields of the test record, use emission cutpoints from the 2525 emission fields of the VLT.

If the pass/fail results for a mode(s) is not used, do not store the results for that mode(s) to the test record. When an extended parameters record is used, store a "4" to the Test Sequence field of the test record, and store an "A" to the Test Cycle field of the test record.

Example # 3
Mode 1 = idle test- Data fields that apply for a idle test and example values. Data fields not used in the idle test mode will be zeros.

Mode 1 Test	T
Mode 1 P/F	Y
Mode 1 engine speed – low limit	04
Mode 1 engine speed – high limit	20
Mode 1 test duration	040
Mode 1 sampling duration	05

T = idle mode
Y = use emissions for P/F determination. Mode will last 40 seconds use last 5 seconds for P/F determination. Note: fast pass sequences do not apply to idle test modes.

3.6.13 **Commencement of the Emissions Sampling Period For Two-Speed Idle Test Only**
Immediately before starting the two-speed idle emissions test, the EIS shall require the operator to verify that the type of ignition system entered is correct and allow the technician to change it if it is incorrect.

a) The sampling period shall commence as soon as stability is achieved. Stability is achieved when all of the following conditions are satisfied:

1. Averaged reading for $CO+CO_2$ over a period of two seconds meet the dilution threshold.

2. Engine RPM has been within specified thresholds for at least one second.

3. Sample flow rate is adequate to prevent triggering the low flow lockout.

b) After stability has been achieved and sampling has been initiated, if any of the following conditions occur, the test mode must be restarted:

1. The dilution level is below the specified threshold.

2. Engine RPM is outside the specified thresholds.

3. Sample flow rate is not adequate to prevent triggering the low flow lockout.

c) Exceeding the RPM limits, not reaching the dilution threshold or a low flow rate during a testing period shall automatically cause the testing period to restart for that mode. The EIS shall allow the technician three attempts before displaying a message asking the technician if he/she wants to abort the test. The same message shall be displayed after each subsequent unsuccessful attempt.

3.6.14 **Two-Speed Idle Testing Sequence**

a) The following testing/sampling sequences shall be available in the EIS at the time of certification:

<u>SEQUENCE #1</u>:

Testing period:	30 seconds for each stage
First stage:	2500 RPM (± 10 %)
Second stage:	Idle RPM
Basis for test results:	Average of last 5 seconds of each sampling period.

Units of test results: Concentration measurements: PPM HC, % CO, % O_2 and % CO_2.

Test Sequence # 1 shall be used to test all vehicles except those mentioned under the test sequences below.

SEQUENCE #2:

Testing period: 30 seconds for each stage

Note: Prior to initiating the test, the technician shall be informed that the vehicle they will be testing will require special test procedures and that it is important to follow directions carefully. The technician shall then be prompted to turn the key off for 10 seconds. At the end of 10 seconds, the EIS shall prompt the technician to restart the engine and begin the 2500-RPM test. The EIS shall ensure that there is no RPM signal for 10 seconds prior to starting the 2500-RPM test.

First stage: 2500 RPM (±10 %)

Note: Between the test stages, the technician shall be prompted to turn the ignition off for 10 seconds. The EIS shall ensure that there is no engine RPM signal for at least 10 seconds. At the end of 10 seconds, the EIS shall prompt the technician to restart the engine and begin the idle test.

Second stage: Idle RPM (see standards for maximum)
Basis for test results: After the first 15 seconds of each stage, any passing reading (averaged over 5 consecutive seconds) collected during each sampling period or if none, over the last 5 seconds.
Units of test results: Concentration measurements: PPM HC, % CO, % O_2 and % CO_2

Test sequence #2 could take as little as 20 seconds if test conditions are satisfied and the vehicle meets the standards. If the emissions are not within the standards for any 5-second period (following the initial 15-second period), the test shall run the full 30 seconds.

All 1981-1984 Ford passenger cars with 5.8L (351 CID) engines shall be tested using Sequence # 2.

SEQUENCE #3:

Testing period: 30 seconds for each stage

Note: Before the 2500 RPM test starts, the EIS shall display a message to the technician indicating that the engine RPM cannot exceed 2650 for this vehicle.

First stage:	2500 RPM (+ 6 %, - 10 %)
Second stage:	Idle RPM (see standards for maximum)
Basis for test results:	Average of the last 5 seconds of each sampling period.
Units of test results:	Concentration measurements: PPM HC, % CO, % O_2 and % CO_2

All 1984 Jeeps with a 2.5L (150 CID) light-duty trucks shall be tested using test Sequence # 3.

SEQUENCE #4:

Testing period:	30 seconds for each stage
First stage:	2500 RPM (±10 %)

Note: A message shall be displayed to the technician indicating that the vehicle being tested will require special test procedures and that it is important that they follow directions carefully. The EIS shall display the following prompt:

DISPLAY PROMPT:

IS THE VEHICLE FUEL INJECTED? (YES/NO)

Programming Criteria:

1. If YES, perform test sequence # 4.
2. If NO, follow inspection sequence # 1.

The technician shall be prompted to set the parking brake, press the brake pedal and run the IDLE test with the transmission in DRIVE. When the idle test is complete, the technician shall be prompted to return the transmission to PARK.

Second stage:	Idle RPM (see standards for max.)
Basis for test results:	Average of last 5 seconds of each sampling period.
Units of test results:	Concentration measurements: PPM HC, % CO, % O_2 and % CO_2

All 1984 Chrysler/Dodge/Plymouth passenger cars having a 2.2L, fuel-injected engines with automatic transmissions shall be tested using Sequence # 4.

SEQUENCE #5:

Given the problems with the ZF automatic transmission, the BAR prefers that the affected vehicles be tested at their dealerships. Accordingly, if the technician enters an A (for automatic) for the transmission type, and if the vehicle make, model and model year match BMW/Peugeot/Volvo criteria, the EIS shall display the following message:

BECAUSE OF THE POSSIBILITY OF TRANSMISSION DAMAGE TO THIS VEHICLE, THE BAR PREFERS THAT IT BE INSPECTED AT ITS DEALERSHIP. IF YOU STILL WISH TO PERFORM THE INSPECTION, YOU MAY DO SO AT YOUR OWN RISK OR YOU MAY ABORT THE TEST.

Note: If the technician chooses to continue testing this vehicle, display the following message before beginning the test sequence.

BEFORE BEGINNING THE EMISSIONS TEST, MAKE SURE THE ENGINE IS AT NORMAL OPERATING TEMPERATURE. IF NOT, THE VEHICLE SHOULD BE DRIVEN UNTIL IT IS. DO NOT WARM THE ENGINE BY RAISING THE RPM ABOVE IDLE WHILE THE TRANSMISSION IS IN PARK OR NEUTRAL.

Perform idle test only (delete first stage).

Testing period:	30 seconds for idle stage
Engine Speed:	Idle RPM [Note: One stage only.]
Basis for test results:	Average of the last 5 seconds of the sampling period.
Units of test results:	Concentration measurements: PPM HC, % CO, % O_2 and CO_2

Note: All 1984-1987 BMWs with automatic transmission, 1985-1988 Volvo 740s with automatic transmission, and 1986-1987 Peugeot 505s with automatic transmission shall be tested using test Sequence #5. If the engine has been changed to a different year, the special test sequence shall follow the year of the vehicle.

Example:

* 1985 BMW with a ZF transmission and original engine uses test sequence #5 and the emission standards for 1985.
* 1985 BMW with a ZF transmission and a 1990 engine uses test sequence #5 and emission standards for 1990.

SEQUENCE #6:

Testing period: 30 seconds for each stage
First stage: 2500 RPM (±10%)
Second stage: Idle RPM
Basis for test results:
Stage 1: Average of last 5 seconds of sampling period.

Stage 2: Same as stage 1; however, if the emissions are not within the standards and the idle RPM was below 900, then the technician shall be prompted to rev the engine so that the idle speed is a minimum of 900 RPM (but not to exceed the manufacturer's specifications), and to continue the test for another 30-second Second-Stage Idle Test. After the first 15 seconds of the repeated second stage, any passing reading (averaged over 5 consecutive seconds) collected during the sampling period, or, if none, the average reading over the last 5 seconds of the stage.
Units of test results: Concentration measurements: PPM HC, % CO, % O_2 and % CO_2

All 1985 Ford Ranger 2.3L (140 CID) light duty trucks and 1986 Ford Ranger and Aerostar 2.3L (140 CID) light duty trucks shall be tested using test sequence #6.

SEQUENCE #7:

Testing period: 25 seconds for each stage

Note: Prior to beginning the first stage, the technician shall be informed that the vehicle he/she will be testing will require special test procedures and that it is important to follow directions carefully (this information shall not be displayed prior to the "second-chance" test if preconditioning is required). The technician shall then be prompted to ensure the tachometer lead is connected, start the vehicle and allow it to idle. At the end of 156 seconds, the EIS shall prompt the technician to insert the probe and begin the 2500 RPM test. The EIS shall ensure that there is an RPM signal for 156 seconds prior to starting the 2500 RPM test. This 156-second warm-up shall not be required prior to the "second-chance" test if preconditioning is required.

First stage: 2500 RPM (±10 %)
Second stage: Idle RPM (see standards for maximum)

Basis for test results: After the first 10 seconds of each stage, averaging shall begin. Any passing reading (averaged over 5 consecutive seconds) collected during each sampling period or if none, over the last 5 seconds.
Units of test results: Concentration measurements: PPM HC, % CO, % O_2 and % CO_2

Test Sequence #7 could take as little as 15 seconds if test conditions are satisfied and the vehicle meets the standards. If the emissions are not within the standards for any 5-second period (following the initial 15-second period), the test shall run the 25 seconds.

All 1985-1986 GM passenger cars with 5.0L engine and VIN-Y ("Y" in eighth position of the VIN) engines shall be tested using Sequence # 7.

b) Accommodations shall be made to allow for additional test sequences and sampling periods, which can be added at a later date. Based on information in the *TSI Test Sequence* field of the VLT, the following test sequence may be performed instead of the standard ASM test sequences listed above.

SEQUENCE #8:

Testing period: 25 seconds for each stage

Note: Prior to initiating the test, the technician shall be informed that the vehicle they will be testing should be at normal operating temperature prior to starting the test. The technician shall then be prompted to start the vehicle, snap the throttle and allow the throttle plate to snap closed. The EIS shall prompt the technician to insert the probe and begin the 2500-RPM test.

First stage: 2500 RPM (±10 %)
Second stage: Idle RPM (see standards for maximum)
Basis for test results: After the first 10 seconds of each stage, averaging shall begin. Any passing reading (averaged over 5 consecutive seconds) collected during each sampling period or if none, over the last 5 seconds.
Units of test results: Concentration measurements: PPM HC, % CO, % O_2 and % CO_2

Test Sequence #8 could take as little as 15 seconds if test conditions are satisfied and the vehicle meets the standards. If the emissions are not within the standards for any 5-second period (following the initial 10-second period), the test shall run the 25 seconds.

All vehicles designated in the VLT with an "8" in the *TSI Test Sequence* field shall be tested using Sequence # 8.

c) The different test sequences are designed to make the Smog Check test procedure correlate better with the Federal Test Procedure. Most of the different test sequences will be designed to prevent incorrectly failing pattern failures (errors of commission). Therefore, the BAR will provide information to the manufacturers regarding which procedure should be used with which engine families. The EIS should be designed to automatically run the appropriate test sequence after vehicle identification information is entered. Additional test sequences selected by the BAR will be provided to the manufacturers as soon as they become available. The test sequence number shall be documented in the *Test Sequence* field of the test record and the VIR.

d) When the vehicle has met RPM, flow rate and dilution conditions, the emissions test sequence shall begin and the display shall show the word TESTING and time remaining in the test sequence. The EIS shall record the emission readings at the end of the TESTING period, for each test mode.

e) For vehicles that have had engine changes, special test sequences shall follow the year of the engine, except special test sequence #5.

Example:
A 1980 Ranger with a 1985 2.3L engine uses special test sequence #6 and emission standards for 1985.

3.6.15 **Vehicle Preconditioning Sequence For Two-Speed Idle Test**

If a vehicle fails any of the TSI emission tests, the EIS shall instruct the technician to precondition the vehicle and run a second chance test. The EIS shall also use special test sequences for the second chance test if they were used for the first test. For example: if the EIS uses special test sequence #2 and the vehicle requires preconditioning, the EIS shall use special test sequence #2 for the second chance test. The EIS shall also follow any RPM restrictions that the special test sequence may require, i.e., a 1985 BMW with a ZF transmission shall NOT be preconditioned at high RPM. Based on the surveys conducted for the BAR, and on studies conducted on suspected pattern failures by the EPA, all model vehicles failing an initial test shall be preconditioned in the following manner, and retested:

DISPLAY PROMPT:

REMOVE THE EXHAUST PROBE FROM THE TAILPIPE.

PROCEDURE #1: <u>For All Vehicles Except Those Covered by Procedures 2 and 3</u>

OPERATE THE VEHICLE AT 2500 ±300 RPM FOR THREE MINUTES WITH THE TRANSMISSION IN "PARK" OR "NEUTRAL."

AT THE END OF THE THREE-MINUTE PERIOD, ALLOW THE VEHICLE TO RETURN TO IDLE AND STABILIZE FOR 10 SECONDS, BUT DO NOT TURN THE IGNITION SWITCH OFF.

INSERT THE PROBE INTO THE TAILPIPE.

AT THE END OF THE 10-SECOND PERIOD, IMMEDIATELY BEGIN THE EMISSIONS TEST.

<u>Programming Criteria For Procedure # 1</u>

The EIS shall detect a signal in the proper range for 3 minutes within a 3-minute and 15-second period, with no single excursion exceeding 5 seconds. A message shall be displayed instructing the technician to adjust the engine RPM, restart the test or abort the test as appropriate if the RPM is outside of the specified limits. The preconditioning period shall begin as soon as the engine RPM is stable (for a period of 1 second) and in the proper range. To avoid loading the sample system with vehicle exhaust during the preconditioning process, the EIS shall either back purge during the preconditioning sequence or prevent preconditioning if the probe is in the tailpipe. Preconditioning prevention could be determined by checking for emissions prior to or during the preconditioning sequence.

When the preconditioning period is complete, the technician shall be instructed to allow the vehicle to return to idle and the EIS shall ensure that the engine speed is reduced for at least 10 seconds, but no more than 30 seconds. If the engine speed is reduced for less than 10 seconds or more than 30 seconds, a message shall be displayed instructing the technician to either restart the preconditioning procedure or abort the test. Messages indicating the retest instructions shall be displayed at the end of the 10-second idle period.

PROCEDURE #2: <u>For 1981-1986 Fords and 1984-1985 Honda Preludes</u>

OPERATE THE VEHICLE AT 2500 ±300 RPM FOR 3 MINUTES WITH THE TRANSMISSION IN "PARK" OR "NEUTRAL."
AT THE END OF THE 3-MINUTE PERIOD, ALLOW THE VEHICLE TO RETURN TO IDLE AND IMMEDIATELY TURN THE IGNITION KEY OFF.

INSERT THE PROBE INTO THE TAILPIPE.

LEAVE THE IGNITION OFF FOR 10 SECONDS THEN RESTART THE ENGINE AND PROCEED IMMEDIATELY WITH THE EMISSIONS TEST.

<u>Programming Criteria For Procedure # 2</u>

Within 30 seconds of having completed the three-minute portion of the preconditioning sequence, the technician shall release the throttle, turn off the ignition for at least 10 seconds and insert the probe and return the engine to 2500 (±250) RPM*. The 30-second time period shall begin when the engine RPM drops below 2200. The EIS shall provide prompts indicating when the technician should release the throttle, turn the ignition key off, insert the probe, and to restart the engine and immediately increase the engine RPM to the appropriate range as specified. The emissions test shall begin as soon as the engine RPM reaches the appropriate range. The EIS shall display the time remaining before the preconditioning period will have to be restarted or the test aborted.

PROCEDURE #3: <u>For "ZF" Automatic Transmission</u>

Given the problems with the ZF automatic transmission, the BAR prefers that the affected vehicles be tested at their dealerships. Accordingly, if the technician enters an A (for automatic) for the transmission type, and if the vehicle make, model and model year match BMW/Peugeot/Volvo criteria, the EIS shall display the following message:

*Emissions test RPM requirements may vary depending upon the test sequences.

BECAUSE OF THE POSSIBILITY OF TRANSMISSION DAMAGE TO THIS VEHICLE, THE BAR PREFERS THAT IT BE INSPECTED AT ITS DEALERSHIP. IF YOU STILL WISH TO PERFORM THE INSPECTION, YOU MAY DO SO AT YOUR OWN RISK. PRESS "ENTER" TO CONTINUE. IF NOT, PRESS "ESC" TO ABORT THE TEST.

For all 1984-1987 BMWs with automatic, 1986-1987 Peugeot 505s with automatic, and 1985-1988 Volvo 740s with automatic transmission.

If these vehicles fail the first chance, display the following message:

DUE TO POSSIBLE SERIOUS TRANSMISSION DAMAGE, DO NOT RAISE THE ENGINE SPEED ABOVE IDLE RPM WHILE THE TRANSMISSION IS IN NEUTRAL OR PARK. IF THE VEHICLE NEEDS TO BE PRECONDITIONED, DRIVE IT UNTIL IT HAS REACHED OPERATING TEMPERATURE.

The EIS shall start the second chance test as soon as the EIS detects engine RPM within the idle RPM range. The EIS shall perform the emissions measurement at idle for 30 seconds. After the second chance, the EIS shall allow the technician to continue with the remainder of the inspection.

Programming Criteria For All Procedures:

The manufacturer shall provide for the capability to utilize as many different preconditioning procedures as can be contained in the EIS. The preconditioning procedure number shall be recorded on the test record in the *Preconditioning Procedure* field.

1) **For all procedures** - The EIS shall automatically instruct the technician to initiate the preconditioning procedure whenever a vehicle fails the emissions test before the test can proceed. The EIS shall select and display only the appropriate preconditioning procedure based on the vehicle make and model year information entered by the technician.

2) **For procedure # 1** - A message shall be displayed instructing the technician to remove the exhaust probe, increase the engine RPM to 2500 (±300) and hold it there for 3 minutes. The EIS shall detect a signal in the proper range for 3 minutes within a 3-minute and 15-second period, with no single excursion exceeding 5 seconds. A message shall be displayed instructing the technician to adjust the engine RPM, restart the test or abort the test as appropriate if the RPM is outside of the specified limits. The preconditioning period shall begin as soon as the engine RPM is stable (for a period of 1 second) and in the proper range. To

avoid loading the sample system with vehicle exhaust during the preconditioning process, the EIS shall either back purge during the preconditioning sequence or prevent preconditioning if the probe is in the tailpipe. Preconditioning prevention could be determined by checking for emissions prior to or during the preconditioning sequence.

When the preconditioning period is complete, the technician shall be instructed to allow the vehicle to return to idle and the EIS shall ensure that the engine speed is reduced for at least 10 seconds, but no more than 30 seconds. If the engine speed is reduced for less than 10 seconds or more than 30 seconds, a message shall be displayed instructing the technician to either restart the preconditioning procedure or abort the test. Messages indicating the appropriate ignition key on/off and retest instructions shall be displayed at the end of the 10-second idle period. The technician shall be instructed to strike the ENTER key as soon as possible after 10 seconds of idling has occurred.

3) **For all procedures** - The EIS shall display the engine speed and the time remaining during each stage of the preconditioning sequence. The number of the preconditioning procedure shall be recorded on the test record automatically by the EIS. If no preconditioning procedure was used (vehicle passed the emissions portion of the test the first time), the *preconditioning procedure* field shall be filled with a space.

4) ERROR MESSAGES:

(For all procedures)
NO RPM SIGNAL - MAKE SURE THE TACH LEAD IS CONNECTED.

(For procedures 1 & 2)
ENGINE RPM DROPPED BELOW 2250-RPM -RAISE THE ENGINE SPEED TO 2500 (±250) RPM AND HOLD IT THERE FOR 3 MINUTES.

(For procedures 1 & 2)
ENGINE RPM INCREASED ABOVE 2750 RPM-REDUCE THE ENGINE SPEED TO 2500 (±250) RPM AND HOLD IT THERE FOR 3 MINUTES.

5) **For all procedures -** If a vehicle subject to preconditioning receives a second-chance test, the emissions results of both tests shall be stored in the test record. The results for either or both tests shall not be written to the test record until the pass/fail decision has been made by the EIS.

The emission values from the first test should be written to a "scratch" file on the EIS hard drive until a pass/fail decision on the emissions values has been

determined. If the emissions indicate a pass, the values from the first test shall be written to the *Emissions Test Results: Final Values* fields of the test record, and the *Emissions Test Results: Before Preconditioning/ASM Test Sequence #3* fields shall remain blank.

Note: For the two-speed emissions test, NO is not measured. When two-speed emissions data is inserted into the *Emissions Test Results: Final Values* fields of the test record, the NO field should remain blank.

If preconditioning and a second chance emissions test is given, the second chance emissions values shall be written to the *Emissions Test Results: Final Values* fields of the test record. The results of the first test, which are in the "scratch" file, shall be written to the *Emissions Test Results: Before Preconditioning/ASM Test Sequence #3* fields of the test record.

NEW DESCRIPTION	LAYOUT
TWO-SPEED IDLE AT 2500 RPM	
DCF	N.NN
RPM	NNNN
AIR/FUEL RATIO	NN.N
CATALYST EFFICIENCY	X
DCF HC	NNNN
DCF CO	NN.NN
DCF CO_2	NN.N
O_2	NN.N
TWO-SPEED IDLE AT IDLE RPM	
DCF	N.NN
RPM	NNNN
AIR/FUEL RATIO	NN.N
CATALYST EFFICIENCY	X
DCF HC	NNNN
DCF CO	NN.NN

DCF CO_2	NN.N
O_2	NN.N

3.6.16 **Air/Fuel Ratio Calculation**

The average air/fuel ratio shall be calculated during all emissions test modes (ASM 5015, ASM 2525, and two-speed idle test). The ratio shall be stored in the *Average Air/Fuel Ratio-ASM 5015 or TSI-2500 RPM* and *Average Air/Fuel Ratio-ASM 2525 or TSI-Idle RPM* fields of the test record.

The average air/fuel ratio shall be calculated during the pass/fail determination window using the DCF values in the following formula:

<u>Air-to-Fuel Ratio (Based on Oxygen Balance)</u>

This equation is an extension of the Spindt formula. It adds an oxygen-to-carbon ratio, needed to properly calculate A/F for oxygenated gasolines and alcohol-based fuels.

$$A/F_o = \frac{138.1918}{M_F}\left(\frac{CO_2 + \frac{CO}{2} + \frac{R_{OC}}{2}HC + \frac{H_2O}{2} + \frac{NO}{2} + O_2}{CO_2 + CO + HC} - \frac{R_{OC}}{2}\right)$$

where

A/F_o	=	Oxygen-balanced air-to-fuel ratio
R_{OC}	=	Oxygen-to-carbon ratio of fuel
M_F	=	Gram-molecular weight of fuel, $= 12.0115 + (1.00797*R_{HC}) + (15.9994*R_{OC})$
HC	=	Hydrocarbon concentration in exhaust, %C, = 6*(HC, ppm hexane)/10,000
CO	=	Carbon monoxide concentration in exhaust, %
NO	=	Nitric oxide concentration in exhaust, %, = (NO, ppm)/10,000
CO_2	=	Carbon dioxide concentration in exhaust, %
O_2	=	Oxygen concentration in exhaust, %

138.1918 = $M_A * [100/(\%\{O_2\}_A)]$

M_A = Gram-molecular weight of air, = 28.965

$\%\{O_2\}_A$ = Percent of oxygen in the air, = 20.9

H_2O = Water formation during combustion, expressed by the following equation:

$$H_2O = \frac{[CO + CO_2]\frac{R_{HC}}{2}}{\left[\frac{CO}{WC * CO_2}\right] + 1.0} = \frac{1.75\,CO_2\,(CO + CO_2)\,R_{HC}}{CO + 3.5\,CO_2}$$

WC = Water gas constant, = 3.5
R_{HC} = Hydrogen-to-carbon ratio of fuel

Hydrogen To Carbon and Oxygen to Carbon Ratios for Various Fuels

Fuel	Formula	R_{HC}	R_{OC}
*CA Phase 2 Reformulated Gasoline	$C_7H_{13.89}O_{0.12}$	1.980	0.017
Compressed Natural Gas (CNG)	CH_4	4.000	0
E85 (Ethanol)	C_2H_5OH (85%) + **gasoline (15%)	2.831	0.425
M85 (Methanol)	CH_3OH (85%) + **gasoline (15%)	3.681	0.850
Propane	C_3H_8	2.667	0

* Note: The formula is an empirical average, based on the following mass percentages: C: 84.17%, H: 13.89%, O: 1.94%.

**Note: Gasoline blended with ethanol or methanol is assumed to have an empirical formula of C8H15, R_{HC} of 1.875, and R_{OC} of 0.0.

3.6.17 **Catalytic Converter Efficiency Determination**

The catalytic converter efficiency determination shall be performed on all vehicles that fail the emissions portion of the Smog Check. The EIS shall analyze the final emission test results to determine catalytic converter efficiency based on the following criteria:

A catalyst is presumed to be defective if the final ten-second average CO concentration is >0.3% for either the ASM 5015 or the ASM 2525 test mode (use the final five second average periods for TSI, either the 2500 rpm or idle tailpipe test), and the corresponding ten-second average O_2 concentration is ≥0.4% AND

the corresponding ten-second CO_2 concentration is less than 14%. The values used for the five second average for TSI, or ten second average for ASM shall be DCF corrected, except for CO_2 and O_2.

Programming Criteria:

1) The EIS shall automatically determine the efficiency of the catalytic converter if the vehicle fails the emissions portion of the test. The determination shall be made immediately after the end of the ASM 2525 test (or at the end of the idle test for TSI). The data (pass or fail) shall be stored in the *Catalyst Efficiency Test Result (ASM 5015 or TSI-2500 rpm)* and *Catalyst Efficiency Test Result (ASM 2525 or TSI-Idle rpm)* fields of the test record but shall not be displayed on the screen or printed on the VIR.

2) If the vehicle does not require the catalytic converter efficiency test, N (not applicable) shall be written to the *Catalyst Efficiency Test Result (ASM 5015 or TSI-2500 rpm)* and *Catalyst Efficiency Test Result (ASM 2525 or TSI Idle rpm)* fields of the test record.

3.6.18 **Emission Control Systems Visual Inspection**

a) Visual Inspection Procedures

All vehicles, regardless of test type or inspection reason, shall receive a visual inspection.

DISPLAY PROMPT:

EMISSION CONTROL SYSTEMS VISUAL INSPECTION

ENTER ONE OF THE FOLLOWING CODES FOR EACH EMISSION CONTROL SYSTEM:

CODE	DESCRIPTION
P	**PASS**
D	**DISCONNECTED**
M	**MODIFIED**
S	**MISSING**
N	**NOT APPLICABLE**
F	**DEFECTIVE**

EMISSION CONTROL SYSTEM

- **PCV System**
- **Thermostatic Air Cleaner**
- **Fuel Evaporative Controls**
- **Catalyst**
- **Exhaust Gas Recirculation**
- **Ignition Spark Controls**
- **Carburetor**
- **Fuel Injection**
- **Air Injection**
  Pump air injection (display if yes is entered at the air injection prompt)
  Pulse air injection (display if yes is entered at the air injection prompt)
- **O_2 Sensor And Connectors**
- **Wiring of Other Sensors/Switches/Computer**
- **Vacuum Line Connections to Sensors/Switches**
- **Other Emission Related**
  Components Add-on emission-related components
  NOx retrofit devices
  Retrofit crankcase emission control devices
- **Liquid Fuel Leaks**
- **Fuel Tank Cap**
  Fuel tank cap (see functional test to see how visual test and functional test prompts are to be displayed).

Programming Criteria: (*Visual Inspection*)

1. The EIS shall prevent the entry of either Pass or Missing, Modified or Disconnected results code for both the Carburetor and Fuel Injection. A vehicle has only one type of fuel induction system and therefore an N (not applicable) must not be entered for both.

2. The EIS will display each emission control system. The EIS will require the technician to enter a single code for each emission control system.

3. The Fuel Tank Cap visual inspection will be prompted separately rather than being included with the Fuel Evaporative Control's visual.

4 The EIS shall prompt YES or NO for **"Air Injection**." The response "Y" for YES or "N" for NO shall be recorded in the *Air Injection* field of the test record. If NO, the EIS shall automatically enter "N" in the *Pulse Air* field and *Air Pump* field of the test record. If YES, the EIS shall prompt the technician to select either "Pump Air Injection" or "Pulse Air Injection" system. The EIS shall require the entry of P, D, M, S, N, or F for air pump or pulse air injection if a yes was entered for the air injection. The EIS shall allow only one type of air injection, therefore "N" must be entered for one of the air injection sub menus. The EIS shall enter the appropriate letter (P, D, M, S, N, or F) to the *Air Pump* field and *Pulse Air* field of the test record, and print the appropriate type and result to the VIR.

b) **Test Record Entries:**
A single entry is mandatory for each byte. The EIS shall be designed so that only a P, D, M, S, N or F can be entered by the technician for this field, except for the *Liquid Fuel Leaks field* which shall only accept P, F, or N. The entries must be made in sequence, but technicians may be allowed to edit previous entries. The technician shall make a positive entry for each ECS. The EIS shall have no built in defaults for the visual inspection.

The entries shall be recorded in the appropriate field in the test record. If any entries of D, M or S, are made into any fields in the visual inspection results portion of the test record, then a T will be entered in the *Visual Inspection Result* field of the test record. If no entries of D, M or S and any entries of F are made into these fields, then an F will be entered in the *Visual Inspection Result* field of the test record. If all entries in any fields in the visual inspection results portion of the test record are either P or N, then a P will be entered into the *Visual Inspection Result* field of the test record. The results shall be printed on the VIR.

3.6.19 **Functional Checks**

The following functional checks will be performed on all vehicles tested (ASM and two-speed idle) regardless of inspection reason, except as indicated.

DISPLAY PROMPT:

THE FUNCTIONAL INSPECTION

ENTER ONE OF THE FOLLOWING CODES FOR EACH OF THE FUNCTIONAL CHECKS:

CODE	DESCRIPTION
P	**PASS**
F	**FAIL**
N	**NOT APPLICABLE**

Note: Print visual or functional, whichever applies, next to the EGR and fuel cap results on the VIR.

Manual Functional Checks

- **Exhaust Gas Recirculation System** (display for two-speed idle testing only)
- **Ignition Timing**
- **Malfunction Indicator Light (MIL)/Check Engine Light**
- **Fuel Cap Integrity Test**
- **Fillpipe Restrictor (display for "I" initial registration reason only)**

Programming Criteria:

1) General: The EIS shall prompt the technician to perform the indicated functional inspection and enter P, F or N results (or T in the *Fillpipe Restrictor* field). If all of the fields in the Functional Check Results portion of the test record (except for the *Fuel Cap Provided* field) contain either a P or N, then P will be entered in *Functional Test Result* field of the test record. If any of these fields contain an F, then F will be entered into *Functional Test Result* field of the test record. If any of these fields contain a T, then T will be entered into the *Functional Test Result* field of the test record. The results will be printed on the VIR.

   If a functional check is not required for any item, the EIS shall automatically populate the field with an "N" indicating that a function check of the item was not applicable.

2) Exhaust Gas Recirculation: The functional inspection of the EGR applies only to vehicles subject to the two-speed idle test; the EGR functional test does not apply to vehicles subject to an ASM test. For ASM tests, the *Exhaust Gas Recirculation System (Functional)* field of the test record shall be filled with an "N".

DISPLAY PROMPT:

CHECK EGR ACCORDING TO THE MANUFACTURER'S EGR CHECK PROCEDURES AND ENTER P, F OR N.

3) Ignition Timing: Ignition timing shall be performed on all vehicles, except for vehicles with non adjustable timing.

Programming Criteria: *(Ignition Timing Check)*

1. The EIS shall prompt the technician to prepare the vehicle for the ignition timing check in accordance with the vehicle's underhood specification and manufacturer's prescribed check procedures. The EIS shall display the following message:

   DISPLAY PROMPT:

   SEE VEHICLE'S UNDERHOOD LABEL AND MANUFACTURER'S TIMING CHECK PROCEDURES.

2. The EIS shall prompt the technician to verify that the vehicle's engine speed for the ignition timing check is within the manufacturer's tolerance, if applicable.

   DISPLAY PROMPT:

   IS THE VEHICLE ENGINE RPM OUT OF MANUFACTURER'S RECOMMENDED TOLERANCE? (YES/NO)

   If the technician enters NO, the EIS shall prompt the technician to proceed with the ignition timing check. If the technician enters YES, the EIS shall record a "U" for Engine Speed Failure in the *Ignition Timing* field of the vehicle test record and print the following message on the VIR.

   THIS VEHICLE FAILED THE IGNITION TIMING CHECK DUE TO ENGINE RPM BEING OUT OF TOLERANCE.

3. The technician shall be prompted to enter the results of the ignition timing check. If the technician enters a P or an F for ignition timing, the EIS shall prompt the technician to enter the vehicle's engine ignition timing in degrees followed by a B for before top dead center or an A for after top dead center. If the technician enters 0 degrees timing, no entry (A or B) is required. If the ignition timing can not be checked due to slipped damper, non-visible timing mark or other mechanical problems, the EIS shall prompt the technician to enter M (Mechanical Problem) and proceed with the inspection. M shall also be recorded in the test record. For non-adjustable computer-controlled vehicles, the software shall allow entry of Not Applicable (N) for the timing check, and shall store this in the *Ignition Timing* field of the vehicle test record. Entries of F, M or U shall all be considered a failure of the ignition timing check.

DISPLAY PROMPT:

ENTER RESULT OF IGNITION TIMING CHECK:
P = PASS
F = FAIL
M = MECHANICAL PROBLEM PROHIBITS TIMING CHECK
N = NON ADJUSTABLE TIMING

DISPLAY PROMPT: (FOR PASS/FAIL ENTRIES)

ENTER DEGREES.

4) Malfunction Indicator Light (MIL)/Check Engine Light: The technician shall be prompted to perform the MIL/Check Engine Light functional test and to enter the results of the test. Acceptable responses are "P" for Pass, "F" for Fail or "N" for non-applicable.

DISPLAY PROMPT:

PERFORM THE MIL/CHECK ENGINE LIGHT FUNCTIONAL TEST.

ENTER RESULTS OF MIL/CHECK ENGINE LIGHT FUNCTIONAL TEST (P, F, OR N)

Programming Criteria: (MIL/Check Engine Light)

A) OBD I

P, N or F shall be recorded in the *Malfunction Indicator Light (MIL)/Check Engine Light* field of the test record (P= pass, F= fail, N= Not applicable).

B) OBD II

The OBDII test consists of two parts, a visual check of the MIL/check engine light, and fault code retrieval. The EIS shall perform OBDII check as follows:

a. If there is an "N" in the OBDII Check field of the configuration file, only prompt the technician to enter "P", "F", or "N" for the MIL/check engine light. If there is a "Y" in the OBDII Check field of the configuration file, perform the OBDII check as listed below.

b. For 1996 and newer passenger cars and light duty vehicles (trucks and motor homes less than 14,001 lbs.) display the following prompt:

IS THIS VEHICLE SUPPOSED TO GET AN OBDII FUNCTIONAL CHECK? (YES/NO)

If yes, prompt the technician to visually inspect the MIL/check engine light, and enter "P" or "F" for the light. Once "P" or "F" have been entered, the EIS shall prompt the technician to hook up the EIS's OBDII connector. Then the EIS shall prompt the technician to start the vehicle, and allow the vehicle to idle. Next, the EIS shall access the OBD system and check for readiness indicators and fault codes.

If no, only prompt the technician to enter "P", "F", or "N" for the MIL/check engine light.

c. If there is an "N" in the OBDII field of the VLT, do not prompt the technician to hook up the OBDII connector. For vehicles with an "N" in the OBDII field of the VLT, prompt the technician to enter "P", "F", or "N" for the MIL/check engine light. The "N" in the OBDII field overrides the criteria listed in item b above.

1. The EIS shall determine the pass/fail status of the OBD systems as follows:

Pass (P) No emission related faults (or emission related

faults detected, but the MIL was not commanded on), readiness indicators turned on, and "P" was entered for the MIL/check engine light visual test.

Note: Only use the readiness indicators for pass/fail criteria if there is a match with the vehicle's readiness indicator(s) that is not turned on and the readiness indicators in the VLT, or OBD_RED.DAT. In addition to looking for a match between the vehicle's readiness indicators, the EIS shall use a count supplied in the VLT or OBD_RED.DAT to determine the maximum number of monitors that can not be turned on and still pass.

If a monitor is not supported by a vehicle's OBDII system, ignore the monitor.

Fail (F) Faults detected (emission related codes) with the MIL commanded on, or "F" was entered for the MIL/check engine light.

Note: Only fail the OBDII system for emission related fault codes (Functional check) when the MIL is commanded on.

Not Ready (R) = (F) Vehicle has not been operated long enough since faults were cleared (readiness indicators not turned on, or too many readiness indicators have not been turned on). The vehicle fails the test.

Note: Only use the readiness indicators for pass/fail criteria if there is a match with the vehicle's readiness indicator(s) that is not turned on and the readiness indicators in the VLT, or OBD_RED.DAT. In addition to looking for a match between the vehicle's readiness indicators, the EIS shall use a count supplied in the VLT or OBD_RED.DAT to determine if too many readiness indicators have not been turned on. If too many readiness indicators have not been turned on, the vehicle fails.

If a monitor is not supported by a vehicle's OBDII system, ignore the monitor.

No Communication (U) = (F) Unable to communicate with OBD system. The vehicle fails the test.

If there is failed communication, prompt the technician to recheck the OBDII hookup and try again. If failed communication occurs again, store U to the fault codes field of the test record, and print the following message on the VIR:

THIS VEHICLE FAILED THE MIL/CHECK ENGINE LIGHT DUE TO OBD COMMUNICATION FAILURE.

If the readiness indicators are not turned on, store the appropriate readiness indicator codes (see item 3 below for readiness indicator codes to store in the test record) to the *readiness indicators* field of the test record, and print the following message on the VIR: (Only print the following message when the readiness indicator(s) is used for the pass/fail criteria.)

THIS VEHICLE FAILED THE MIL/CHECK ENGINE LIGHT DUE TO FAILURE TO SUCCESSFULLY COMPLETE ALL OBD SELF TESTS.

The standard emission related fault codes and corresponding description shall be displayed, printed on the VIR and stored in the test record (only print and display emission related fault codes when the MIL is commanded on, store all emission related fault codes, up to eleven codes). If the failure was due to the MIL/check engine light visual inspection, store L to the fault codes field of the test record, and print the following message on the VIR:

THIS VEHICLE FAILED MIL/CHECK ENGINE LIGHT DUE TO A WARNING LAMP FAILURE.

A list of emission related fault codes along with their corresponding description shall be in OBDII.DAT. A list of readiness indicators and the number of indicators that must be turned on shall be in the VLT or OBD_RED.DAT. The EIS shall first look to the VLT for the readiness indicators and count. If the misfire monitor status field in the VLT is filled with a 'Y' or 'N', all readiness indicator information will be contained in the VLT. If the misfire monitor status field in the VLT is filled with a space, all the readiness indicator information will be contained in OBD_RED.DAT. The EIS shall compare all readiness indicators that are not turned on against those in the VLT, or OBD_RED.DAT. If there is a match between the readiness indicators that are not turned on, and too many of the vehicle's readiness indicators are not turned on, the vehicle fails.

Examples:

OBDII is enabled in CONFIG.DAT
OBDII required field in the VLT is space filled
1996 passenger vehicle, technician states vehicle is supposed to get an OBDII check

VLT fields filled as follows:		OBD_RED.DAT filled as follows:		Vehicle's OBDII system filled as follows: (On = Ready Off = Not Ready)	
Misfire	N	Misfire	Y	Misfire	On
Fuel System	N	Fuel System	Y	Fuel System	On
Comprehensive component	Y	Comprehensive component	Y	Comprehensive component	On
Catalyst	Y	Catalyst	Y	Catalyst	On
Heated catalyst	Y	Heated catalyst	Y	Heated catalyst	Off
Evaporative system	Y	Evaporative system	Y	Evaporative system	On
Secondary air system	Y	Secondary air system	Y	Secondary air system	Not supported
A/C system refrigerant	N	A/C system refrigerant	Y	A/C system refrigerant	On
Oxygen sensor	N	Oxygen sensor	Y	Oxygen sensor	On
Oxygen sensor heater	N	Oxygen sensor heater	Y	Oxygen sensor heater	On

EGR system	N	EGR system	Y	EGR system	On
No match	N	No match	N		
Count	2	Count	5		

The EIS shall use the readiness indicator information from the VLT. To pass the readiness indicator portion of the OBDII check, the vehicle cannot have two or more of the following readiness indicators not set and still pass the readiness indicators check:

Comprehensive component
Catalyst
Heated catalyst
Evaporative system
Secondary air system

The above vehicle passes the readiness indicators check.

Example #2:
OBDII is enabled in CONFIG.DAT
OBDII required field in the VLT is space filled
1998 passenger vehicle, technician states vehicle is supposed to get an OBDII check

VLT fields filled as follows:		OBD_RED.DAT filled as follows:		Vehicle's OBDII system filled as follows: (On = Ready Off = Not Ready)	
Misfire		Misfire	Y	Misfire	On
Fuel System		Fuel System	Y	Fuel System	On
Comprehensive component		Comprehensive component	Y	Comprehensive component	Off
Catalyst		Catalyst	Y	Catalyst	Off
Heated catalyst		Heated catalyst	Y	Heated catalyst	Off
Evaporative system		Evaporative system	Y	Evaporative system	Off
Secondary air system		Secondary air system	Y	Secondary air system	Off
A/C system refrigerant		A/C system refrigerant	Y	A/C system refrigerant	Off
Oxygen sensor		Oxygen sensor	Y	Oxygen sensor	Off
Oxygen sensor heater		Oxygen sensor heater	Y	Oxygen sensor heater	On

EGR system		EGR system	Y	EGR system	Not supported
No match		No match	N		
Count		Count	8		

The EIS shall use the readiness indicator information from OBD_RED.DAT because the misfire monitor field in the VLT is space filled. To pass the readiness indicator portion of the OBDII check, the vehicle must not have eight or more of the following readiness indicators not set:

Misfire
Fuel System
Comprehensive component
Catalyst
Heated catalyst
Evaporative system
Secondary air system
A/C system refrigerant
Oxygen sensor
Oxygen sensor heater
EGR system

The above vehicle passes the readiness indicators check.
Example #3:
OBDII is enabled in CONFIG.DAT
OBDII required field in the VLT is space filled
1998 passenger vehicle, technician states vehicle is supposed to get an OBDII check

VLT fields filled as follows:		OBD_RED.DAT filled as follows:		Vehicle's OBDII system filled as follows: (On = Ready Off = Not Ready)	
Misfire		Misfire	Y	Misfire	On
Fuel System		Fuel System	Y	Fuel System	On
Comprehensive component		Comprehensive component	Y	Comprehensive component	Off
Catalyst		Catalyst	Y	Catalyst	Off
Heated catalyst		Heated catalyst	Y	Heated catalyst	Off
Evaporative system		Evaporative system	Y	Evaporative system	Off
Secondary air system		Secondary air system	Y	Secondary air system	Off
A/C system		A/C system	Y	A/C system	Off

refrigerant		refrigerant		refrigerant	
Oxygen sensor		Oxygen sensor	Y	Oxygen sensor	Off
Oxygen sensor heater		Oxygen sensor heater	Y	Oxygen sensor heater	On
EGR system		EGR system	Y	EGR system	Off
No match		No match	N		
Count		Count	8		

The EIS shall use the readiness indicator information from OBD_RED.DAT because the misfire monitor field in the VLT is space filled. To pass the readiness indicator portion of the OBDII check, the vehicle must not have eight or more of the following readiness indicators not set:

Misfire
Fuel System
Comprehensive component
Catalyst
Heated catalyst
Evaporative system
Secondary air system
A/C system refrigerant
Oxygen sensor
Oxygen sensor heater
EGR system

The above vehicle fails the readiness indicator check.

Note: whenever the OBD II functional check is performed, store the MIL status to the *MIL Status* field of the test record.

Whenever a readiness indicator(s) is not turned on, store the appropriate letter(s) to the readiness indicators field of the test record. Example: if the catalyst monitoring readiness indicator is not set, store "D" to the *readiness indicators* field of the test record.

A Misfire monitor status
B Fuel system monitor status
C Comprehensive component monitoring status
D Catalyst monitoring
E Heated catalyst monitoring
F Evaporative system monitoring
G Secondary air system monitoring
H A/C system refrigerant monitoring

I Oxygen sensor monitoring
J Oxygen sensor heater monitoring
K EGR system monitoring
L No Match

5) Fuel Cap Integrity Test: For all vehicles, except for vehicles with fuel type codes P or N that are not bi-fueled, equipped with evaporative control systems, there shall be a two-part test. The first part shall be a visual inspection checking for the presence of the cap and the second part shall be a functional test. For vehicles not equipped with evaporative control systems, this test will consist of only a visual inspection of the fuel cap.

Programming Criteria:

a) Visual Fuel Cap Integrity Test

DISPLAY PROMPT:

INSPECT FUEL CAP(S) FOR PROPER FIT AND INSTALLATION. ENTER INSPECTION RESULT:

P = PASS
F = FAIL
S = MISSING

If P, record a P in the *Fuel Cap Visual* field of the test record and proceed with functional inspection, if applicable.

If F or S, the vehicle fails the visual portion of the Fuel Cap Integrity Test and also automatically fails the functional portion of the test. The F or S shall be recorded in the *Fuel Cap Visual Test* field of the test record and on the VIR.

In addition, if the visual test result was F, an F (Fail) shall be recorded in the *Fuel Cap Leak-down Test* field of the test record and on the VIR; if the visual test result was S, an N (Not Applicable) shall be recorded in the *Fuel Cap Leak-down Test* field of the test record and on the VIR.

i.) DISPLAY PROMPT:

SELECT A FUEL CAP ADAPTER FROM THE LIST.

GRAY
BLUE
BLACK
BROWN
RED
YELLOW
LIGHT BLUE
ORANGE
GREEN
WHITE
VIOLET
THREADED
NO ADAPTER AVAILABLE
OTHER

The EIS shall record the appropriate fuel cap adapter code to the *Fuel cap adapter* field of the test record. Entering "No Adapter Available" will complete the fuel cap functional test. Note that an entry of "No Adapter Available" entry will not cause the vehicle to fail the Fuel Cap Leak-down Test.

Fuel cap adapter codes are as follows:

GY = Gray
BL = Blue
BK = Black
BR = Brown
RD = Red
YW = Yellow
LB = Light Blue
OR = Orange
GR = Green
WH = White
VI = Violet
TH = Threaded
NN = No Adapter
OT = Other

ii.) DISPLAY PROMPT:

SELECT THE MANUFACTURER OF THE FUEL CAP ADAPTER.

STANT
WAEKON
OTHER

The EIS shall record appropriate manufacturer to the *Fuel Cap Manufacturer* field of the test record.

Fuel cap manufacturer codes are as follows:

S = Stant
W = Waekon
O = Other

iii.) DISPLAY PROMPT:

PRESS (FUNCTION KEY) TO BEGIN FUEL CAP LEAK DOWN TEST.

iv.) If a pass is sent to the EIS, the data will be recorded on the VIR and the test record. After every pass or fail result for the functional fuel cap test, the EIS shall prompt the technician as follows:

DISPLAY PROMPT:

IS THERE ANOTHER FUEL CAP TO BE FUNCTIONALLY TESTED? (Y OR N)

If Y, repeat the functional test prompts provided above until an N response if given.

v.) If a fail is sent to the EIS, the EIS shall display the following prompt.

DISPLAY PROMPT:

THE FUEL CAP HAS FAILED. ***DO YOU WISH TO REPLACE THE GAS CAP AND TRY AGAIN? (Yes/No)***

If the technician enters yes, the EIS shall store a "Y" to the *Fuel Cap provided* field of the test record, and prompt the technician to perform a leak down check on the new gas cap. If the new fuel cap fails store an "F" in the *Fuel Cap Leak-down Test* field of the test record. If the new fuel cap passes, the result for this set of gas caps shall be "P".

If the technician does not replace the gas cap, the EIS shall display the following prompt:

REMOVE THE FUEL CAP AND INSPECT.

TIGHTLY INSTALL THE FUEL CAP ON THE FUEL CAP TESTER AND PRESS (FUNCTION KEY) TO BEGIN FUEL CAP LEAK-DOWN CHECK OR PRESS *(function key)* **TO FAIL THE FUEL CAP.**

If the functional test has indicated a failure again, the data shall be recorded in the *Fuel Cap Leak-down Test* field of the test record.

6) Fuel EVAP Test: The EIS shall prompt for an EVAP functional test on all vehicles, except for vehicles with fuel type codes P or N that are not bi-fueled, or vehicles without evaporative control systems. Store the results of the test to the *Fuel EVAP Test* field of the test record.

7) Fillpipe Restrictor: If the vehicle inspection reason is I (initial registration in this state) and the vehicle is equipped with a catalytic converter, the software shall prompt the technician to perform the fillpipe restrictor test using the dowel gauge.

DISPLAY PROMPT:

IS THE FILLPIPE RESTRICTOR ENLARGED? (YES/NO)

Programming Criteria:

1. If yes, display the following prompt:

   DISPLAY PROMPT:

   IS THE FILLPIPE RESTRICTOR ENLARGED DUE TO TAMPERING? (YES/NO)

   If YES, (the fillpipe restrictor has been enlarged), then the vehicle fails this test as a tamper and a "T" shall be entered into the *Fillpipe Restrictor* field of the test record.

2. If YES and the vehicle also failed the emissions test, then the vehicle fails as a tamper for the fillpipe restrictor, the catalytic converter and O_2 sensor, if so equipped. The EIS shall record the result as T in the appropriate fields of the test record and print the results on the VIR .

3. If NO, write P on the *Fillpipe Restrictor* field.

4. If inspection reason is other than I, then fill the *Fillpipe Restrictor* field with N (Not Applicable).

3.6.20 **Repairs Performed Before Test**

At the conclusion of functional testing, the EIS shall prompt the technician to determine if any repairs were made to the vehicle prior to the start of the inspection. The response will be Yes/No. The response shall be recorded in the *Repairs Performed Before Test* field of the test record.

1) The EIS shall display the following prompt:

DISPLAY PROMPT:

WERE ANY EMISSIONS-RELATED REPAIRS PERFORMED PRIOR TO THE START OF THE INSPECTION? (YES/NO)

Programming Criteria:

1. If the technician enters Y, the EIS shall go to the next prompt under Subsection 2) (Were the repairs performed at your shop?).

2. If the technician enters N, the EIS shall proceed with the inspection process (go to §3.6.23). The EIS shall store N in the *Repairs Performed Before Test* field of the test record.

2) The EIS shall display the following prompt:

DISPLAY PROMPT:

WERE THE REPAIRS PERFORMED AT YOUR SHOP? (YES/NO)

The response (yes or no) shall be recorded in the *Repairs Performed* field of the test record.

Programming Criteria:

1. If the technician enters Y, the EIS shall prompt as follows:

DISPLAY PROMPT:

DID YOU PERFORM THE REPAIRS? (YES/NO)

a) If the technician selects "Y" (for YES), then the EIS shall automatically store the technician's license number in the *Repair Technician License Number* field of the repair record and continue with the repair information entry process.

b) If the technician selects "N" (for NO), then the EIS shall display the list of technicians (Names and License Numbers only) that are stored in the Technician Information File (see §3.14.5) and shall allow to scroll up or down in this list and select the technician that has performed the repairs. The EIS shall store the technician's license number in the *Repair Technician License Number* field of the repair record and shall display the following prompt:

DISPLAY PROMPT:

WERE ANY OF THE "REPAIRS PERFORMED AT YOUR SHOP" THE RESULT OF A TAMPERED EMISSION SYSTEM? (YES/NO)

i. If the technician enters Y, the *Repairs Performed Before Test* field of the test record shall be overwritten with a "T." A "Y" entry shall require the following statement to be printed on the VIR in the technician's signature block (as indicated in Appendix C).

ALL REPAIRS WERE MADE IN ACCORDANCE WITH BAR GUIDELINES.

ii. If the technician enters N, there will be no modification to the test record. An N entry shall require the following statement to be printed on the VIR in the technician's signature block (as indicated in Appendix C).

PRETEST REPAIRS PERFORMED ON THIS VEHICLE WERE <u>NOT</u> TAMPER RELATED.

2. If the technician enters N to the prompt "Were there repairs performed at your shop," the EIS shall proceed with the inspection process (go to §3.6.23)

3.6.21 **Repair Action Categories**

The EIS shall display the Repair Action Categories (underlined) if Y was entered in response to the question "WERE THERE REPAIRS PERFORMED AT YOUR SHOP?" All repair-related information shall be stored in the repair record pursuant to Confidential Appendix C-2. Upon selection of a Repair Action Category, the EIS shall display the appropriate Menu items, indicated by the bullet (♦). If a "♦" Menu is not required, the appropriate sub-menu items will be displayed after the Repair Action Category. When the sub-menu items are displayed (under either the selected Repair Action Category or "♦" Menu), the EIS shall display the following message:

DISPLAY PROMPT:

ENTER ONE OF THE FOLLOWING CODES FOR EACH OF THE EMISSION-RELATED SYSTEM ITEMS THAT HAVE BEEN DIAGNOSED AND/OR REPAIRED.

T - TAMPERED SYSTEMS REPAIRED/RESTORED
R - EMISSIONS-RELATED REPAIRS (OR REPLACEMENTS OR ADJUSTMENTS) - REPAIRS THAT WERE PAID BY THE CONSUMER
D - DIAGNOSED - SYSTEM OK (NO PROBLEM) - DIAGNOSIS THAT WAS PAID BY THE CONSUMER
E - ESTIMATED ADDITIONAL REPAIRS NEEDED
L - EMISSIONS-RELATED REPAIRS (OR REPLACEMENTS OR ADJUSTMENTS) - REPAIRS THAT WERE PAID BY LIRAP
C - DIAGNOSED - SYSTEM OK (NO PROBLEM) - DIAGNOSIS THAT WAS PAID BY LIRAP

or PRESS (FUNCTION KEY) TO BACK-UP ONE SCREEN

REPAIR ACTION CATEGORIES

Emissions Control Systems
♦Positive Crankcase Ventilation
PCV Valve
PCV Hose
♦Thermostatic Air Cleaner
Pre Heat Tube
Vacuum Motor
Thermostatic Bulb
Control Valve
♦Air Injection System
Air Pump

Pulse Valve
Pump Belt
Diverter Valve
Plumbing
Check Valve

- **Exhaust Gas Recirculation**
  - **Vacuum Routing**
  - **EGR Valve**
  - **Passages Cleaned**
  - **Controls (non computer)**
- **Evaporative Emission Control**
  - **Vacuum Routing**
  - **Purge Valve (non-computer)**
  - **Fuel Cap**
  - **Vapor Lines**
  - **Charcoal Canister**
  - **Other**
- **Exhaust**
  - **Catalytic converter**
  - **Thermal Reactor**

<u>Ignition System</u>

- **Primary**
  - **Ignition Module**
  - **Distributor**
  - **Spark Control**
- **Secondary**
  - **Spark Plugs**
  - **Ignition Wires**
  - **Cap/Rotor**
  - **Initial Timing**
  - **Ignition Coil**
  - **Other**

<u>Fuel System</u>

- **Carburetor**
  - **Fuel Filter**
  - **Air Filter**
  - **Adjustment**
  - **Rebuild/Replace**
- **Fuel Injection**
  - **Fuel Filter**

Air Filter
Pressure Regulator
Throttle Body
Fuel Distributor
Fuel Injectors
Cold Start Valve
Other

Engine Mechanical

Vacuum Leaks
Cylinder Heads
Top Engine Cleaning
Valve Train
Valve Adjustment
Lower End (Pistons, rings, etc.)
Intake Manifold
Turbo/Supercharger
Other

Computer System

- **Inputs**
  - **Coolant Temperature Sensor**
  - **Air Temperature Sensor**
  - **Throttle Position Sensor**
  - **Oxygen Sensor**
  - **MAP Sensor**
  - **BARO Sensor**
  - **EGR Valve Position Sensor**
  - **Engine Speed Sensor**
  - **Vehicle Speed Sensor**
  - **Mass Air Flow Sensor**
  - **Crankshaft Position Sensor**
  - **Camshaft Position Sensor**
  - **Other**
- **Outputs**
  - **M/C Solenoid**
  - **Spark Control**
  - **Canister Purge Solenoid**
  - **Idle Speed Control**
  - **EGR Solenoid**
  - **Diverter Solenoid**
  - **Other**

♦Controls
ECM
PROM

Programming Criteria:

1. The EIS shall only allow the letters T, R, L, C, D or E to be entered for each applicable menu item. The technician shall be able to go directly to the repair action category(ies) of choice, without having to scroll through all of the menu items or back up one screen at a time. If an item is not selected, a blank space shall be recorded in the corresponding field of the repair record. Similarly, if a menu item is chosen and no value is entered, a blank space (indicating no action taken) shall be recorded to the repair record. The EIS may display the following error messages:

   ERROR MESSAGES:

   THE REPAIR ACTION CODE IS NOT VALID - TRY AGAIN.

2) The EIS shall not allow the inspection to proceed without entering an appropriate repair code for at least one repair action category item. If there is no entry made for at least one repair action category item, the EIS shall display the following message.

   DISPLAY PROMPT:

   WERE REPAIRS PERFORMED AT YOUR SHOP? (Y or N)

   IF YES, A REPAIR ACTION CODE ENTRY IS REQUIRED!

   If Y, continue with repair action category function. If N, change the entry recorded in the *Repairs Performed* field of the test record from Y to N; do not write to the repair record.

3) The EIS shall provide a review screen option to assist the technician to view all repair category actions that have been entered.

3.6.22 **Repair Cost Information**

After the appropriate repair action codes have been entered, the EIS shall require entry of the repair cost information. The EIS shall display the following message:

DISPLAY PROMPT:

a) ENTER THE AMOUNT OF LABOR TIME IT TOOK TO REPAIR THE VEHICLE (ROUND TO THE NEAREST TENTH OF AN HOUR):

TOTAL REPAIR TIME, HH.H HOURS _____

b) ENTER THE TOTAL AMOUNT CHARGED FOR PARTS AND LABOR TO PERFORM EMISSION-RELATED REPAIRS. ENTER THE DOLLAR AMOUNT ONLY (ROUND TO THE NEAREST WHOLE DOLLAR). DO NOT INCLUDE ANY WARRANTY REPAIRS (EMISSION-RELATED OR NOT) AND/OR TAMPER REPAIRS.

EMISSION-RELATED REPAIRS *(charged to the consumer):* PARTS COST $_____
EMISSION-RELATED REPAIRS *(charged to the consumer):* LABOR COST $_____
EMISSION-RELATED REPAIRS *(charged to LIRAP*): PARTS COST $_____
EMISSION-RELATED REPAIRS *(charged to LIRAP):* LABOR COST $_____

c) ENTER THE TAMPERED REPAIRS TOTAL PARTS AND LABOR COST WHICH INCLUDES REPAIRS TO GROSS POLLUTERS (ROUND TO THE NEAREST WHOLE DOLLAR):

TAMPER REPAIRS (PARTS AND LABOR) COST $_____

d) ENTER THE ESTIMATED COST OF ADDITIONAL REPAIRS NOT PERFORMED (ROUND TO THE NEAREST WHOLE DOLLAR):

ESTIMATED COST OF ADDITIONAL REPAIRS $_____

e) ENTER THE STATION HOURLY LABOR RATE (ROUND TO THE NEAREST WHOLE DOLLAR):

HOURLY LABOR RATE $_____

Programming Criteria:

1) The EIS shall display the technician's entries, but shall disregard any portion less than a whole dollar amount for the repair record.

2) The EIS shall provide a summary screen for the technician to review the repair and diagnostic data entries. In addition, the EIS shall print the information on the VIR.

DISPLAY PROMPT:

IS THE INFORMATION CORRECT? (YES/NO)

3) If the information is incorrect, the EIS shall allow the technician to make changes.

4) The EIS shall recall and display the hourly labor rate from the previous test and write the same rate to the *Hourly Labor Rate* field unless changed by the technician. Then the new hourly labor rate shall be stored in the repair record.

5) If the information is correct, the EIS shall store the data in the repair record as follows:

DESCRIPTION	**LAYOUT**
REPAIR TIME	HH.H
EMISSION-RELATED PARTS COST *(charged to the consumer)*	$$$$
EMISSION-RELATED LABOR COST *(charged to the consumer)*	$$$$
EMISSION-RELATED PARTS COST (charged to LIRAP)	$$$$
EMISSION-RELATED LABOR COST (charged to LIRAP)	$$$$
TAMPERED REPAIRS (PARTS & LABOR) COST	$$$$
ESTIMATED COST OF ADDITIONAL REPAIRS	$$$$
HOURLY LABOR RATE	$$$$

3.6.23 **Pass/Fail Determination**

The final inspection results shall be determined as follows:

a) If the *Overall Emissions Test Result, Visual Inspection Result* and *Functional Check Result* fields of the test record all contain P entries, then a P shall be entered into the *Overall Test Result* field of the test record. The vehicle shall pass the inspection and the EIS shall issue a certificate subject to the conditions listed in §3.6.24.

b) If any of the fields indicated in Item a) contain an F, but not a T or G, then F shall be entered in the *Overall Test Result* field. The vehicle shall fail the inspection and the EIS shall not issue a certificate.

c) If any of the fields indicated in Item a) contain a T but not a G, then a T shall be entered in the *Overall Test Result* field. The vehicle shall fail the inspection as a 'tamper' and a certificate is not issued.

d) If any of the fields indicated in Item a) contain a G, then G will be entered in the *Overall Test Result* field. The vehicle shall fail the inspection as a 'gross polluter' and a certificate is not issued.

e) Once the Pass/Fail determination has been made, the test cannot be aborted. The test data cannot be changed and the EIS shall store the final test data in the test record and transmitted to the VID.

f) When the pass/fail determination has been made, the EIS shall record the time to the *Test End Time* field of the test record.

3.6.24 **Electronic Certificate of Compliance or Noncompliance**

The EIS shall issue an electronic certificate of compliance or noncompliance for vehicles that pass all portions of the Smog Check inspection. The certificate number shall be printed on the VIR and shall be transmitted during the END-OF-TEST network contact to the VID along with the final vehicle test results. The EIS shall attempt END-OF-TEST network contact to the VID immediately following the issuance of electronic certificate.

Under the following conditions, even if the vehicle passes the Smog Check, the EIS shall not issue an electronic certificate.

- GROSS POLLUTER as indicated by the VID or previous EIS record.
- Government fleet vehicle.
- Motorist on military assignment and is not seeking California DMV registration for a vehicle

- TRAINING mode
- HANDS-ON-TEST mode
- Government Facility
- Hardship Extension within last 12 months

The EIS shall keep track of the number of remaining certificates based on the total number purchased from the VID.

The certificate number shall be put in the *Certificate Number* field of the test record. The first two characters of this entry are alpha characters, the next 6 digits shall be used sequentially for each emissions test requiring a certificate number. The last character shall be alpha, as specified in the test record.

If F is entered for Certification Type and vehicle is less than or equal to 3 years old, and has less than 7500 miles on the odometer, the EIS shall automatically issue a Certificate of Noncompliance, and add an N as the last character of the certificate number. The EIS shall print a Certificate of Noncompliance number on the VIR. For all other circumstances, the EIS shall add a C as the last character of the certificate number.

When the EIS issues a Certificate of Noncompliance, it shall print a "Notification of Noncompliance" form (see Appendix E).

3.6.25 **Transmission Date and Time**

The EIS shall initiate the "End-of-Test" contact to the VID. If successful, the date and time the test record was transmitted to the VID shall be recorded in the *Date of Record Transmission* and *Time of Record Transmission* fields of the test record. These fields shall be populated by the VID at the time that the record is received by the VID.

3.6.26 **Display of Final Inspection Test Results**

Following successful or unsuccessful END-OF-TEST network contact to the VID, the EIS shall display the final inspection test results. As a minimum, the words PASS, FAIL, GROSS POLLUTER or TAMPERED shall be written beside each inspection result as shown in the table below (visual, functional and emissions) except for CO_2 and O_2.

HC: (ASM 5015 or TSI 2500 rpm)	XXXX PPM	PASS or FAIL or GROSS POLLUTER
CO: (ASM 5015 or TSI 2500 rpm)	XX.XX %	PASS or FAIL or GROSS POLLUTER
CO_2: (ASM 5015 or TSI 2500 rpm)	XX.X %	blank
O_2: (ASM 5015 or TSI 2500 rpm)	XX.X %	blank

NO: (ASM 5015)	XXXX PPM	PASS or FAIL or GROSS POLLUTER
HC: (ASM 2525 or TSI - Idle rpm)	XXXX PPM	PASS or FAIL or GROSS POLLUTER
CO: (ASM 2525 or TSI - Idle rpm)	XX.XX %	PASS or FAIL or GROSS POLLUTER
CO_2: (ASM 2525 or TSI - Idle rpm)	XX.X %	blank
O_2: (ASM 2525 or TSI - Idle rpm)	XX.X %	blank
NO: (ASM 2525)	XXXX PPM	PASS or FAIL or GROSS POLLUTER
AIR/FUEL RATIO:	XX.X	blank
VISUAL TEST	blank	PASS or FAIL or TAMPERED
FUNCTIONAL TEST	blank	PASS or FAIL or TAMPERED
OVERALL TEST RESULT	blank	PASS or FAIL or GROSS POLLUTER or TAMPERED

3.6.27 **Vehicle Inspection Report (VIR)**

After display and review of the final test results, and after END-OF-TEST contact attempt with the VID, the EIS shall print the VIR. If contact was not made with the VID, it shall be indicated on the VIR. See Appendix C for VIR format/information.

If a Smog Check certificate is issued and no contact was made with the VID, print the following message on the VIR:

YOUR SMOG CHECK CERTIFICATE WILL BE ELECTRONICALLY TRANSMITTED TO DMV.

If a Smog Check certificate is issued and contact was made with the VID, print the following message on the VIR:

YOUR SMOG CHECK CERTIFICATE HAS BEEN ELECTRONICALLY TRANSMITTED TO DMV.

The following messages shall be sent from the VID to the EIS in a text file. The EIS shall print the appropriate message on the VIR

For vehicles that pass the smog check inspection and a certificate is not issued due to a certificate restriction which includes previous gross polluter, previous hardship extension, and response bits 71 -74, print the message named VIR_NCRT from

MESSAGE.DAT on the VIR. If VIR_NCRT is printed on the VIR, do not print VIR_RPAS, or VIR_PASS on the VIR.

If the vehicle is a military fleet vehicle, or a government fleet vehicle, do not print VIR_NCRT on the VIR, only use the messages named VIR_PASS, VIR_RPAS, VIR_FAIL, or VIR_REPR when applicable.
The current message named VIR_NCRT is the following:

HOWEVER, ONLY A TEST-ONLY CENTER IS AUTHORIZED BY LAW TO ISSUE A CERTIFICATE OF COMPLIANCE AFTER REPAIRS HAVE BEEN MADE TO A VEHICLE IDENTIFIED AS A GROSS POLLUTER.

For vehicles that pass the smog check inspection and have been repaired, print the message named VIR_RPAS from MESSAGE.DAT on the VIR. The current message named VIR_RPAS is the following:

THANK YOU FOR PERFORMING THE NEEDED EMISSIONS-RELATED REPAIRS TO YOUR VEHICLE. THESE REPAIRS HELP CALIFORNIA REACH ITS GOAL OF REMOVING AN EXTRA 100 TONS OF SMOG-FORMING EMISSIONS FROM THE AIR EVERY DAY.

For vehicles that pass the smog check inspection and have not been repaired, print the message named VIR_PASS from MESSAGE.DAT on the VIR. The current message named VIR_PASS is the following:

BY KEEPING YOUR VEHICLE WELL-MAINTAINED, YOU'VE PASSED YOUR ENHANCED SMOG CHECK AND ARE HELPING CALIFORNIA REACH ITS GOAL OF REMOVING AN EXTRA 100 TONS OF SMOG-FORMING EMISSIONS FROM THE AIR EVERY DAY.

For vehicles that fail the smog check inspection the message named VIR_REPR from MESSAGE.DAT on the VIR. The current message named VIR_REPR is the following:

REPAIRING YOUR VEHICLE IS NECESSARY TO HELP CALIFORNIA REACH ITS GOAL OF REMOVING AN EXTRA 100 TONS OF SMOG-FORMING EMISSIONS FROM THE AIR EVERY DAY. THE STATE OFFERS A LOW-INCOME EMISSION REPAIR ASSISTANCE PROGRAM AND A VOLUNTARY RETIREMENT PROGRAM FOR POLLUTING VEHICLES. ASK YOUR TECHNICIAN FOR THE OFFICIAL PROGRAM INFORMATION PAMPHLETS OR CALL 1-800-952-5210. YOU CAN ALSO GET INFORMATION ABOUT ALL SMOG CHECK PROGRAMS AT <WWW.SMOGCHECK.ORG>

For vehicles that fail the smog check inspection, bold all results that are shown as a "Fail" on the VIR.

For vehicles that fail the inspection for any reason, the EIS shall print the message named VIR_FAIL from MESSAGE.DAT on the VIR. The current message named VIR_FAIL is the following:

VEHICLES FAILING SMOG CHECK MUST HAVE NECESSARY REPAIRS MADE TO REDUCE VEHICLE'S EMISSIONS TO REQUIRED LEVELS. IF YOU HAVE SPENT MORE THAN THE REQUIRED COST EXPENDITURE FOR APPROPRIATE EMISSION-RELATED REPAIRS (EXCLUDING WARRANTY REPAIRS AND REPAIRS TO MISSING, MODIFIED OR DISCONNECTED EMISSION CONTROL SYSTEM) AT A LICENSED SMOG CHECK REPAIR FACILITY, YOU MAY BE ELIGIBLE FOR A ONE TIME WAIVER. YOU MAY ALSO BE ELIGIBLE FOR A ONE-TIME ECONOMIC HARDSHIP EXTENSION.

REPAIR WAIVERS WILL NOT BE ISSUED FOR VEHICLES WITH MISSING, MODIFIED OR DISCONNECTED EMISSIONS CONTROL EQUIPMENT REGARDLESS OF COST TO MAKE REPAIRS; VEHICLES IDENTIFIED AS "GROSS POLLUTERS," (VEHICLES WHICH HAVE MUCH HIGHER EMISSIONS THAN PROPERLY MAINTAINED VEHICLES IN THEIR CLASS); VEHICLES THAT WERE ISSUED A HARDSHIP EXTENSION; OR VEHICLES THAT OBTAINED A REPAIR COST WAIVER IN THEIR MOST RECENT SMOG CHECK. TWO CONSECUTIVE REPAIR WAIVERS WILL NOT BE ISSUED.

FOR QUESTIONS, ASK THE SMOG CHECK TECHNICIAN OR SMOG CHECK STATION REPRESENTATIVE. IF THE SMOG CHECK TECHNICIAN OR SMOG CHECK STATION REPRESENTATIVE IS UNABLE TO ANSWER YOUR QUESTIONS, PLEASE CALL THE BUREAU OF AUTOMOTIVE REPAIR AT (800) 952-5210.

3.6.27 **Vehicle Inspection Report (VIR)**

After display and review of the final test results, and after END-OF-TEST contact attempt with the VID, the EIS shall print the VIR. If contact was not made with the VID, it shall be indicated on the VIR. See Appendix C for VIR format/information.

On all VIRs, when specifying the visual inspection final result, indicate whether the visual inspection is limited, comprehensive or none is required.

If a smog check certificate is issued and no contact was made with the VID, print the following message on the VIR:

YOUR SMOG CHECK CERTIFICATE WILL BE ELECTRONICALLY TRANSMITTED TO DMV.

If a smog check certificate is issued and contact was made with the VID, print the following message on the VIR:

YOUR SMOG CHECK CERTIFICATE HAS BEEN ELECTRONICALLY TRANSMITTED TO DMV.

The following messages shall be sent from the VID to the EIS in text files. The EIS shall print the appropriate message on the VIR

For vehicles that pass the smog check inspection and have been repaired, print the message named VIR RPAS from MESSAGE .DAT on the VIR. The current message named VIR_RPAS is the following:

THANK YOU FOR PERFORMING THE NEEDED EMISSIONS-RELATED REPAIRS TO YOUR VEHICLE. THESE REPAIRS HELP CALIFORNIA REACH ITS GOAL OF REMOVING AN EXTRA 100 TONS OF SMOG-FORMING EMISSIONS FROM THE AIR EVERY DAY.

For vehicles that pass the smog check inspection and have not been repaired, print the message named VIR_PASS from MESSAGE.DAT on the VIR. The current message named VIR_PASS is the following:

BY KEEPING YOUR VEHICLE WELL-MAINTAINED, YOU'VE PASSED YOUR ENHANCED SMOG CHECK AND ARE HELPING CALIFORNIA REACH ITS GOAL OF REMOVING AN EXTRA 100 TONS OF SMOG-FORMING EMISSIONS FROM THE AIR EVERY DAY.

For vehicles that fail the smog check inspection, the message named VIR REPR from MESSAGE.DAT on the VIR. The current message named VIR_REPR is the following:

REPAIRING YOUR VEHICLE IS NECESSARY TO HELP CALIFORNIA REACH ITS GOAL OF REMOVING AN EXTRA 100 TONS OF SMOG-FORMING EMISSIONS FROM THE AIR EVERY DAY. THE STATE OFFERS (EFFECTIVE MARCH 1, 1998) A LOW-INCOME EMISSION REPAIR ASSISTANCE PROGRAM AND A RECYCLING PROGRAM FOR POLLUTING VEHICLES. ASK YOUR TECHNICIAN FOR THE OFFICIAL PROGRAM INFORMATION PAMPHLETS OR CALL 1-800-952-5210. YOU CAN ALSO GET INFORMATION ABOUT ALL SMOG CHECK PROGRAMS AT <WWW.SMOGCHECK.ORG>

For vehicles that fail the smog check inspection, bold all results that are shown as a "Fail" on the VIR.

For vehicles that fail the inspection for any reason, the EIS shall print the message VIR_FAIL from MESSAGE.DAT on the VIR. The current message named VIR_FAIL is the following:

VEHICLES FAILING SMOG CHECK MUST HAVE NECESSARY REPAIRS MADE TO REDUCE VEHICLE'S EMISSIONS TO REQUIRED LEVELS. IF YOU HAVE SPENT MORE THAN THE REQUIRED COST EXPENDITURE FOR APPROPRIATE EMISSION-RELATED REPAIRS (EXCLUDING WARRANTY REPAIRS AND REPAIRS TO MISSING, MODIFIED OR DISCONNECTED EMISSION CONTROL SYSTEM) AT A LICENSED SMOG CHECK REPAIR FACILITY, YOU MAY BE ELIGIBLE FOR A ONE TIME WAIVER. YOU MAY ALSO BE ELIGIBLE FOR A ONE-TIME ECONOMIC HARDSHIP EXTENSION.

REPAIR WAIVERS WILL NOT BE ISSUED FOR VEHICLES WITH MISSING, MODIFIED OR DISCONNECTED EMISSIONS CONTROL EQUIPMENT REGARDLESS OF COST TO MAKE REPAIRS; VEHICLES IDENTIFIED AS "GROSS POLLUTERS," (VEHICLES WHICH HAVE MUCH HIGHER EMISSIONS THAN PROPERLY MAINTAINED VEHICLES IN THEIR CLASS); VEHICLES THAT WERE ISSUED A HARDSHIP EXTENSION; OR VEHICLES THAT OBTAINED A REPAIR COST WAIVER IN THEIR MOST RECENT SMOG CHECK. TWO CONSECUTIVE REPAIR WAIVERS WILL NOT BE ISSUED.

FOR QUESTIONS, ASK THE SMOG CHECK TECHNICIAN OR SMOG CHECK STATION REPRESENTATIVE. IF THE SMOG CHECK TECHNICIAN OR SMOG CHECK STATION REPRESENTATIVE IS UNABLE TO ANSWER YOUR QUESTIONS, PLEASE CALL THE BUREAU OF AUTOMOTIVE REPAIR AT (800) 952-5210.

3.7 REPAIR-ONLY SOFTWARE FUNCTIONS

The Repair-Only Software function shall display the following options:

1. Recall Repair Records
2. Create New Repair Records

1) Recall Repair Records

Recall Repair Records/Check for Low Income Repair Assistance

When this function is selected, the EIS shall prompt the technician to enter the VIN and license plate number of the vehicle. Upon transmission of VIN/license plate number to the VID, if records are found, the VID will transmit up to 10 of the most recent repair records. The EIS shall allow the technician to only view and/or print a user-selectable number of records. If the Low Income Repair field in the repair record is filled with a "Y", the EIS shall display the following message prior to exiting the repair only software functions.

THIS VEHICLE QUALIFIES FOR LOW INCOME REPAIR ASSISTANCE.

If the *Low Income Repair* field in the repair record is filled with an "N", the EIS shall display the following message prior to exiting the repair only software functions.

THIS VEHICLE DOES NOT QUALIFY FOR LOW INCOME REPAIR ASSISTANCE.

2) Create New Repair Records

When this menu item is selected, the EIS shall prompt the technician to enter his/her technician license number and access code per §3.6.2 and 3.6.3. Next, the EIS will prompt the technician for the VIN and license plate number, and then will display the Repair Category per §3.6.21 and 3.6.22. After the repairs have been entered, the EIS will send the record to the VID.

3.8 MANUAL TESTING MODE

When the technician selects manual testing mode, the EIS shall display the following prompt:

DISPLAY PROMPT:

ENTER THE VEHICLE FUEL TYPE CODE:

Select the appropriate fuel type in accordance with §3.6.7.n) - Vehicle Fuel Type Code.

After the technician has selected the fuel type, the EIS shall display the following menu items:

DISPLAY PROMPT:

ENTER CHOICE FOR MANUAL MODE TESTING:

1) **NO-LOAD EMISSIONS MEASUREMENT**
2) **TECHNICIAN SELECTED STEADY LOAD**
3) **ASM DIAGNOSTIC TEST**
4) **STRUCTURED TEST DRIVE**
5) **FREE-FORM TEST DRIVE**

At the conclusion of any of the above modes, the EIS shall, if the technician chooses, be able to display or print a time-aligned second-by-second emissions and wheel speed (if applicable) plot for each gas (HC, CO, NO, O_2 and CO_2) for up to the last 180 seconds of any of the manual test modes. The gas values shall default to dilution corrected readings and as an option may be set to uncorrected for dilution as toggled by the technician except for the Structured Test Drive and the Free-Form Test Drive, where only uncorrected values shall be displayed. The EIS shall display the emission readings of (HC, CO, NO, O_2 and CO_2). However, the manufacturer may provide an option to toggle off the display. The rules for applying the DCF during the manual mode shall be the same as the inspection mode.

Each of the above tests, aside from the No-Load Emissions Measurement, must be preceded by the EIS manufacturer's recommended pretest procedures.

a) **No-Load Emissions Measurement**

When the operator selects the No-Load Emissions Measurement, the EIS shall start sampling HC, CO, O_2 and CO_2 gases. The EIS shall display these gas values along with the engine speed on the screen until the operator leaves the No-Load Emissions Measurement.

b) **Technician Selected Steady Load**

When the operator selects the Technician Selected Steady Load, the driver shall be prompted to enter a horsepower load for the dynamometer to simulate. The EIS shall simulate tire losses, and the technician shall be warned accordingly. However, the manufacturer may provide an option to toggle off the tire losses and warning message. This horsepower should be accurate at or above 14 mph and should not exceed safe limits established by the EIS manufacturer. The dynamometer shall smoothly apply the load above 10 mph. Once the power setting is selected, the EIS shall start sampling and the following values shall be displayed on the screen: gas readings for HC, CO, NO, O_2 and CO_2, engine speed, wheel speed, and a reference time clock (displaying seconds).

c) **ASM Diagnostic Test**

To be able to conduct an ASM Diagnostic Test, the vehicle information must be known. If the information for the vehicle has not been entered already, the EIS must prompt the technician to enter all vehicle data required to correctly determine dynamometer loading information for both modes of the ASM test.

Once the vehicle information is entered, the technician shall be given the option to simulate either the 5015 mode, the 2525 mode, or both as in an actual ASM inspection test. Once a mode is selected, the gas EIS shall start sampling and the screen shall display all of the same values as the Technician Selected Steady Load test in addition to the driver trace appropriate to the mode selected. In either case, the dynamometer shall not apply load below 10 mph for the ASM 5015 and 20 mph for the ASM 2525 mode to aid in bringing the vehicle up to speed.

Once the vehicle information is entered, the EIS shall display HC, CO, NO, O_2, CO_2, engine speed, wheel speed, and time while the gas EIS starts taking samples.

Whenever the ASM Diagnostic Test is run on a different vehicle, the *Row ID Number* field of the VLT shall be recorded along with the date and time in a separate file identified in Confidential Appendix C-2. Only the 25 most recent vehicles must be kept in this file. This information will be used elsewhere in the EIS to create vehicle pretest statistics.

d) **Structured Test Drive**

To assist in the repair of vehicles, the EIS must be capable of providing a repeatable test drive for the vehicle to follow, in this case, the BAR-31 simulation trace. As with the ASM Diagnostic Test, the vehicle information must be known prior to conducting structured test drive. If the information for the vehicle has not been entered already, the EIS must prompt the technician to enter all vehicle data required to correctly access the VLT. This information will be used to determine

the appropriate vehicle loading from the VLT. The load shall be applied according to the requirements in §2.5.5.2. a), Diagnostic Level Simulation.

Once the vehicle information is entered, the EIS shall display HC, CO, NO, O_2 and CO_2 gases, engine speed, and wheel speed while the gas EIS starts taking samples. The test shall start once the operator presses START.

e) **Free-Form Test Drive**
To assist in the repair of vehicles, the EIS must be capable of providing a free-form test drive. This will allow the vehicle to be test driven on the dynamometer as it would be test driven on the actual road. As with the ASM Diagnostic Test, the vehicle information must be known prior to conducting the free-form test drive. If the information for the vehicle has not been entered already, the EIS must prompt the technician to enter all vehicle data required to correctly access the VLT. This information will be used to determine the appropriate vehicle loading from the VLT. The load shall be applied according to the requirements in §2.5.5.2 a), Diagnostic Level Simulation.

Once the vehicle information is entered, the EIS shall display HC, CO, NO, O_2 and CO_2 gases, engine speed, and wheel speed while the gas EIS starts taking samples. The test shall start once the operator presses START.

3.9 EIS CALIBRATION MENU

When the technician selects the EIS CALIBRATION MENU, the EIS shall display the following menu items:

ENTER CHOICE:

1) 3-DAY CALIBRATION, LEAK CHECK & SYSTEMS CHECK
2) ANALYZER GAS CALIBRATION
3) ANALYZER SAMPLE SYSTEM LEAK CHECK
4) DYNAMOMETER CALIBRATION
5) FUEL CAP TESTER CALIBRATION WITH MASTER CAPS
6) FLOPPY DRIVE AND FLOPPY DISK CHECK

The procedures shall be user-friendly and shall prompt the technician through every step needed to properly perform the required calibration/system check (including, for example, when to turn the gas cylinder valve on and off). Results of all calibrations and checks shall be displayed and recorded in the calibration record. All cylinder bar code data shall be stored in the calibration record.

a) **Three-Day Calibration, Leak Check and Systems Check**
The system shall preclude I/M testing after 72 hours if a full EIS calibration & leak/systems check (CLSC) is not performed and passed. However, if the dynamometer fails the dynamometer calibration, the EIS shall not be locked out of two-speed idle testing. If the EIS fails any portion of the three-day CLSC, a message shall be displayed indicating the failure and suggesting possible technician-fixable causes for the failure; e.g., CHECK GAS CYLINDERS SHUT/EMPTY/CONNECTED TO WRONG PORTS. TRY AGAIN. IF NONE OF THESE, CALL SERVICE. If a Smog Check is initiated, and the dynamometer calibration has failed, the EIS shall display the following prompt:

DISPLAY PROMPT:

THE DYNAMOMETER HAS FAILED CALIBRATION. PRESS *(function key)* **TO CONTINUE WITH TWO-SPEED IDLE TEST OR [ESC] TO ABORT.**

If the technician presses the escape key [ESC], the Smog Check will abort. If the technician presses the appropriate function key to continue, the technician will be allowed to continue. However, once the test is determined (ASM or TSI) by the VID or from the vehicle information entered, the inspection will abort if the vehicle requires an ASM inspection.

The Three-Day CLSC selection shall perform automatically, in sequence, all the other items in the Calibration Menu, prompting the technician to perform tasks as required. The calibrations and checks shall be performed in the same order as the Calibration Menu list. Since the Three-Day CLSC procedure is a sequence of other procedures, its details will be delineated in Items b) through f), below.

The Dilution Correction Factor and the NO Humidity Correction Factor (HCF) shall be disabled during Three-day Gas Calibration and Gas Audit.

The O_2 sensor shall be calibrated, not just checked during gas calibration. If the O_2 sensor does not pass calibration, the EIS shall display the following message:

THE O_2 SENSOR FAILED CALIBRATION. CALL FOR SERVICE TO AVOID LOCKOUT.

The EIS shall not be prevented from performing a Smog Check if oxygen is the only channel to fail gas calibration. However, if the O_2 sensor does not pass calibration within seven days, the EIS shall be locked out and the following prompt shall be displayed:

DISPLAY PROMPT:

THE O_2 SENSOR IS OUT OF CALIBRATION. EIS IS LOCKED OUT. CALL FOR SERVICE.

b) **Analyzer Precalibration Audit and Gas Calibration**
The gas analyzer shall be calibrated every 72 hours, or more frequently if required by the system's self-diagnostics..
When this menu item is selected, the EIS shall disable the Dilution Correction Factor (DCF) and the NO Humidity Correction Factor (HCF), and shall display the following prompt:

1. DISPLAY PROMPT:

   SCAN THE HIGH RANGE CYLINDER'S THREE BAR CODES IN SEQUENCE (1, THEN 2, THEN 3), OR PRESS [function key] FOR MANUAL ENTRY.

   i. If the technician presses the [*function key*], the EIS shall display a manual entry Gas Cylinder Data Screen, prompting the technician to enter the following information manually via the keyboard:

   - BAR Label Number
   - HC Cyl. Value, ppm
   - CO_2 Cyl. Value, %
   - O_2 Cyl. Value, %
   - Cylinder Expiration Date
   - Gas Blend Code
   - CO Cyl. Value, %
   - NO Cyl. Value, ppm
   - Cylinder Lot Number

   The BAR Label Number must contain 2 Alpha characters followed by 8 numeric characters. Any deviation from this shall cause the EIS to display the prompt:

   INVALID BAR LABEL NUMBER

   The calibration sequence shall stop until a proper BAR Label Number is entered.

   The EIS shall check the cylinders' expiration dates to see that none of the gas blends have expired. (NOTE: Zero air generators do not have an expiration date.) If any expiration date has been exceeded, the EIS shall display the prompt:

GAS EXPIRATION DATE HAS PASSED.

The calibration sequence shall stop until the expired cylinder has been replaced.

The EIS shall check the label concentrations of each of the gases in each cylinder to ensure that they are within ±2% of the nominal concentrations listed in §2.4.5.c) 3 of this specification. (E.g., the nominal concentration of propane in the low range calibration gas is 200 ppm. The allowable concentrations scanned in from the cylinder's label are between 196 –204 ppm (±2% of 200 is ±4 ppm)
If any gas label concentration is outside the *±2% tolerance, the EIS shall display the prompt:*

GAS VALUE EXCEEDS TOLERANCE.

The calibration sequence shall stop until the faulty cylinder has been replaced.

After the technician has successfully scanned the bar codes on the high range cylinder, or entered the required data manually, the software shall prompt him to

DISPLAY PROMPT:

SCAN THE LOW RANGE CYLINDER'S THREE BAR CODES IN SEQUENCE (1, THEN 2, THEN 3), OR PRESS [function key] FOR MANUAL ENTRY.

The software shall follow the same procedure as in Step 1.i above.

After the technician has successfully scanned the bar codes on the low range cylinder, or entered the required data manually, the software shall prompt him to

DISPLAY PROMPT:

SCAN THE THREE BAR CODES IN SEQUENCE (1, THEN 2, THEN 3) ON THE ZERO AIR CYLINDER OR ZERO AIR GENERATOR, OR PRESS [function key] FOR MANUAL ENTRY.

The software shall follow the same procedure as in Step1.i above.

2. After the technician has successfully scanned the bar codes on the zero air source, or entered the required data manually, the software shall begin the precalibration audit and calibration routines, displaying prompts for technician actions and inputs, and the status of the calibration procedure as it progresses.

3. The EIS manufacturers, in consultation with their analyzer bench/sensor providers, shall determine whether single-point or two-point calibration, as described below, will result in greater and more consistent accuracy and dependability in their particular systems. The EIS manufacturers shall incorporate the better calibration method in their systems. The two calibration methods, along with their associated precal audits, are performed as follows:

4. *Single-Point Calibration*

DISPLAY PROMPT:

OPEN CAL GAS CYLINDERS AND ZERO AIR. PRESS [*function key*] TO CONTINUE.

i. After the technician presses the function key, the software shall cause zero air to flow through the analyzer. (It is permissible to flush the system with ambient air before flowing zero air; however, sufficient zero air must flow to flush the ambient air before zeroing.) The EIS manufacturer shall determine how long the flow must be maintained. The EIS shall record each channel's precal zero reading (span reading for O_2).

ii. The EIS shall adjust all channels except O_2 to zero. The O_2 channel shall be calibrated to 20.9%. The EIS shall record each channel's adjusted zero reading (span reading for O_2).

iii. The software shall then cause High Range BAR-97 calibration gas to flow through the analyzer until the readings have stabilized. (The EIS manufacturer shall determine the time required for the readings to stabilize.) The response time check in Step iv below shall be performed at this point. The EIS shall record each channel's precal high-range reading (zero reading for O_2). Each channel shall then be adjusted to the center of its tolerance range, except that O_2 shall have its zero reading adjusted to the center of its tolerance range. The adjusted values shall be within ±1% of the actual values shown on the High Range calibration gas cylinder.

The EIS shall record each channel's calibrated high-range reading (calibrated zero reading for O_2).

iv. During the calibration procedure, analyzer/sensor response times for the CO, NO and O_2 channels shall be checked. *The EIS shall introduce high range calibration gas and shall calculate* the time required to reach T_{90} (see §2.4.5 r), or T_{10} for O_2 , and shall compare it to the values *in §2.4.5 r (10 seconds for O_2). If the measured response time for any channel exceeds its allowable response time by more than* one (1) second, a message shall be displayed on the EIS monitor.

DISPLAY PROMPT:

ANALYZER RISE TIME TOO SLOW. CALL FOR SERVICE. PRESS [*function key*] **TO CONTINUE.**

If the difference between the values (except for O_2) exceeds two (2) seconds, the EIS shall fail the gas calibration, prevent any smog checks from being performed, and a suitable message displayed.

DISPLAY PROMPT:

FAILED GAS CALIBRATION. ANALYZER RISE TIME TOO SLOW. CALL FOR SERVICE. PRESS [*function key*] **TO CONTINUE.**

An O_2 channel response time failure shall not cause a calibration failure unless its response time has been at least two seconds over the limit for seven calendar days.

Similarly, the EIS computer shall measure the analyzer/sensor responses to the purging of the high range calibration gas, shall calculate the time required to reach T_{10} and shall compare it to the values in §2.4.5 r. If the difference between the values exceeds one (1) second, a message shall be displayed on the EIS monitor.

DISPLAY PROMPT:

ANALYZER FALL TIME TOO SLOW. CALL FOR SERVICE. PRESS [*function key*] **TO CONTINUE.**

If the difference between the values (except for O_2) exceeds two (2) seconds, the EIS shall fail the gas calibration, store any results to the calibration record, prevent any smog checks from being performed, and a suitable message displayed. The O_2 criterion for causing a calibration 1failure shall be the same as that for a T_{90} failure.

DISPLAY PROMPT:

FAILED GAS CALIBRATION. ANALYZER FALL TIME TOO SLOW. CALL FOR SERVICE. PRESS [*function key*] **TO CONTINUE.**

v. If the analyzer passed the response time test, the EIS shall then cause Low Range BAR-97 calibration gas to flow through the analyzer. No precal readings shall be recorded. The channels shall be checked, but NOT adjusted, to determine that each channel is still within the accuracy requirements listed in §2.4.5 j.

Acceptance Criteria: (1) If Steps i through v, above, are all successfully completed, the software shall display the prompt

DISPLAY PROMPT:

PASSED GAS CALIBRATION. PRESS [*function key*] **TO CONTINUE.**

When the technician presses the [*function key*], the software shall return to the calibration menu. If this is a 3-day calibration and leak check, it shall proceed to the leak check procedure. (2) If any step is not successfully completed, the software shall display the prompt

DISPLAY PROMPT:

FAILED GAS CALIBRATION. TRY AGAIN? (YES/NO)

If the technician enters YES, the software shall repeat the calibration procedure from Step iii one more time. If the technician enters NO, the software shall return to the calibration

1

menu, shall store the result in Calibration Data file and shall prevent a smog check from being performed.

OPTION: If the EIS manufacturer has chosen single-point calibration as the preferred method, and if the analyzer has failed the gas calibration, and the technician elects to try again, the EIS may at this time perform a two-point calibration, calibrating to the low range gas first, then to the high range gas. However, the following limitations apply:

(a) Two-point calibrations cannot be performed twice in a row. They must be preceded by an on-point calibration that successfully calibrated to the high range gas.

(b) A two-point calibration may not be performed if three two-point calibrations have been performed within the previous 21 days.

These limitations are present because the EIS and the analyzer/sensor manufacturers have determined that the single-point calibration method provides better accuracy and consistency in their systems than does the two-point calibration method..

5. *Two-Point Calibration*

DISPLAY PROMPT:

OPEN CAL GAS CYLINDERS AND ZERO AIR. PRESS [*function key*] TO CONTINUE.

i. After the technician presses the function key, the software shall cause zero air to flow through the analyzer. (It is permissible to flush the system with ambient air before flowing zero air; however, sufficient zero air must flow to flush the ambient air before zeroing.) The EIS manufacturer shall determine how long the flow must be maintained. The EIS shall record each channel's precal zero reading (span reading for O_2).

ii. The EIS shall adjust all channels except O_2 to zero. The O_2 channel shall be calibrated to 20.9%. The EIS shall record each channel's adjusted zero reading (span reading for O_2).

iii. The software shall then cause Low Range BAR-97 calibration gas to flow through the analyzer until the readings have stabilized. (The EIS manufacturer shall determine the time required for the readings to stabilize.) The EIS shall record each channel's precal low-range reading (zero reading for O_2). Each channel shall then be adjusted to the center of its tolerance range, except that O_2 shall have its zero reading adjusted to the center of its tolerance range. The adjusted values shall be within ±1% of the actual values shown on the Low Range calibration gas cylinder. The EIS shall record each channel's calibrated low-range reading (calibrated zero reading for O_2).

iv. The software shall then cause High Range BAR-97 calibration gas to flow through the analyzer until the readings have stabilized. The response time check in Step 4. iv above shall be performed at this point. The EIS shall record each channel's precal high-range reading (zero reading for O_2). Each channel shall then be adjusted to the center of its tolerance range, except that O_2 shall have its zero reading adjusted to the center of its tolerance range. The adjusted values shall be within ±1% of the actual values shown on the High Range calibration gas cylinder. The EIS shall record each channel's calibrated high-range reading (calibrated zero reading for O_2).

[*Note that the T_{90} response time is taken over the range of low-range final reading to high-range stabilized value. For example, if the final low range reading for NO was 300 ppm and the stabilized high-range reading was 3000 ppm, the range would be 3000 – 300 = 2700 ppm. 90% of 2700 is 2430 ppm, so the T90 point would be 2430 + 300 = 2730 ppm.*]

6.. <u>Summary</u>: Single-Point Analyzer Calibration Sequence

1. The EIS flows zero air; the HC, CO, CO_2 & NO channels are zeroed; the O_2 channel is set to 20.9%.

2. The EIS flows high range gas; the EIS measures response times to T_{90} for CO & NO and T_{10} for O_2 and compares to response times in §2.4.5.r; the HC, CO, CO_2 & NO channels are calibrated; the O_2 channel is zeroed.

3. The EIS flows zero air; the EIS measures response times to T_{10} for CO & NO (T_{90} for O_2), and compares to response times in §2.4.5.r.

4. The EIS flows low-range gas and checks the analyzer readings to ensure that the accuracy requirements of this specification are met (calibration adjustments are NOT to be made at low range).

5. The EIS makes the analyzer precal audit and calibration pass/fail determinations, purges the bench and goes on to the next step.

7. Summary: Two-Point Analyzer Calibration Sequence

1. The EIS flows zero air; the HC, CO, CO_2 & NO channels are zeroed; the O_2 channel is set to 20.9%.

2. The EIS flows low range gas; the HC, CO, CO_2 & NO channels are calibrated; the O_2 channel is zeroed.

3. The EIS flows high range gas; the EIS measures response times to T_{90} for CO & NO and compares to response times in §2.4.5; the HC, CO, CO_2 & NO channels are calibrated; the O_2 channel is zeroed.

4. The EIS flows zero air; The EIS flows zero air; the EIS measures response times to T_{10} for CO & NO (T_{90} for O_2), and compares to response times in §2.4.5.r.

   The EIS makes the analyzer precal audit and calibration pass/fail determinations, purges the bench and goes on to the next step.

8. If the EIS is configured without a NO_x measuring device the EIS shall make the following modifications to the calibration routine:

1. The EIS shall be able calibrate on gas that does contain NO.

2. The EIS shall be able to accept zero for NO gas bottle values (the software shall still be able to accept the standard high/low NO gas bottle values). The EIS shall also be able to accept the appropriate blend code entries for calibration gas that does not contain NO.

3. The EIS shall zero fill the appropriate NO results in the calibration data record.

9. The EIS shall write the type of NO_x Measuring device installed in the EIS to the *NO_x device installed* field of the calibration record.

   1 = NOx device installed (standard cell), 2 = NOx device not installed , 3 = NDIR bench installed, 4 = chemiluminesence installed, 5 = NOx gel cell installed, 6 = NDUV bench installed.

   Note: If alternate NO technologies are not used numbers 3 – 6 do not apply.

c) **EIS Sample System Leak Check**
Selection of this item shall bring up a set of leak check procedures. The procedures shall be user friendly and shall indicate every step needed to properly perform a leak check (including when it is necessary to turn the gas cylinder valve on and off). Procedures shall be approved by the BAR. Results of the leak check shall be displayed and recorded on the calibration record. If the EIS fails the three-day gas calibration or the leak check, the unit shall be "locked out" (prevented from testing) and a message shall be displayed on the screen indicating that and instructing the technician how to correct the failure or to call for repairs.

d) **Dynamometer Calibration**
The dynamometer shall be calibrated every 72 hours using the following calibration procedures described below. If the dynamometer fails the calibration, the EIS shall not be locked out of two-speed idle testing. If the EIS is configured without a dynamometer do not prompt for a dynamometer calibration during a Three-Day Calibration.

1) **Warm-Up:** Whenever the dynamometer is due for dynamometer warm-up check, the EIS shall display the following message:

   DISPLAY PROMPT:

   DYNAMOMETER WARM-UP REQUIRED.

   <u>Programming Criteria</u>:

   1. The dynamometer shall be warmed up in accordance with the dynamometer manufacturer's warm-up procedure. The EIS shall provide sufficient information (temperature compensation) to

instruct the technician regarding the dynamometer manufacturer's warm-up test procedure. The technician shall be required to press a function key to start the warm-up procedure and the EIS shall display the following message:

DISPLAY PROMPT:

DYNAMOMETER WARM-UP IS IN PROGRESS.

2. If the dynamometer does not meet the manufacturer's warm-up time, the EIS shall be locked out of loaded mode inspection for DYNAMOMETER WARM-UP FAILURE. If the dynamometer warm-up time is within the dynamometer manufacturer's specification, then the dynamometer passes the warm-up check, the EIS shall display the following message:

   DISPLAY PROMPT:

   DYNAMOMETER PASSED WARM-UP CHECK.

   If the dynamometer doesn't meet the manufacturer's warm-up time, the EIS shall be locked out of inspection for DYNAMOMETER WARM-UP FAILURE.

   DISPLAY PROMPT:

   DYNO WARM-UP FAILURE - - CALL FOR SERVICE.

2) **Coast-down Check:** Whenever the dynamometer is due for dynamometer coast-down check, the EIS shall perform the coast-down check in accordance with §2.5.7.2 (a) and (b). The EIS shall display the following message:

DISPLAY PROMPT:

DYNAMOMETER COAST-DOWN CHECK IS REQUIRED

Programming Criteria:

1. The EIS shall provide sufficient information to instruct the technician to perform the dynamometer coast-down check. The technician shall be required to press a function key to start this check procedure and the EIS shall display the following message:

DISPLAY PROMPT:

DYNAMOMETER COAST-DOWN CHECK IN PROGRESS.

2. Upon completion of the dynamometer coast-down check, the EIS shall store in the calibration record file the coast-down times.

   a. If the dynamometer coast-down times are within the limits, then the dynamometer passes the coast-down check and the EIS shall display the following message:

      DISPLAY PROMPT:

      DYNAMOMETER CALIBRATION COMPLETE.

   b. If the dynamometer coast-down times are not within the limits, the EIS shall be locked out of inspection for DYNAMOMETER COAST-DOWN FAILURE.

      DISPLAY PROMPT:

      DYNO COAST-DOWN FAILURE -- PERFORM PARASITIC LOSS DETERMINATION

3. Parasitic Loss Determination: Perform the parasitic loss determination according to the procedures in §2.5.7.3. The EIS shall store parasitic losses measured in horsepower in the calibration record.

   a) If the dynamometer parasitic losses are within the limits, then perform another coast-down check using the new parasitic loss values.

      DISPLAY PROMPT:

      DYNO PARASITIC LOSSES RECALIBRATED -- PERFORM COAST DOWN CHECK

      1. If the coast-down times are within manufacturer required specifications, the dynamometer calibration is complete.

DISPLAY PROMPT:

DYNAMOMETER CALIBRATION COMPLETE

2. If the coast-down times are not within manufacturer required specifications, the dynamometer shall be locked out of inspection for DYNAMOMETER LOAD CELL CALIBRATION FAILURE.

   DISPLAY PROMPT:

   DYNAMOMETER LOAD CELL CALIBRATION FAILURE -- PERFORM DEAD WEIGHT CALIBRATION

b) If the dynamometer parasitic losses are not within the manufacturer's allowable limits, then the EIS shall be locked out of inspection for DYNAMOMETER PARASITIC LOSSES FAILURE.

   DISPLAY PROMPT:

   DYNO PARASITIC LOSS FAILURE -- CALL FOR SERVICE

4. If a dynamometer's parasitic losses fall within the manufacturer's recommended limits but the dynamometer cannot pass the coast-down test, perform the dead weight calibration according to the manufacturer's recommended procedures followed by another coast-down test. Record the coast-down values and the dead weight test results in the test record.

   a) If the load cell will not come to within manufacturer's recommended specifications, the EIS shall be locked out of inspection for DYNAMOMETER LOAD CELL FAILURE.

      DISPLAY PROMPT:

      DYNO LOAD CELL FAILURE -- CALL FOR SERVICE.

b) If the coast-down times are still not within the limits after the load cell calibration, the EIS shall be locked out of inspection for DYNO CALIBRATION FAILURE.

DISPLAY PROMPT:

DYNO CALIBRATION FAILURE -- CALL FOR SERVICE

c) If the parasitic losses and the coast-down times are within the allowable limits, the dynamometer may be used to perform inspections.

DISPLAY PROMPT:

DYNAMOMETER CALIBRATION COMPLETE

e) **Fuel Cap Tester Calibration**
The fuel cap tester shall be checked for proper calibration accuracy every 72 hours. The EIS shall display the following prompts.

A. Pass Cap

i. DISPLAY PROMPT:

TIGHTLY INSTALL THE "PASS CALIBRATION CAP" ON THE FUEL CAP TESTER AND PRESSURIZE THE SYSTEM AND PRESS THE START TEST BUTTON.

ii. The tester shall send a pass/fail to the EIS. If a pass is sent to the EIS, the EIS shall continue on with the fail cap test **(B)**. If a fail is sent to the EIS, the EIS shall display the following prompt.

DISPLAY PROMPT:

THE "PASS CALIBRATION CAP" HAS FAILED. REMOVE THE "PASS CALIBRATION CAP" AND CHECK FOR PROPER SEAL. BE SURE THE CALIBRATION CAP IS TIGHTLY INSTALLED.

iii. The tester shall send a pass/fail to the EIS. If a pass is sent to the EIS, the EIS shall continue on with the fail cap test **(B)**. If a fail is sent again, the EIS shall display the following prompt.

DISPLAY PROMPT:

THE FUEL CAP TEST SYSTEM IS NOT CALIBRATED OR IS MALFUNCTIONING. SET FUEL CAP TEST SYSTEM CALIBRATION (only if system is designed for recalibration) OR CALL FOR SERVICE.

B. Fail Cap

i. DISPLAY PROMPT:

TIGHTLY INSTALL THE "FAIL CALIBRATION CAP" ON THE FUEL CAP TESTER AND PRESSURIZE THE SYSTEM AND PRESS THE START TEST BUTTON.

ii. The tester shall send a pass/fail to the EIS. If a fail is sent to the EIS, the calibration shall end at this point.

iii. If a pass is sent to the EIS, the EIS shall display the following prompt.

DISPLAY PROMPT:

THE FUEL CAP TESTER HAS FAILED THE CALIBRATION CHECK. THE FUEL CAP TEST SYSTEM IS NOT CALIBRATED OR IS MALFUNCTIONING.

If the system is designed for recalibration, the following prompt shall be displayed:

DISPLAY PROMPT:

SET THE FUEL CAP TEST SYSTEM CALIBRATION.

If the system is NOT designed for recalibration, continue with the following prompt: **CALL FOR SERVICE.** A lockout shall be set if the fuel cap tester cannot be recalibrated or fails after recalibration.

NOTE: Manufacturers may modify the above procedure upon approval by BAR.

f) **Floppy Disk Check**

The State-secured floppy disk shall be checked every 72 hours for surface structure, directory structure, file system and file allocation table errors. The EIS shall display the following prompt.

DISPLAY PROMPT:

PRESS ENTER TO START FLOPPY DISK CHECK.

If no errors are found, the following prompt shall be displayed.

DISPLAY PROMPT:

FLOPPY DRIVE CHECK PASSED

If an error is found and the error can not be repaired, a lockout shall be set and the following prompt shall be displayed.

DISPLAY PROMPT:

FLOPPY DRIVE ERROR. CALL FOR SERVICE.

NOTE: All floppy disk surface errors require the above prompt. Software repairs are not usually adequate and these errors are a sign of disk deterioration.

3.10 STATUS PAGE

Selection of this item will display a status screen containing the following information:

- EIS number
- PEF number
- Span gas cylinder values
- Date and time of last calibration
- Gas Analyzer
- Fuel Cap Tester
- Dynamometer
- Leak Check
- Date EIS was last serviced
- Time and date
- Active software version number
- Update software version number
- Update activation date
- Date and time of last network access
- Number of Smog Checks and number of days since last network access
- Station license has expired

- Station license suspended
- Station license revoked
- Failure to pay for certificate numbers purchased
- Failure to pay for communication services
- Warm-up in progress
- Warm-up failure
- Dynamometer warm-up in progress
- Dynamometer calibration required
- Dynamometer calibration failure
- Dynamometer failure
- Gas calibration required
- Gas calibration failure
- Gas analyzer failure
- Calibration Gas Cylinder Violation
- Fuel cap tester failure
- Fuel cap tester out of calibration
- Dyno lift failure
- Leak check required
- Leak check failure
- Cabinet tampering
- Out of certificates
- Hard disk is full
- Floppy disk or disk mechanism failure
- Hard disk or disk mechanism failure
- QA/State EIS lockout
- EIS initialization (data missing, incorrect or incomplete)
- Certificate sequencing error
- State disk drive tampering
- O_2 Sensor Out of Calibration
- Clock lockout
- VLT corrupt
- Dynamometer scale failure
- Excessive Number of Aborts
- Live weight scale reading
- Humidity reading
- Temperature reading
- Barometric pressure reading
- NO_x measuring device is installed (Y/N)
- Dynamometer installed (Y/N)

3.11 NETWORK COMMUNICATIONS DIAGNOSTICS

This item shall be used to diagnose communications-related problems. The following diagnostic tests shall be provided:

a) Dial Tone Check: The EIS shall have the capability of performing a dial tone check. When selected, the EIS shall check for the presence of a dial tone.

If a dial tone is not present, the EIS shall display the following message:

DISPLAY PROMPT:

DIAL TONE CHECK FAILED

VERIFY THAT DEDICATED PHONE LINE IS PLUGGED IN AND RETRY

If a dial tone is present, the EIS shall display the following message:

DISPLAY PROMPT

DIAL TONE CHECK PASSED

If after entry, the dial tone is not present, display the following message:

DISPLAY PROMPT:

DIAL TONE CHECK FAILED

b) Modem Serial Port Diagnostics: Modem serial port diagnostics shall be provided by the EIS manufacturer pursuant to manufacturer-specific hardware configurations.

It is the responsibility of each EIS manufacturer to work with the VID contractor to ensure that the modem strings are set up automatically and correctly.

The modem strings will be setup in a data file (refer to Confidential ET Communications Protocol in Appendix C-4) for the VID contractor's software.

c) Network Diagnostics: The EIS shall provide the data needed to conduct NETWORK DIAGNOSTICS (refer to the Confidential Appendix C-2). The structure of this file is determined by each EIS manufacturer. The data file Network DIAGNOSTIC TRANSMIT RECORD shall be transmitted to the VID and the data file NETWORK DIAGNOSTIC RECEIVE RECORD shall be sent

back to the EIS from the VID. They should be identical upon completion of the network diagnostics routine for this test to pass. The EIS shall display the following message:

DISPLAY PROMPT:

TRANSMITTING DATA, PLEASE WAIT.

Programming Criteria:

1. If, upon completion of network access, the data transmitted by the EIS to the VID is the same as the data received by the EIS from the VID, then the EIS shall display the following message:

   DISPLAY PROMPT:

   NETWORK COMMUNICATIONS PASSED.

2. If, upon completion of network access, the data transmitted by the EIS to the VID is **not** the same as the data received by the EIS from the VID, then the EIS shall display the following message:

   DISPLAY PROMPT:

   NETWORK COMMUNICATIONS FAILED.

3. If network communications access is not achieved, the EIS shall display the following message:

   DISPLAY PROMPT:

   CANNOT ACCESS NETWORK.

d) Remote Dial-In Check: The EIS shall be capable of responding to a modem tone check.

3.12 PRETEST/TRAINING MODE

When this item is selected, the EIS shall provide an option to perform either a Pretest or Training Mode. Prompts shall be provided to allow the trainee to perform a practice inspection in accordance with the requirements specified in §3.2.10.

3.13 RECALL PREVIOUS VEHICLE TESTS

The EIS must be able to recall the previous data and reprint a VIR for at least the most recent 100 inspections. The EIS shall provide prompts to the technician to review or print, if required, a summary of the test result or the specific vehicle information.

3.14 QA FUNCTIONS

The EIS shall display the list of State/QA functions when this item is selected.

3.14.1 QA/State Menu

Access to initialize the EIS by QA/State representatives must be in place at the time the EIS is delivered.

The access code for the QA/State menu is a case-sensitive alphanumeric code that changes daily. The access code will be supplied by the state via a confidential data disk (refer to §1.4). The EIS shall display the access code as Xs on the screen when the access code is entered.

The manufacturer shall display the following menu options for the QA inspectors and State representatives:

1. **LEAK CHECK**
2. **GAS AUDIT**
3. **UPDATE STATION INFORMATION**
4. **VIEW TECHNICIAN INFORMATION**
5. **INSTALL NEW DATA DISK**
6. **RESET DATE & TIME**
7. **HANDS-ON TEST**
8. **LOCKOUT EIS**
9. **PERFORM EMERGENCY SOFTWARE UPDATE**
10. **SEARCH AND RETRIEVE TEST RECORD**
11. **STATE STAFF INSPECTION**
12. **QA INSPECTION**
13. **COMMUNICATIONS LOG**

Access to the QA/State Menu will require entry of an access code by a QA/State representative when the initial station inspection has been completed. The EIS's I/M testing functions shall not operate until the access code is entered. Information contained in the files associated with the QA/State Menu shall be hidden in software to the BAR's satisfaction.

The access code shall consist of five case-sensitive alphanumeric characters. When **QA/STATE MENU** is selected, the EIS shall display the following message:

DISPLAY PROMPT:

ENTER THE QA/STATE ACCESS CODE

When the correct QA/State access code for the day has been entered, the EIS shall display the "QA/State Menu" functions.

Once access to the QA/State Menu functions has been allowed, the EIS shall monitor for keyboard strokes. If the EIS does not detect keyboard strokes or processor activities continuously for five minutes, the EIS shall automatically close the QA/State Menu and return to the Main Menu.

3.14.2 **Leak Check**

Instructions for conducting a leak check (refer to §3.9.c)) shall be displayed on one screen and the EIS shall allow the QA inspector to press a function key when ready to begin the leak check. The following message shall be displayed at the bottom of the leak check instruction page:

PRESS (Function key) **WHEN YOU WANT TO START THE LEAK CHECK.**

3.14.3 **Gas Audit**

The EIS shall prompt the gas audit procedure specified in §2.4.5; the ambient temperature, relative humidity and barometric pressure shall also be displayed. HC readings shall be displayed as ppm propane, or selectable as ppm hexane or propane. The actual PEF values must be displayed along with the readings.

3.14.4 **Update Station Information**

Selecting this item will cause the EIS to display a table showing the following station information. This information is entered by BAR upon initialization of the station and when the information changes.

STATION LICENSE NUMBER

(8 alphanumeric)

DYNAMOMETER CONFIGURATION

(2WD, AWD, NO DYNAMOMETER)

NO_x MEASURING DEVICE INSTALLED

1 = NOx cell installed (standard cell), 2 = NOx device not installed , 3 = NDIR bench installed, 4 = chemiluminesence installed, 5 = NOx gel cell installed, 6 = NDUV bench installed

Note: If alternate NO technologies are not used numbers 3 – 6 do not apply.

EIS #
(8 alphanumeric)

The EIS shall record the above data to the appropriate fields in the test record, i.e. *Station License Number, Dyno Configuration, NOx cell installed,* and *EIS Number*.

3.14.5 **View Technician Information**
The technician information shall be transferred from the VID to the EIS. The EIS shall provide viewing option to the State/QA inspector. When the technician information is displayed, a function key must be pressed to display the technician access code. The technician access code shall be displayed for two seconds after the function key is pressed. The technician access code shall never be printed.

TECHNICIAN NAME	ACCESS CODE	LICENSE NUMBER
(20 alpha)	(5 numeric)	(8 alphanumeric)
ENDORSEMENTS	EXPIRATION DATE	
(1 alpha)	(MMDDYYYY)	

Space for 99 licensed technicians shall be provided. Alternative arrangements of the information will be considered by the BAR.

3.14.6 **Install New Data Disk**
The manufacturer shall display instructions, on a single screen, for changing the floppy disk. The instructions shall meet BAR approval. If the floppy disk is changed, the EIS shall check the newly installed data disk for existing EIS records and shall perform a disk check for corruption. If EIS records are found, the EIS must prompt the user to install a blank disk. Once a valid floppy disk has been installed, the EIS shall automatically format the new floppy disk.

3.14.7 **Reset Date and Time**
Selection of this item shall cause the date and time to be displayed. The date and time shall be displayed in the following manner:

MONTH DAY, YEAR	**HOUR:MINUTES:SECONDS**
(8 digits)	(24-hour time)

The manufacturer shall provide mechanisms for direct entry of the date and time.

3.14.8 **Hands-on Test**

When this item is selected, the EIS shall not issue a certificate, but shall record an H (Hands-on Test) for the inspection reason on the test record. The test results shall be printed on the VIR, QA Audit Hands-on Evaluation printed in the test results block and recorded to the Hands-on Test file; they shall be transmitted to the VID during the next required communication session.

3.14.9 **EIS Lockout/Tamper**

When this item is selected, the EIS shall display the list of the lockouts/tampers and current lockout/tamper status.

DISPLAY PROMPT:

SELECT "Y" FOR YES TO SET LOCKOUT.

SELECT "N" FOR NO TO CLEAR LOCKOUT.

List of lockouts/tampers:

-QA/State EIS lockout
-Cabinet tampering
-State disk drive tampering
-Station license suspended
-Station license revoked
-Station license expired
-Failure to pay for certificate numbers purchased
-Failure to pay for communications services
-Certificate sequencing error
-No communication with VID in XXX days and XXX tests
-Clock lockout
-VLT Corrupt (self-correcting upon VID verification of VLT data replacement)
-Calibration Gas Cylinder Violation
-Excessive Number of Aborts
-Dynamometer scale failure

The EIS shall allow the lockouts to be set or cleared (tampers can only be cleared) by a method approved by BAR.

The EIS shall display a message if the EIS is locked out from I/M testing.

Only the QA/State Representatives, either at the EIS unit or via the VID, shall be able to clear lockouts set by BAR staff. The EIS shall be designed to allow the BAR to set or

clear all lockouts that are transmitted to the VID via the VID. However, if a lockout is cleared at the EIS unit and not via the VID, the lockout will be re-set during the next VID contact. A tamper can only be set initially by the EIS unit.

3.14.10 **Perform Emergency Software Update**

If an emergency software update is required, the EIS, using this menu selection, shall allow the BAR representative or the QA inspector to install the software update on affected, if applicable, EIS units.

If this menu selection is made, the EIS shall display the following prompt:

DISPLAY PROMPT:

DO YOU WANT TO PERFORM AN EMERGENCY SOFTWARE UPDATE? (YES/NO)

Programming Criteria:

1. If Yes, the EIS shall automatically open the door to the floppy or (if a lock mechanism is used) shall display a message regarding how to open the door. The EIS shall then prompt to insert the update disk in the state drive and press a function key to implement the software update. After the update has been completed, the EIS shall prompt to remove the update disk and close the floppy door. The EIS shall then return to the QA/State menu. Any time a software update is performed, the EIS shall require the technician to perform a Data file refresh before a Smog Check can be initiated.

2. If No, the EIS shall return to the QA/State menu.

3.14.11 **Search and Retrieve Test Records**

The search shall locate, display and printout completed test and calibration records based on knowledge of the vehicle license plate number, VIN, date/time or certificate number. Once a test record is located, the QA/State Representative shall be allowed to review the previous test records as well as those which follow the target record. If an exact match is not found, the closest match shall be displayed. Once a record is located, the QA or state representative shall be allowed to review the complete vehicle inspection or calibration record and print those records using the VIR printer.

3.14.12 **State Staff Inspection**

The State Field Staff Inspection shall be a selectable item under the QA/STATE MENU and the type of inspection performed shall be determined by the first character of the ID number entered (either Q or S).

Selection of this menu item shall bring forward a screen in which a State Field Staff person will enter station inspection data. (Refer to Confidential Appendix C-2 for details.)

State Field Staff personnel shall have a unique Identification Number (6 alphanumeric) which shall be scanned or manually entered via dual method entry in which entry is not displayed, at the beginning of the inspection. The VID shall verify this number upon transmission of the inspection result record.

Programming Criteria:

1) DISPLAY PROMPT:

SCAN OR MANUALLY ENTER ID NUMBER.

No message is needed when both entries match. The EIS shall display the following error message when both of the inputs are not the same. Both entries must match before proceeding with an inspection.

BOTH ENTRIES ARE NOT THE SAME - TRY AGAIN.

2) DISPLAY PROMPT:

ENTER THE INSPECTION REASON

CODE	DESCRIPTION
I	INITIAL
F	FOLLOW UP
P	PERIODIC
L	LOCKOUT
T	TECHNICIAN ACCESS CODE

3) DISPLAY PROMPT:

ENTER INSPECTION RESULT (PASS OR FAIL)

4) DISPLAY PROMPT:

FOLLOW-UP ACTION? (YES/NO)

5) DISPLAY PROMPT:

SCAN OR MANUALLY ENTER "STATION ACTION TAKEN" CODES

The State Field Staff shall have the choice of entering or not entering up to 10 sets of codes (up to 3 alphanumeric digits for each set). The State Field Staff shall be able to add or delete code strings. Dual method entry is not required.

6) DISPLAY PROMPT:

ENTER INSPECTION COMMENTS (UP TO 140 CHARACTERS).

The State Field Staff shall have a screen prompt to review and/or edit the entries. There shall be a clear choice of exiting the input screen at any point by pressing a function key and either saving or not saving the data to a file. If the data is saved, the EIS shall automatically populate the Station License Number, EIS ID, Date and Time fields. If the data is not saved, a new record in the data file shall not be created.

3.14.13 **QA Inspection**

Selection of this menu item will bring forward a screen on which a Quality Assurance (QA) Inspector will enter the station inspection data. (Refer to Confidential Appendix C-2 for details.)

The QA inspector shall have a unique Identification Number (6 alphanumeric) which shall be scanned or manually entered via dual method entry in which entry is not displayed at the beginning of the inspection. The VID shall verify this number upon transmission of the inspection result record.

Programming Criteria:

1) DISPLAY PROMPT:

SCAN OR MANUALLY ENTER ID NUMBER.

No message is needed when both entries match. The EIS shall display the following error message when both of the inputs are not the same. Both entries must match before proceeding with an inspection.

BOTH ENTRIES ARE NOT THE SAME - TRY AGAIN.

2) DISPLAY PROMPT:

ENTER INSPECTION RESULT (PASS OR FAIL)

3) DISPLAY PROMPT:

EIS FIX-IT TICKET ISSUED? (YES/NO)

4) DISPLAY PROMPT:

SCAN OR MANUALLY ENTER "CRITICAL EXCEPTION" CODES.

The QA inspector shall have the choice of entering or not entering up to 10 sets of codes. State inspector shall be able to add or delete code strings. Dual method entry is not required.

5) DISPLAY PROMPT:

SCAN OR MANUALLY ENTER "NON-CRITICAL EXCEPTION" CODES.

The QA inspector shall have the choice of entering or not entering up to 10 sets of codes (up to 3 alphanumeric digits for each set). State inspector shall be able to add or delete code strings. Dual method entry is not required.

6) DISPLAY PROMPT:

ENTER INSPECTION COMMENTS (UP TO 140 CHARACTERS).

The QA shall have a screen prompt to review and/or edit the entries. There shall be a clear choice of exiting the input screen at any point by pressing a function key and either saving or not saving the data to a file. If the data is saved, the EIS shall automatically populate the Station License Number, EIS ID, Date and Time fields. If the data is not saved, a new record in the data file shall not be created.

[The State Field Staff and QA Inspection Record format are part of Appendix C-2 which may only be released with prior written consent from the BAR Engineering Section.]

3.14.14 **Communications Log**

This function will allow the QA or State Representative to view the communications log and shall provide an option to view and print. The EIS shall keep a log of the 100 most recent communication transactions. The logs are to be created using the "/L" switch built into ESP's "BAR 97 EIS COMMUNICATION INTERFACE TO VID" specification. The log files must be created regardless of whether or not the “/L” switch enables or disables the log feature. (This log shall also be made available to the manufacturer's representatives in the FIELD SERVICE MENU.)

3.15 STATION MANAGER MENU

1. **PURCHASE CERTIFICATE NUMBERS**
2. **REVIEW CERTIFICATE INVENTORY**
3. **DATA FILE REFRESH**
4. **UPDATE NETWORK COMMUNICATIONS DATA**
5. **STATION IDENTIFICATION**
6. **SET STATION PASSWORD**
7. **UPDATE VLT**

3.15.1 Purchase Certificate Numbers

This function will allow certificate numbers to be purchased via the network. The EIS shall only allow authorized personnel (station manager's access code) to enter this feature. Upon selection, network access shall be attempted and, if successful, certificate numbers in multiples of fifty (50) may be ordered.

If transmission of certificate numbers is successful, then the certificate numbers shall be returned (in the CERTIFICATE NUMBERS data file) either immediately or at a subsequent network access and should be stored in the REVIEW CERTIFICATE INVENTORY file. If sufficient funds are not available, the VID shall send a lockout message. The EIS shall display the following menu items under purchase certificate numbers:

1. SET AUTOMATIC ORDER QUANTITY
2. MANUAL ORDER

When automatic order quantity is selected, the EIS shall allow the operator to set the low certificate warning threshold and set the number for automatic certificate order. When manual order is selected, the EIS shall commence with certificate purchase.

DISPLAY PROMPT:

TRANSMITTING DATA, PLEASE WAIT.

<u>Programming Criteria</u>:

1) Certificate numbers purchase request will be transmitted to VID.

2) Upon successful transmission of the request, the EIS shall display the following message provided that certificate numbers are not sent from VID at this time:

DISPLAY PROMPT:

CERTIFICATE ORDER HAS BEEN PLACED. ENSURE THAT ACCOUNT HAS SUFFICIENT FUNDS.

3) Upon receipt of certificate numbers, the EIS shall display the following message:

DISPLAY PROMPT:

CERTIFICATE NUMBERS RECEIVED.

A receipt shall be printed.

The EIS shall display a CERTIFICATE RECEIVED message and shall print a receipt as shown below:

ELECTRONIC CERTIFICATE NUMBER PURCHASE RECEIPT

Date:	MM/DD/YYYY	Time:	HH:MM
Station:	Station License #		
EIS ID:	EIS #		

Certificate Numbers have been issued to this station via electronic transfer. If purchase has not been pre-paid, usage of these certificate numbers will be revoked immediately if payment is not received.

For example:

Range of Cert #	Total Cert #.	Cost/Cert.	Total Cost
AA000001-AA000050	50	$8.25	$412.50

Note: List each range of fifty (50) certificates.

4) If the requestor's bank cannot honor the debit transaction due to insufficient funds in the requestor's account, etc., the EIS shall be locked out after all "paid-off" certificates have been used. The EIS shall display the following message:

DISPLAY PROMPT:

INSUFFICIENT FUNDS. THE EIS SHALL BE LOCKED OUT. CALL DCA/BAR ACCOUNTING DEPARTMENT.

5) If a certificate order will not be acknowledged until funds are received, then the following message will be displayed:

DISPLAY PROMPT:

FUNDS MUST BE CLEARED THROUGH DEBIT PROCESS BEFORE CERTIFICATES ARE ISSUED.

6) If a certificate order is not approved by BAR, then the following message will be displayed:

DISPLAY PROMPT:

PURCHASE IS NOT AUTHORIZED. CONTACT NEAREST BAR OFFICE.

The number of certificates remaining shall be displayed before each Smog Check. When the number remaining drops below a pre-defined threshold, a warning message will be displayed.

DISPLAY PROMPT:

ONLY X CERTIFICATES REMAIN. REORDER CERTIFICATES.

The following data shall be modified through this menu item:

Description	Length	Format
Low certificate warning threshold	3	Numeric
Number of certificates remaining to trigger re-order	3	Numeric

If the station has authorized automatic reordering (provided that the number of certificate lots to be automatically re-ordered is 1), the EIS shall automatically place a certificate order once the number of remaining certificates drops to a pre-defined threshold (number of certificates to trigger reorder is between 0 and 50; 0 = manual ordering). The automatic certificate reordering function is preset by the station manager or authorized personnel.

Automatic reorder shall not be triggered until previously ordered certificates have been received.

3.15.2 **Review Certificate Inventory**

This feature shall display the number of all certificates currently residing in the inventory. The EIS shall display the certificate numbers as follows:

DISPLAY PROMPT:

REVIEW CERTIFICATE INVENTORY

XXxxxxxx to XXxxxxxx

THERE ARE XX CERTIFICATES REMAINING IN INVENTORY

3.15.3 **Data File Refresh**

This feature shall allow the station manager or other authorized station personnel to place a request to the VID to update date and time, BAR messages (if applicable), certificate numbers (that the EIS currently uses and those, if any, that are stored in the inventory), technician's information, ESC Table and lockout status.

The EIS shall overwrite the existing tables with the refreshed data received from the VID.

Whenever a DATA FILE REFRESH is selected and before performing the data refresh procedure, the EIS shall display the following message: (Alternative methods may be used upon approval by BAR.)

DISPLAY PROMPT:

THE VID SHALL UPDATE THE TECHNICIAN INFORMATION FILE AND THE CERTIFICATE NUMBER INVENTORY.

Prior to performing the DATA FILE REFRESH, the EIS shall display a list of technician license number endorsements and expiration dates. The EIS shall also display the certificate number inventory that currently exist in the EIS and shall provide an option to print, if desired. Then the EIS shall prompt the technician to perform the refresh procedure.

Upon completion of the DATA FILE REFRESH procedure, the EIS shall display the following message:

DISPLAY PROMPT:

THE TECHNICIAN LICENSE NUMBERS AND CERTIFICATE NUMBERS HAVE BEEN UPDATED BY THE VID. PLEASE CHECK. IF THERE ARE PROBLEMS, CONTACT YOUR LOCAL BAR FIELD OFFICE.

After the display prompt, the EIS shall display the updated list of technician license numbers, any new BAR messages (if applicable), and certificate number inventory. During screen display or printing of the technician information, the EIS shall not display the actual technician access codes (hidden) so that they may not be viewed by unauthorized person(s).

3.15.4 **Update Network Communications Data**

When selected, the following data shall be required for communications with the VID:

- Primary network phone number (up to 15 numeric and commas)
- Name of Diagnostic and Repair Vendor (up to 20 characters)
- Network phone number for Diagnostic and Repair Vendor (up to 15 numeric and commas)

The EIS shall provide space for up to five diagnostic and repair vendor names and telephone numbers within the "Network Communications Data" function. (Refer to Confidential Appendix C-2 for file structure.)

3.15.5 **Station Identification**

This function shall be in the Station Manager menu to allow the station name and address information to be changed and printed on the VIR. Fields required for entry of this information shall be as follows (Refer to Confidential Appendix C-2 for the file structure.):

Station Name - 50 characters
Address - 50 characters
City - 50 characters
State - 2 upper case characters
Zip - 5 characters

3.15.6 **Set Station Password**

This function will allow the 5-character station password to be changed.

3.15.7 **Update VLT**

Upon selection of this menu item, the EIS shall prompt the station manager to perform a VLT update by CD or floppy disk (updating by floppy disk is optional). The CD or the

floppy update disk shall be encrypted (for data protection and integrity) in a manner approved by BAR.

3.15.8 **Perform Software Update**

The EIS shall provide a menu option to perform a software update, or shall automatically perform a software update once the update disk (floppy disk or CD) is inserted. All update disks shall be encrypted in a manner approved by the BAR. Any time a software update is performed, the EIS shall require the technician to perform a data file refresh before a Smog Check can be initiated.

3.15.9 **Recall BAR Message**

The EIS shall save the most recent 100 BAR messages. The EIS shall allow the technician to scroll through the list of messages, or select a message by the date the message was received. If an exact match by date is not found, the EIS shall display the message(s) with the closest match. The file format and location of the file is up to the EIS manufacturer. Once a message is located, the EIS shall allow the technician to print the message(s).