

Environmental Management Commission

North Carolina Analyzer System Specification

March 12, 2008

R1 (July 22, 2008)

R2 (January 29, 2010)

January 29, 2010 R2

This version R2 incorporates all comments discussed since the previous March 12, 2008 R1 release, as well as incorporating clarifying statements and removing all previously strikethrough text. **NO NEW ITEMS HAVE BEEN INCORPORATED THAT NEED VENDOR'S ATTENTION.** All new text incorporated herein have already been provided to all vendors which have been or will be incorporated into the vendors next software release. If any item is omitted in their software, that vendor will be notified for inclusion within the next software release.

1. Section 1.2 - Removed the strikethrough words “or E-Sticker authorization” from the “MT” abbreviation.
2. Section 1.6 – In the first paragraph, the words “to cabinet” are added in reference to when controlled access is required.
3. Section 1.8 #8 - Made # 8 that reads, “CERTIFIM.DAT, CERTIFSI.DAT, and CERTIFMT” as a strikethrough since paper stickers are no longer used. This entire #8 will be removed in the next Specification update.
4. Section 1.8 #14 – Removed the strikethrough words “and contain a e-sticker override starte date” which was located at the end of the paragraph.
5. Section 1.8 #20; Section 1.20; Section 3.28.1 - Inserted the words “analyzer must always” in the sub-note referencing when the default login of ten 1’s and access code of five 1’s must be accepted.
6. Section 1.28 - Added clarifying statements concerning the unique identification of analyzers that are applicable to both safety and safety/OBD analyzers.

Also provided analyzer ID logic that should be used whenever an analyzer is converted from one manufacturer to another manufacturer.

7. Section 2.1 – Added the clarifying word “paper” when text is referring to the paper inspection stickers in paragraph #2. Also converted the text prior to the display prompt to lower case.
8. Table 2.3.2 – Added the clarifying words “in addition with the tamper inspection” into Notes #13 and #14.
9. Table 2.3.3 – Added parenthesis within the table to better show what items are added to the inspection process when vehicles start receiving the OBDII inspection.
10. Section 2.13 – Removed the strikethrough words “or failure to receive an RPM signal” from within the second paragraph.

11. Section 2.16 – Added new sub-note stating that upon start of the E-Sticker Start Date, safety-only inspection will count toward the offline limit.
12. Section 3.6.3 #2– Added a new sub-note which states the analyzer must ask for confirmation that the vehicle information entered, specially the VIN, is correct.
13. Section 3.6.3 – New #7 added to incorporated new logic where VINs contain the letters of “I”, “O” or “Q”.
14. Section 3.7C1(t) – Removed the entire strikethrough item (t) that read: “Receive E-Sticker Start Date Override (VIDCOMM.DAT)”.
15. Section 3.9.2.4 – Included new “Engine Information” in the heading. Also added new sub-note that: 1) Provides the accepted engine displacement range for light duty gasoline powered vehicle; and 2) number of cylinders and engine displacement must accept a zero (0) value for electric powered vehicles.
16. Section 3.9.2.5 – Added new sub-note clarifying to allow “up to the first four characters” of the vehicle make, if the vehicle is not listed in the vehicle table.
17. Section 3.9.2.7 – Removed the entire 10/19/07 strikethrough sub-note located at the end of item 13 that was dealing with the e-sticker override start date.
18. Section 3.9.2.7 – New item 14 added to incorporated new logic of what is required to be done for VINs which contain the letters of “I”, “O” or “Q”.
19. Section 3.10.3.1 – Replaced “...hook up the scan tool.” with ‘...connect the NCAS OBDII cable to the vehicle’s data link connector.’
20. Section 3.10.6.2 – Corrected the numbering sequence within subsection (r) and (s).
21. Section 3.12 #5(k)ii.2&3 – Clarifying statements added to better explain the process when a “Parts Exemption Number” is accepted.
22. Section 3.15 – The entire Section 3.15 dealing with the issuance of paper stickers, which is no longer applicable, has been strokethrough.
23. Section 3.15.1 – Within this section dealing with e-sticker issuance, corrected the numbering of “Display prompt one (1)” from “2” to the correct number of “1”.
24. Section 3.15.3 #5– Removed the strikethrough reference text of “MT”.
25. Section 3.18 – Removed the entire strikethrough section titled “Waiver Sequence” dealing with issuance of paper waivers.

26. Table 3.18.1.1 – Under the heading “OBDII Ready Results” the criteria was changed to accept either a “P” or an “F” for a Reinspection Repair, RER waiver. Clarified was added in the sub-note that “null” or “blank” fields should be considered and not ignored.
27. Section 3.18.4 #7.ii – Clarifying when the current odometer reading should be recorded in NCAS.DAT file. Replaced sentence that read, “Collect current odometer reading and record to NCAS,DAT.” with “Enter current odometer reading that will be recorded to NCAS.DAT.”
28. Section 3.18.4 #7.iii – Clarifying that the waiver number will be recorded in the test record and “must be” displayed on the inspection receipt.
29. Section 3.18.6 – Made the entire section that reads “(Current until such time E-Sticker Start Date take Affect) Issuing the Sticker and Printing the VIRS due to Waivers” as a strikethrough. This Section will be removed during next update.
30. Sections 3.18.6.3 #1; 3.22#4; 3.22.1 #4; 3.22.3 #6 & #7 – Removed all strikethrough references dealing with Motorcycle/Trailers within these e-sticker sections.
31. Sections 3.19.1 #5; 3.20 #1; 3.28.4.1 #5 & 3.28.5.1 #1 - Removed the strikethrough references “for Class MT XXX”.
32. Section 3.21.1 – Corrected the sequence order of items listed.
33. Section 3.21.1 #4 – Restructured this #4 which clarifies what is to be included on a duplicate receipt/statement when printed. Also added a new sub-note concerning the reference to Section 5(1).
34. Section 3.22 - Made the entire section that reads “(Current until such time E-Sticker Start Date takes affect). Add Inspection Stickers to Analyzer Inventory” as a strikethrough. This Section will be removed at the next update.
35. Section 3.28.12 – Restructured #4 to better state that the date and the time of the reprinting of the receipt/statement under this Enforcement Menu shall be recorded on the printout.
36. Section 4 – NCAS.DAT
 - Removed the MT (Motorcycle/Trailer) reference from Field 16 – Inspection Class;
 - Removed the word “Challenge” from Field 24- Waiver Authorization Number;
 - Removed fuel types M, T, A and added fuel types I, O and F for Field 44 - Vehicle Fule Type;

37. Section 5.2, #1 – Reworded #1 clarifying the date to be printed on the inspection receipt/statement is the test date as recorded in NCAS.DAT and that not of the date of the printing.
38. Section 5.2 #2 – Reference to the Station Menu removed. This “Station Menu” was actually an old reference of the long ago deleted “Challenge Authorization”. This “authorization” was a means whereby enforcement could change the failed results of a previously (within the past 30 days) inspected vehicle to passing. The “Challenge Authorization” program was removed in October 1998.
39. Section 5.2 #17– Provide clarification of where the various “brochures” are to be located for re-print. Perfer location is under the State Inspection Menu.
40. Section 5.3.1; Section 5.4 & Section 5.5 - Inspection Receipt/Statement revised to remove/replace reference of “e-stickers” to e-authorization, removed the printing of the Next Inspection Due Date as well as adding new display field “engine size”.
41. Section 5.7 – The strikethrough text in Section 5.7 “Sample Waiver Receipt/Statement” removed.
42. Section 5.9 - Reworded the third answer to now read “Return within 60 days to the station that did your original inspection to be reinspected.” Removed the “*Prior to January, 2009...” reference.

Also within the fourth answer, removed the “*” which is located after the number 60.
43. Section 5.11. - Remove the sentence under the sub-section “If The Vehicle Fails, It Must Have:” that reads “(NOTE: Prior to January 1, 2009, repairs must be completed within 30 days.)”
44. Section 9.4 - Made the entire section that reads “Inspection Stickers” as a strikethrough. This entire section will be removed at the next update.
45. Section 10, Appendix C - Made the entire section that reads “Appendix C: Emission Standards Table (for exhaust emissions sampling)” as a strikethrough. This entire Section will be removed at the next update.
46. Section 11, Appendix D - Made the entire section 11 that reads “Appendix D: ZF-4 Automatic Transmission Testing Procedures (for exhaust emissions sampling)” as a strikethrough. This entire Section will be removed at the next update.

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Environmental Management Commission (EMC)

Introduction

As a result of changing needs of the North Carolina program, several types of analyzers will be eligible for certification as a North Carolina Analyzer System (NCAS). This will allow inspection facilities the flexibility in deciding which types of inspections they will offer to motorists. The three types of units to be used in the program will be:

BAR-90 Analyzer (BAR-90)

Preconditioned Idle BAR-97/OBDII Analyzer (BAR-97/OBDII)

Stand-alone OBDII Analyzer (OBDII-only)

“Idle exhaust emissions test” used throughout this text refers to the preconditioned idle emissions test referenced in Section 12, Appendix E. The BAR-90 Analyzer will function as a safety-only and safety/emissions analyzer for vehicles requiring an idle exhaust emissions test. The idle BAR-97/OBDII analyzer will be capable of performing any program test, including safety-only and safety/emissions tests for vehicles requiring either an idle exhaust emissions test or an OBDII inspection for the emissions portion of the test, only if the analyzer is so equipped with the OBDII test hardware/software. Stand-alone OBDII analyzers will perform safety-only inspections and will also perform safety/emissions inspections for vehicles requiring an OBDII inspection for the emissions portion of the test. Unless otherwise stated, references throughout this document to “emissions inspection” indicate either an exhaust emissions inspection or an OBDII inspection. Vehicle test applicability is presented in Section 2.3 below.

In order to be certified as a NCAS, a sample of the candidate model must be submitted to the State for review and approval under procedures designed and set forth by the State BAR-90 and BAR-97 analyzers, and must be certified by the California Bureau of Automotive Repair in order to apply for certification in North Carolina. Analyzers submitted for certification in North Carolina are expected to be similar to analyzers certified for California. Vendors will be required to provide proof of California certification of an analyzer they submitted for North Carolina certification and state in writing the modifications that were made to the California certified model in order to create the NCAS. Stand-alone OBDII analyzers will not be required to undergo California certification, but must conform to the requirements set forth in this specification. A demonstration test will be required prior to the certification process for all analyzer types to assure all items offered meet the specifications stated herein. This test will be conducted at a site specified by the State. The vendor is required to provide and set up the entire configuration proposed in response to this specification.

Upon approval of the vendor's model, the State will document model certification for the respective manufacturer and will add the model to the list of approved NCAS units. In addition, the State will periodically distribute this list to licensed inspection stations. No analyzer will be authorized for sale and use in the North Carolina Emission Inspection Program unless certified by the State. The State retains the authority to decertify a model at any time if the production model used by licensed inspection stations is found to be inconsistent with the specification or for any other material reason. The certified model will be loaned to the State for the duration of the emissions program or until such time as the model is decertified.

The balance of this document contains the specifications for the analyzers, which will be certified for offering to the safety and emission inspection stations in North Carolina. The major Sections of this document are as follows:

- Section 1 - General Specifications
- Section 2 - NCAS Software Functions
- Section 3 - NCAS Display and Program Requirements
- Section 4 - Test Record Specifications
- Section 5 - Vehicle Inspection Receipt/Statement and Printer Function
- Section 6 - Technical Specifications for the NCAS
- Section 7 - Documentation, Logistics, and Warranty Requirements.

1 Section 1 – NCAS General Specifications

PURPOSE: This section describes the general specifications of the North Carolina Analyzer System. The analyzer system shall be used to perform State inspections on motor vehicles in specified areas of the State.

1.1 Background Information.

The North Carolina Analyzer System (NCAS) has been designed around a DOS/Windows personal computer system to provide the capability to make modifications, which are needed after the analyzers are put into use. The NCAS will be capable of performing uniform and consistent tests for North Carolina's annual motor vehicle safety and emissions inspection program.

Features of the BAR-90 NCAS and the BAR-97/OBDII NCAS shall include:

1. Vehicular emission measurements of hydrocarbon (HC), carbon monoxide (CO) and carbon dioxide (CO₂). Oxygen (O₂) shall be offered as an option;
2. Engine RPM measurements for direct and standard ignition vehicles; the analyzer must be able to measure engine speed on all vehicles currently in production;
3. Exhaust dilution determinations;
4. A bar code scanner for more convenient and accurate data entry;
5. An optional printer for vehicle inspection reports or other general purpose printouts; a required printer to fill in all State vehicle inspection receipt/statements (VIRS); data recording on standard 1.44 megabyte (1.44 Mb) 3.5" floppy disks and a hard drive of sufficient size to contain all required information, programs, etc. specified within this NCAS specification; information display to the NCAS operator; bi-directional communications via dial-up telephone line and modem; and fully menu driven, interactive, simple microprocessor controlled operation; and full compatibility with the North Carolina Electronic Transmission System (NCETS), as administered by the North Carolina Division of Motor Vehicles.

Features of the BAR-97/OBDII NCAS and the OBDII NCAS shall include:

1. The system shall include the hardware and software necessary to access the onboard computer systems on 1996 and newer vehicles, determine OBDII readiness, and recover stored fault codes using the SAE standardized link.
2. A bar code scanner for more convenient and accurate data entry;
3. An optional printer for vehicle inspection reports or other general purpose printouts; a required printer to fill in all State vehicle inspection receipt/statements (VIRS); data recording on standard 1.44 megabyte (1.44 Mb) 3.5" floppy disks and a mass storage device (such as hard drive, hard disk or any other state approved device) of sufficient size to contain all required information, programs, etc. specified within this NCAS specification; information display to the NCAS operator; bi-directional communications via dial-up telephone line and modem; and fully menu driven, interactive, simple microprocessor

controlled operation; and full compatibility with the North Carolina Electronic Transmission System (NCETS), as administered by the North Carolina Division of Motor Vehicles.

The NCAS shall be designed and constructed to provide reliable and accurate service in the automotive repair and service center environment. The manufacturer of a NCAS shall make every effort to maximize operator to machine interface simplicity.

1. The NCAS analyzer shall utilize a commonly known programming language such as "C", "C++", "Visual Basic", "Java", or any other program otherwise approved in writing by the State.
2. The software used in the analyzer shall consist of a process control system as well as data look up files. Security shall be provided that will prevent any unauthorized modifications of the software.
3. Where the word "analyzer" is used in the specifications, it refers in most cases to the analyzer system, which includes all of the components that make up a certified NCAS. This includes any of the three types of analyzers to be used in North Carolina (BAR-90, BAR-97/OBDII, or OBDII-only). Where the word "Sticker" is used in these specifications, it refers to the windshield sticker or decal used in North Carolina. Where term "E-Sticker" is used in these specifications, it refers to the issuing of an electronic authorization for vehicles that receives an overall "pass" on their State inspection.
4. The State reserves the right, at any time, to acquire analyzers currently in-use at licensed inspection stations for the purpose of evaluating compliance with the certification specifications. When an analyzer is pulled from the field, manufacturers shall supply the station from which it was removed with a loaner in working condition. Manufacturers shall pay for all necessary shipping and transfer costs for the loaner and the analyzer selected for random testing.
5. The hard disk shall be partitioned into two parts. The main partition should be of sufficient size to accommodate all of the required programs, all of the vehicle test and calibration records, and the disk operating system. All of the proprietary programming developed to meet the requirements of the specifications shall be contained in the remaining partition. The State will consider allowing the manufacturers to use additional mass storage in the main partition for optional software applications if the programs stored there will benefit the motor vehicle inspection program.

1.2 List of Abbreviations

AC	Alternating Current
ASCII	American Standard Code for Information Interchange
BIOS	Basic Input Output System
CAT	Catalytic Converter
CE	Conversion Equipment
cm	Centimeters
CO	Carbon Monoxide

CO ₂	Carbon Dioxide
Cyl	Cylinder
CRT	Cathode Ray Tube
DAQ	Division of Air Quality
DC	Direct Current
DTC	Diagnostic Trouble Code
DIS	Direct Ignition System
DLC	Data Link Connector
DMV	Division of Motor Vehicles
ECS	Emission Control System
EPA	Environmental Protection Agency
ESC	Emission Standards Category
ETL	Environmental Testing Laboratories
F	Fail
FCC	Federal Communications Commission
Fed	Federal
FS	Full Scale
GVWR	Gross Vehicle Weight Rating
HC	Hydrocarbon
Hp	Horsepower
IIN	IBM Information Network
I/M	Inspection/Maintenance
IM	Class of Sticker or E-Sticker authorizations for Emission Inspections
K	Emission Reduction Factor
L	Left
LCD	Liquid Crystal Display
LIC	License
M/V/S	Missing/Voided/Stolen
MAP	Manifold Absolute Pressure
Mb	Megabyte
MIL	Malfunction Indicator Light
MT	Class of Sticker for Trailers and Motorcycles [4/29/08 (NC) The MT inspection class will no longer be used starting with the e-sticker Start Date as displayed in NETWORK.DAT.]

N	None
NBS	National Bureau of Standards
NCAS	North Carolina Analyzer System
NCETS	North Carolina Electronic Transmission System
OBD	On-Board Diagnostics
OBDII	On-Board Diagnostics Generation Two
OEM	Original Equipment Manufacturer
O ₂	Oxygen
P	Pass
PCV	Positive Crankcase Ventilation
PEF	Propane Equivalency Factor
ppm	Parts Per Million
PRE	Previous
QA	Quality Assurance
R	Right
ROM	Read Only Memory
RPM	Revolutions Per Minute
SAE	Society of Automotive Engineers
SI	Class of Sticker or E-Sticker authorizations for Safety Inspections
SS	Special Standards
U	Unknown
UL	Underwriters Laboratory
uP	Microprocessor/microcomputer
VDC	Volts Direct Current
VEC	Vehicle Emission Control label
VID	Vehicle Information Database
VIN	Vehicle Identification Number
VIRS	Vehicle Inspection Receipt/Statement
#	Number

1.3 High Throughput Testing Capability

BAR-90 and BAR-97/OBDII analyzers shall be designed so that they are capable of performing at least ten (10) idle exhaust emission tests per hour without experiencing excessive hang-up or other deleterious effects. A study shall be submitted, upon request, to the State, validating the number of tests per hour that were achieved using the analyzer

submitted for certification. A brief description of the study methodology used by the manufacturer to make the throughput determination shall be included in the study. This evaluation shall not include the time required to enter vehicle identification data or to conduct the underhood and safety inspections and preconditioning.

1.4 Performance Expectations

The manufacturer shall demonstrate to the State that the exhaust emission analyzers meet or exceed the performance specifications of this document.

1.5 Applicable Codes

The manufacturer shall certify that the NCAS submitted for certification complies with all applicable North Carolina and federal administrative, safety, ergonomic, licensing and certification requirements. The State will not accept ignorance of the law as an excuse for noncompliance. The State feels that if manufacturers are going to market a product, it is their responsibility to determine if their product meets applicable laws and regulations. Outside of Underwriter's Laboratories (UL) or Environmental Testing Laboratories (ETL) approval, the State is not aware of additional requirements that the analyzers might be subject to in the station environment. The State cannot be held responsible, nor will the stations be held responsible, to pay for analyzer modifications required by regulations that the manufacturer was not cognizant of when the equipment was built. Therefore, at a minimum, it is recommended that in addition to UL or ETL, manufacturers contact the Federal Communications Commission (FCC) regarding radio frequency interference and the Occupational Health and Safety Administration (OSHA) regarding the storage and use of analyzers and calibration gases in the garage environment (for BAR-90 and BAR-97/OBDII analyzers).

1.6 Tamper Resistance

Controlled access design shall be required for BAR-90 and BAR-97/OBDII - analyzers, and shall be the responsibility of the manufacturer. This controlled access is subject to approval by the State, including resistance to physical access as well as testing of cabinet lockouts. A controlled access **to cabinet** design is not required on an OBDII-only analyzer. Analyzer operators shall be prohibited, to the State's satisfaction, from creating or changing any inspection or test results, State approved programs or State data files contained in the NCAS. Manufacturers shall utilize special BIOS partitions (or equivalent approved by the State), as well as other appropriate software and hardware provisions deemed necessary by the State to protect the files and programs. File and program protection may consist of mechanical systems in combination with electronic/software systems. The protection features of BAR-90 and BAR-97/OBDII analyzers shall prevent access to the secured floppy disk drive and portions of the hard disk containing I/M programs and inspection and test data. This physical security may be in the form of a lockout tag or lock on the computer case, monitored with as many micro switches as deemed necessary by the manufacturer. OBDII-only analyzers are not subject to any automated lockout system or physical protection features. OBDII-only analyzers are not required to restrict access to the State floppy drive.

The validity of the Transaction Identification Number (TIN) shall be confirmed by the VID contractor for all "pass" tests downloaded onto the VID.

Analyzers shall not be able to run personal software off the State floppy-drive or portions of the hard disk containing I/M programs and inspection and test data. Additional hard and floppy drives may be provided for personal software, if desired.

All emission analyzers and sampling systems (for BAR-90 and BAR-97/OBDII units) shall be made tamper-resistant to the State's satisfaction. At a minimum, the manufacturer shall develop tamper-resistant features to prevent unauthorized access through the cabinet, as described above. Micro switches, keyed locks and software algorithms requiring the use of a password, which would be changed by the manufacturer no less than on a quarterly basis beginning January 1 of each calendar year, would all be acceptable provided the physical or logical design effectively prevents unauthorized access. For example, a mercury switch would not be effective if the analyzer can be tipped over to one side to trigger the switch. A keyed lock would not be effective if it is placed in a position that allows the analyzer cabinet to be flexed slightly to bypass the lock.

If tampering occurs, a software lockout algorithm shall be activated which aborts any inspection sequence in progress and prevents further State inspections until the tamper condition is corrected and the lockout is cleared. Authorized manufacturer service technicians, upon correction of a tamper condition, may release the tamper lockout.

Software obtained independently by the inspector-mechanic shall not be bootable from any floppy disk.

The lockout system shall be designed so that it can be viewed and activated by a DMV representative from the Enforcement State Audit Menu. Manufacturers shall develop a system by which their service technicians shall be prevented, by a method approved by the State, from clearing DMV installed lockouts.

The tamper resistance features of these cabinets shall be designed so that software programs, especially those that deal with repair and diagnostics of vehicles, can be added at a later date.

Optional software packages supplied by the manufacturer shall not interfere with the normal operation of the State inspection and testing software, shall not compromise the tamper-resistance of the analyzer (such as give the inspector-mechanic access to the DOS) and shall be approved by the State prior to performing official State inspections.

1.7 Microcomputer Compatibility

A standard microcomputer must be included in the NCAS analyzer and is to be used to control all NCAS functions. The microcomputer shall be a State certified and approved unit, including all features defined in Appendix A to this Specification. Each vendor is to develop executable programs for each major State required function. These programs shall -

1. Control each of the NCAS functions and timing;
2. Examine and obtain values from all of the NCAS sensors;
3. Read and write NCAS information to diskette in standard DOS 1.44 Mb 3.5" format;
4. Prepare/format new floppy disks;
5. Archive floppy disk information between floppy disk and hard disk as indicated in subsection (8) below;
6. Copy the NCAS identification information from the hard disk onto each new floppy disk;

7. Provide a mechanism for authorized modem telephone calls, receive and forward files on demand, and
8. Read bar code labels from VIN labels, receipt/statements, ECS guides on vehicles, and approved State representative identification cards.

The State reserves the right to add additional programs and functional performance requirements, up to the technical limits of the hardware, to improve the safety and emissions inspection/OBDII inspection program.

1.8 File Location and Backup

1. The hard disk shall have directories with the following names in the root of the C:\ directory: DOS, NCASDATA, COMM and MAILIN. The manufacturer may name directories for use of the NCAS software but must provide the previously mentioned directories for State use. The computer path must include the ROOT (C:\), the NCAS software directory, DOS and COMM.
2. The C:\NCASDATA directory shall contain the following files: NCAS.DAT, NCAS.HST, NETWORK.DAT, CAL.DAT, COUNTY.DAT, AUDIT.DAT, TECH.DAT, STICKER.DAT, CERTINV.DAT, CERTIFIM.DAT, CERTIFSI.DAT, CERTIFMT.DAT, DLCREP.DAT, ENFACC.DAT, LICENSE.DAT, VIDCOMM.DAT, LOCKOUT.DAT, EXCPCTION.DAT, FEES.DAT, EAUTHINV.DAT and EBUYER.DAT.
3. At the conclusion of each test, station audit, or gas calibration, the test, audit, or calibration record shall be placed in the appropriate file.
4. NCAS.DAT: This file will contain test records, from the start of any test, which have not been transmitted to the VID. A mirror copy of this file, having the same name, will be stored on the root directory of the "A:" floppy disk. Both files will be updated at the same time by the test software. The software must also test for the existence of the file before writing to the file.
5. NCAS.HST: This file will contain archived test records that have been transmitted to the VID. This file will have the "NCAS.DAT" file data appended, record-by-record, each time records are transmitted to the VID. The NCAS.HST file will maintain a history of test records for the analyzer for at least 65 days. The purge of old records shall be an automatic activity.
6. NETWORK.DAT: This file will contain OBDII test criteria such as model year applicability and readiness code criteria for OBDII monitored components. This file will be downloaded to the NCAS upon every update made at the VID.
7. CAL.DAT. This file shall contain gas calibration records from the start of any calibration test, which have not been transmitted to the VID. A mirror copy of this file, having the same name will be stored on the root directory of the "A:" floppy disk. Both files will be updated at the same time by the test software. The software must also test for the existence of the file before writing to the file. The analyzer will purge records, which have been transmitted to the VID. Records from the CAL.DAT file will not be transmitted to the State twice.

8. ~~CERTIFIM.DAT, CERTIFSI.DAT, and CERTIFMT.DAT files shall contain the necessary information to allow the analyzer to track the beginning and ending stickers assigned to a particular analyzer. The sticker files are working files to be established within each analyzer to track the sticker inventory for the analyzer. As working files, there is no need to archive these files (or transmit to the State) after their use of maintaining the number of the next available sticker number for a book of stickers. A mirror copy of these files and all other analyzer sticker working files, having the same names will be stored on the root directory of the "A:" floppy disk so that they may be restored in the case of hard drive failure.~~

~~The files will be used to present the assumed next available sticker number to the analyzer operator for confirmation before recording the sticker number assignment to the test data record for each sticker class as follows:~~

- ~~a. CERTIFIM.DAT for Emission Inspection (IM) Stickers,~~
- ~~b. CERTIFSI.DAT for Safety Inspection (SI) Stickers, and~~
- ~~c. CERTIFMT.DAT for Trailer and Motorcycle (MT) Stickers.~~

~~At the time the stickers are assigned to the analyzer, the operator will be asked to identify any missing numbers identified in the book of stickers. The purpose for this is twofold: 1) to record the missing stickers in the working files so as to not request confirmation of missing numbers during the course of normal operation; and 2) to record in the STICKER.DAT file the missing stickers for reporting to the State. The CERTIFIM.DAT, CERTIFSI.DAT, and CERTIFMT.DAT files, or some other analyzer sticker working file, will record these missing numbers for each sticker class so as not to request confirmation of missing numbers during the course of normal operation. There may be more than one missing sticker from a book of stickers, therefore, there is a need to accommodate multiple missing sticker records. During the course of normal operation, the analyzer operator may be asked to record lost or voided stickers; these stickers will be recorded directly in the STICKER.DAT file.~~

~~The files will contain the following information for each class of sticker:~~

Field	Description	Length
1.	Sticker Class	2
2.	Beginning Sticker number	8
3.	Ending Sticker Number	8
4.	Next Available Sticker Number	8
5.	Missing Sticker Numbers	8

~~(Optional — May occur as necessary)~~

~~There may exist a situation where two books of the same classification may be added to the analyzer's inventory. Since these files are working files for the tracking of the sticker numbers, the manufacturers may take liberties in the construction of the files and the specific method of performing the number tracking function.~~

~~The last sticker for a sticker range is used from inventory when comparing the next available sticker number to the ending sticker number and finding them to be the same value. After the issuance of this sticker and finding no more inventory ranges the last sticker for this class shall have been used. When there are no more stickers for a sticker class the analyzer shall disable State Inspection Menu options for Emissions or Safety~~

~~Inspections, Waivers (that is, any and all the menu functions related to issuance of stickers). The NCAS shall be disabled depending upon the sticker class for which the inventory is depleted. The analyzer shall notify the inspector mechanic that the choice is disabled and that the reason inspections have been disabled is no stickers.~~

~~[7/2/98 (NC) Sticker number format changed from 8 numeric to first character alpha to designate sticker type (IM, SI, or MT), second character alpha (to designate series number), followed by six (6) numeric. Allowable letters for the first alpha character of IM stickers shall be "A", "B", "C", "D", "E", "F", "G", "H", or "I". Allowable letters for first alpha character of SI stickers shall be "N", "P", "Q", "R", "S", "T", "U", "V", "W", "X", "Y", or "Z". Allowable letters for the first alpha character of MT stickers shall be "J", "K", "L", or "M". Bar code contains leading identifier of "B" for booklet and "+" for individual sticker. 12/16/98 Starting booklet number can range from 000001 to 999901.]~~

~~[12/18/98 (NC) Not required converting existing inventory. If converted, do not record to certinv.dat file. It is okay to allow service tech to enter partial booklets. This capability needs to be added to Service menu]~~

~~Adding sticker inventory shall once again enable the NCAS for testing related to that sticker class.~~

9. AUDIT.DAT: This file shall contain records of the performance audits. This file will be transmitted to the VID on a regular basis. The analyzer will purge records that have been transmitted to the VID. Records from the AUDIT.DAT file will not be transmitted to the State twice. A mirror copy of this file, having the same name, will be stored on the root directory of the "A:" floppy disk. Both files will be updated at the same time by the test software. The software must also test for the existence of the file before writing to it.
10. DLCREF.DAT: This data file provides text to be displayed on analyzer screen when "H" is pressed after the OBDII connector prompt and also as a separate menu item under the Station Menu.
11. LOCKOUT.DAT. This file shall contain the lockout data (Y or N) and must be read each time the NCAS software is loaded. This file is sent to the VID on each login and specific lockout values stored in this file are updated from the VID.
[5/1/98 (NC) Default settings for each lockout shall be unlocked]
12. LICENSE.DAT. This file shall contain station license information to be printed on a station license report that the station must post in a public place. The station license report will display station information, as well as the list of emissions and safety inspectors employed at the station. The VID will transmit a new version of the LICENSE.DAT file whenever station license data is updated or modified on the VID or whenever the inspector-mechanic data is updated or modified on the VID. Receipt of a new LICENSE.DAT file shall trigger the printing of a new station license.
13. CERTINV.DAT is an inventory-reporting file that the analyzer will use to report the sticker booklet inventory has arrived at the station. Once sticker booklets have been reported to the VID the analyzer may purge the record. Sticker inventory will also be tracked on the analyzer on a sticker-by-sticker basis. Since e-stickers will come directly from the VID, CERTINV.DAT won't be needed when the e-sticker program begins.
14. VIDCOMM. DAT This file will contain specific data parameters about communications with the VID host, including network phone number, station license, analyzer id, type of inspection the analyzer is capable of performing, communications port data and number of offline inspections allowed (nnn within nnn days), how the offline lockout may be cleared (VID or NCAS).

15. EAUTHINV.DAT will contain the e-sticker authorization inventory as received from the VID for all classes of inspection. As an e-sticker authorization is used the total authorizations displayed in inventory for that class of inspection would be reduced by one. Using the last e-sticker authorization from inventory is determined by comparing the next available e-sticker authorization and finding it to be zero. After issuance of the last e-sticker authorization and finding no more inventory, the last e-sticker authorization for this class shall have been used. When there are no more e-sticker authorizations for an e-sticker class the analyzer shall disable State Inspection Menu options for Emissions, Safety Inspections or Waivers (that is, any and all the menu functions related to issuance of e-sticker authorizations). The NCAS shall be disabled depending upon the e-sticker class for which the inventory is depleted. The analyzer shall notify the inspector-mechanic that the choice is disabled and that the reason inspections have been disabled is no e-stickers authorizations are in inventory. [11/30/07 (NC) E-sticker authorizations shall come from the VID.] Adding e-sticker authorizations to inventory shall once again enable the NCAS for testing related to that e-sticker class.

16. The C:\MAILIN directory will contain the DMVMAIL.TXT file when downloaded by the State for display on the NCAS screen. The NCAS software must look for this file on startup to display, if found.

17. STICKER.DAT This file will contain records of missing, voided or stolen certificates. These records will be transmitted to the VID and the analyzer shall purge records that have been sent. Since all e-stickers will come from the VID and electronically recorded to the test record, this DAT file will not be used for e-stickers. [1/27/99 (NC) Stickers issued (not waiver) are not recorded to this file.]

18. TECH.DAT This file shall contain all the inspector-mechanic license information. This file will be updated from the VID when any information on the inspector-mechanics with access to the analyzer changes. No access to the analyzer for inspection purposes will be allowed to individuals who do not have proper access rights recorded in the TECH.DAT file.
[12/9/98 (NC) Print new station license if technician file received from VID.]

19. EXCPTION.DAT This file contains vehicle-specific test parameters including monitor-specific readiness parameters, total number of “not ready” codes allowed, and special advisory screens (such as those presented for vehicles whose MIL turns off during the KOEO test). Only vehicles with unusual test criteria will be listed in this table. For example, a vehicle that is known to consistently have multiple monitors “not ready” may be listed in this table with more lenient readiness criteria (i.e., 8 “not-ready” monitors allowed, as opposed to the 2 allowed in NETWORK.DAT). Therefore, vehicle readiness criteria found in EXCPTION.DAT shall take precedence over the program-wide criterion that is listed in NETWORK.DAT (only for the current inspection). The updated file will be transmitted in its entirety to the analyzers during analyzer communication sessions with the VID, as necessary.

20. ENFACC.DAT This file shall contain all State Enforcement Auditors license numbers and names for control of access to the Enforcement Screens. This file shall be downloaded from the VID.

[1/8/99; 12/9/98 (NC) If no auditors in file, **analyzer must always** accept default license number of "1111111111" (ten 1's) and access code of "11111" (five 1's)]

[12/09/98 (NC) – The state inspector information (enfacc.dat file) is not to be displayed from the analyzer]

21. FEES.DAT This file shall contain the fees that stations can charge for inspections, reinspections, stickers and window tinting inspections. This file will be updated from the VID when any information changes. The "Open Market Safety-Emissions Inspection Fee" field in fees.dat is a trigger that indicates inspectors can decide (and enter at the end of the test) the test fee to charge. Fees listed in FEES.DAT will be the maximum test fees.
22. COUNTY.DAT This file shall contain a listing of all the counties in North Carolina and shall contain the county name, county code, test beginning date, and type of inspection to be conducted on vehicles registered in the county. This file shall be used as the reference for inspection requirements for vehicles registered in the county. This file shall be downloaded from the VID.
23. EBUYER.DAT. This file shall contain all individuals approved to purchase e-sticker authorizations from the analyzer. This file will be updated from the VID when any information on these purchasers with access to the analyzer changes. No access to the analyzer for e-sticker purchases will be allowed that do not have proper access rights recorded in the EBUYER.DAT.
24. Duplication of Files on the State A: Drive
 1. In order to prevent data loss in the event of serious hard disk malfunctions which may require a new or reformatted hard disk, the manufacturer shall store duplicate files on the State A: floppy disk drive. The files to be duplicated, at a minimum, are:
 - AUDIT.DAT
 - CAL.DAT
 - CERTIF??.DAT (and any other certificate working files) *
 - CERTINV.DAT
 - ENFACC.DAT *
 - LICENSE.DAT *
 - LOCKOUT.DAT *
 - NCAS.DAT
 - NCAS.HST *
 - NETWORK.DAT *
 - STICKER.DAT
 - TECH.DAT *
 - VIDCOMM.DAT *
 - FEES.DAT *
 - COUNTY.DAT *

- EBUYER.DAT *
- EAUTHINV.DAT*

* These items are NOT to be stored on the floppy disk of OBD stand-alone units. They may be stored on the floppy disk of BAR 90 and BAR 97 gas analyzer units.

Each time the files are modified, the changes must be written to both sets of the file.

Once a file is successfully downloaded from the hard disk to the VID, this file will be purged from the floppy disk. In the event of hard disk failure, initial analyzer hard disk file restoration shall be performed using any files on the floppy disk. Remaining files not on the analyzer floppy disk shall be restored to the analyzer via VID download.

The NCAS must write these files to the floppy after a disk change is made by a State representative.

1.9 Printer Requirements

1. The NCAS unit shall use one (1) or two (2) printers. If one printer is used, it shall be capable of performing all printer functions. One printer shall print Vehicle Inspection Receipt/Statements (VIRS), vehicle inspection summary reports and general-purpose (non-State) documents on plain paper.

[5/1/98 (NC) In regards to printing all output to one printer, plain paper replacement obviates need for secure printer. Can enable toggle between printers if mfrs desire.]

1.9.1 Storage

1. If provided, the space designed to store unused paper shall measure nine and a half inches (9 1/2") deep by eleven inches (11") wide and at least five inches (5") tall. The used VIRS drop box, if provided, shall be of the approximate size of the VIRS and shall be designed to keep the receipt/statements in sequential order. The receipt/statement drop box need not be a secured area, but shall prevent receipt/statements from being spilled out when access is gained.

[8/24/00 (NC): NC to determine whether storage to be optional]

2. The area containing the unused paper shall be located so that proper tension is maintained on the paper as it is fed through the printer.
3. There shall be unlimited access to the test report printer so that paper can be easily replaced, printer jams can be cleared and ribbons/toner cartridges can be replaced. See Appendix A to this Specification for more printer information.
4. A secure and lockable drawer for the storage of Vehicle Inspection stickers may be provided as part of the printer area.

[8/24/00 (NC): NC to discuss security requirements for item 4. above with DMV]

There are three (3) types of stickers. The sizes of the stickers currently are as follows:

	Number in Book	Dimensions of Book		
		Height	Length	Thick
Emission Inspection	50	3"	3 1/4"	1/2"
Safety Inspection	50	3 1/8"	3 1/4"	1/2"

Trailer/Motorcycle Inspection	10	2 1/2"	3 1/4"	1/8"
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Sticker design and size is expected to change over time.

[11/30/07 (NC): Physical stickers will no longer be used effective with the start of the e-sticker program]

1.10 Software Modifications

Three potential situations exist for software changes:

- 1) The software is installed in the field with an error that was missed during certification testing and beta testing (i.e., something in the software doesn't comply with the spec)
- 2) Legislative or regulatory changes in the I/M program design necessitate software changes
- 3) Field experience with the new OBD equipment uncovers unanticipated changes that are desired by the State (DMV and DAQ) to improve program efficiency and effectiveness

The three situations, respectively, are handled as follows:

- 1) These software changes are performed by the vendor at no cost to the State or to the inspection station
- 2) Inspection stations purchase these upgrades directly from the vendor
- 3) Equipment manufacturers shall provide one State-approved software update per year during the first two years of the OBD inspection program at no additional cost to the inspection station or the State. These updates will consist of no more than 100 hours of total software development time for the first year and no more than 50 hours for the second year (150 hours total). DAQ will notify vendors of the first years' changes by June 30, 2003 and the second years' changes by June 30, 2004. Each manufacturer will provide the State with the number of hours they anticipate the update to take and the State will use the average of all manufacturers when determining if it exceeds the number of hours set aside for an update.

The software version shall be indicated on the analyzer status screen, on each vehicle test record and the inspection receipt/statement. The software version number shall follow the Analyzer Number information on the Receipt/Statement. The version number shall consist of a four (4) digit numeric code to be made up of the current year and a two (2) digit version number. Example: the software version code for the first version, first revision in 1998 would be "9811". The version of software used in running every vehicle test shall be indicated on the test record. The analyzer manufacturers shall notify the State in writing if they wish to make a software update, and provide an implementation schedule, submit an affidavit signed by the chief executive officer or company president stating that the software update complies with applicable State Specifications, obtain written State approval prior to use of the software update in official State Inspections, and install the correct software version number so that it is recorded to the test record and printed on each VIRS.

Every software update submitted to the State shall cause the software version number to change as indicated on the Analyzer Status screen (see Section 3). In addition, the updated software version number shall be recorded on the test record and inspection receipt/statement as soon as it is installed.

Additional software updates shall be prepared by the analyzer manufacturer on 3.5" PC/MS-DOS standard 1.44 Mb diskettes, or on compact disks, designed to be installed by DMV

Inspectors or other authorized representatives. The analyzer shall also be designed to allow updates to be installed via the modem, or through VID download, at the State's approval. If the software update is accomplished by either modem or VID downloads, the analyzer shall identify itself by brand name and model number, when the system is accessed by the State.

1.11 Bar Code Readers

Non-contact bar code scanners and necessary interface software and hardware designed to read labels meeting SAE specifications J1877 and J1892 are required equipment for all NCAS analyzers. The information scanned shall be stored on the test record and will be used to identify the VIN.

Analyzers which are equipped with the bar code scanners and delivered to stations are required to be equipped with an RS232 connector (which meets noise hardened electrical standards preventing electromagnetic interference from vehicle ignition systems) and the software needed to use the bar coded information in the test procedure. The State will allow submission of an alternative connector to the RS232 for consideration (including remote scanners) but reserves the right to make final determination in each case. Analyzers submitted for certification shall be equipped at that time with fully functional non-contact scanners capable of reading bar coded labels meeting SAE J1877 and J1892 (see Appendix B to this Specification).

In addition to the use for collecting the VIN and reading sticker numbers, scanners may also be required, at a later date, to enter receipt/statement numbers and emission application information from a State approved abbreviated lookup manuals. Another function may include reading inspector-mechanic and DMV inspector identification badges. The DMV inspector identification badges will be provided by the State.

The State recommends that the manufacturers contact the vehicle manufacturers to inquire about obtaining bar coded labels for testing purposes. The State will allow vendors to submit contact readers for consideration.

1.12 Training

The analyzer shall contain a training feature that will allow an inspector-mechanic or student to complete the inspection procedure and generate a "training" inspection record and receipt/statement. Training records are not to be sent to the VID. Vehicle inspection reports shall indicate to the satisfaction of the State that they are for training only and cannot be used for certification. The word "VOID" shall be printed in large letters on the face of the receipt/statement. The inspection record shall be identified with a "T" in the field Record Inspection Disposition and an "8" in the field Record Inspection Type. In addition, sticker number field of the receipt/statement shall be printed with the word "VOID". The use of e-sticker authorizations will not pertain in the "training" mode. The training feature will be used by the authorized State representatives for evaluating inspector-mechanic performance, by the manufacturers for training purchasers of analyzers or by analyzer owners to train new employees. The training application shall not require the use of an inspector-mechanic's access code or allow access to secured areas of hardware or software. The display shall show a message throughout the inspection that this is a training exercise and not a test for certification.

[12/16/98 (NC) Training mode for Waiver not required.]

1.13 Authorized State Representative Access to Test/Calibration Records

The software shall be designed to include provisions for retrieving and copying the test record file or designated portions of it for QA and enforcement purposes using floppy disk access.

There shall be a menu item on the Enforcement State Audit Menu that allows a record search to be performed. The search shall locate, display and printout test records (for all analyzer types) and calibration records (for BAR-90 and BAR-97/OBDII analyzers) based on VIN, date/time, or receipt/statement number information entered by a DMV representative. Once a test record is located, the QA/State representative shall be allowed to review the previous test records as well as those that follow the target record.

1.14 Clock/Calendar

The NCAS unit shall have a real time clock/calendar which shall make available the current date and time. Both time and date shall be in standard IBM PC format and used to set the computer's date and time on power up.

Analyzers shall store the date and time on the test record. For the display, the date may be indicated numerically by month, day and year (separated with a slash between each), or with the month spelled out and the day and year separated by commas. The time shall be on a twenty-four (24)-hour clock.

The date/time, along with the time the inspection or test started and when it ended, is to be included on the test record. The start time is when the connection to the VID was established and the date/time message is received from the VID or when the attempt to establish the connection to the VID failed. The end time is when the test record is saved. If the clock/calendar fails or becomes unstable (as referenced to the initial time set at power up), the NCAS unit shall be locked out from State testing and a message shall be displayed indicating that service is required.

The NCAS shall update its clock/calendar so it will match the clock/calendar of the VID Computer Network. This update shall be performed on the initial contact to the VID for every test that the analyzer performs. The analyzer clock/calendar shall be equipped with a battery backup feature and a battery with a five (5)-year expected life. All software updates shall be activated by the clock/calendar when directed by the State.

1.15 Lockout Notification

The analyzer shall alert the inspector-mechanic of any lockout situation by prominently displaying a message on the CRT.

Lockout Status shall also be displayed on the analyzer status page.

1.16 Manual Testing Mode

BAR-90 and BAR-97/OBDII NCAS analyzers shall be capable of being switched to an operations mode that will allow the NCAS to be used as an ordinary garage emission analyzer for general automotive repair work and diagnostics. BAR-97/OBDII and OBDII-only analyzers shall be capable of performing diagnostic scans for OBDII-equipped vehicles.

If, during an inspection, the NCAS is switched over to the diagnostic mode, the command shall be ignored.

1.17 Software Loading

The inspector-mechanic shall not have to load the microcomputer's operating or applications software to operate the NCAS. On each POWER ON of the NCAS, the NCAS shall automatically do all microcomputer component self-diagnostics, memory checking and loading of all necessary operating software without intervention by the inspector-mechanic. Upon satisfactory computer component check out, the applications software is to present a menu of available NCAS operations. All offered features are to be menu-driven. For each feature, a context sensitive, on-line help facility is to be provided which can be accessed preferably with a single keystroke. If the NCAS does not have a satisfactory computer component check out, the applications software is to lockout the unit.

1.18 Technical and System Documentation

The NCAS software shall be fully documented. One (1) copy of the documentation listed as follows shall be submitted to the State unless otherwise requested by the State. Manufacturers shall agree, in writing (signed by the chief executive officer (CEO) of the company), to submit copies of the program listings to the State upon request, within a time frame satisfactory to the State, or whenever a decision is made by the manufacturer to voluntarily suspend or terminate production of the NCAS. The State does not expect to have a need to review the program listings and, therefore, will not require that they be included with the application for certification. The State reserves the right to require that copies be provided, if the need does arise. Software documentation shall include at least the following:

1. Complete program listings, including the source code as well as the object code, in both machine readable and paper form, shall be provided upon request. They are not required to be submitted with the application for certification;
2. Functional specifications;
3. Functional flowcharts of the manufacturer's software;
4. Sample inputs and outputs from all processes;
5. Detailed interface information on the optical bench including the identification of protocol and output specifications; and
6. All DOS file layouts with file names, file types, file security, field names, field types, field sizes and field editing criteria.

Documentation provided by the manufacturer will be treated as proprietary information by the State, provided such material is clearly marked as confidential. Any trade secrets or similar proprietary data that the offer or does not wish disclosed to other than State personnel (and/or the subcontractor assigned to assist in the certification process) will be kept confidential if identified as described below:

Each page shall be identified in bold-faced at the top and bottom as "Confidential". Any section of the documentation that is to remain confidential should, in addition, be so marked in bold-faced on the title page of the section.

Gross marking of all material as confidential is not acceptable; only that material which is proprietary should be marked.

The purpose of the requirement for detailed code is to provide the State with a mechanism to assure continued performance of inspection stations in the event that a major supplier should fail. The State is not interested in any disclosure of proprietary information, nor in the detailed operations of vendor code, however, it is essential that all of the necessary working code, schematics, drawings and so forth be available in case of such demise.

1.19 Availability of Circuitry

All integrated circuits used in the NCAS shall be types and brands that are presently in common usage. Custom ROM programs developed by the manufacturer for building the analyzer are allowed.

1.20 State Access

The authorized DMV representatives shall have access to update certain portions of the analyzer software. The software shall be designed to include an Enforcement State Audit Menu as indicated in Section 3. Access to the Enforcement State Audit Menu will require entry of an access code that will be entered by an authorized State representative in conjunction with the entry of the DMV inspector number (ten (10) to twelve (12) position numeric, which will be the DMV inspector's N.C. driver license number) when the initial station inspection is accomplished. The analyzer's testing functions shall not operate until the Enforcement State Audit Menu access code is entered. Information contained in the files associated with the State Representative Menu shall be hidden in software to the State's satisfaction. The access code shall consist of five (5) numeric characters. However, leading characters of the access code may be zero, so this field should be designated as an "alpha" field to allow the analyzer to recognize leading zeros. For example, the analyzer should recognize the difference between access code "380" and access code "00380". Authorized State personnel license, name and access code data will be transmitted to the analyzer and stored in the file ENFACC.DAT. The initial access codes for software modification shall not consist of repetitive entries, and shall be revealed only to the analyzer vendors' authorized personnel, the North Carolina Division of Motor Vehicles' I/M Program Enforcement personnel, and the North Carolina Division of Air Quality Mobile Source Compliance personnel.

[1/8/99; 12/9/98 (NC) If no auditors in file, analyzer must always accept default license number of "111111111" (ten 1's) and access code of "11111" (five 1's)]

1.21 Data and File Transfer

1.21.1 Modes

All calibration, vehicle test records and other NCAS files shall be capable of being transferred from the NCAS in two (2) ways -

1. By use of the 3.5" PC/MS-DOS standard 1.44 Mb floppy disk on which data is stored.
2. Via an internal (that is, located inside the cabinet) modem and connection to a telephone line. This modem is to be attached to a telephone line installed in the facility.

1.21.2 Modem

1. A telephone line, separated from the power cord, shall be provided for the modem. The telephone line shall be enclosed in a protective cable that meets State and UL or ETL approval. Alternative methods to protect the telephone line may be submitted to the State for approval.
2. The telephone line shall be plugged in at all times. If a dial tone is not found, or if communications with inspection data transfer are not performed as required, the analyzer shall display an appropriate message whenever communication is required.

1.21.3 Diskettes

Diskettes must be removable and show full compatibility with existent State microcomputers. The 3.5" floppy disk drive and the port on BAR-90 and BAR-97/OBDII units must be secured logically and physically to permit only duly authorized State and manufacturer access. Vendor methodology to restrict such access shall be approved by the State. Secured disk drives will not be required on OBDII-only units.

1.22 Accessing OBDII Fault Codes

BAR-97/OBDII units and OBDII-only units shall be equipped with an OBDII SAE Standardized Link. The link shall enable the NCAS to access engine RPM and fault codes for all OBDII equipped vehicles. The NCAS shall decode, interpret and display the fault codes on the screen and print them with their interpretation on the VIRS.

1.23 Telephone Requirements

Each safety and emission inspection station shall be equipped with private telephone service utilizing a RJ11 jack connector, or State approved functional equivalent, to which the emission analyzer shall be connected at times specified by the State.

The Division of Motor Vehicles and MCI Emissions Customer Service shall be notified immediately when phone numbers are changed or service is interrupted.

The telephone service shall be maintained in good working order.

The telephone line shall be the responsibility of the station owner and not the manufacturer. This telephone line should not have other devices on the line such as answering machines, etc. The manufacturer may offer assistance to the station owner in acquiring the telephone line.

1.24 Manual Data Entry

If bar-code scanner or other automatic data capture systems are not operational, the analyzer shall require redundant data entry to facilitate accurate collection of critical vehicle identification data. The following data elements, if entered manually, shall be entered at least twice (unless noted otherwise) and automatically compared for consistency.

1. Vehicle Identification Number

2. Vehicle License Plate Number
3. Waiver Authorization Number
4. Sticker Numbers (when adding to inventory)

The data entry procedure shall be such that the analyzer provides no visual reference to the initial entry when the inspector-mechanic re-enters the same data element.

Manual entry of safety and tampering inspection item results requires individual keystrokes for each inspection item. Holding down a single key to enter the same result in multiple fields is not allowed. Repeated pressing of the same key is allowed.

1.25 Station License

The analyzer shall print a new station license when station information changes, such as license expiration date, or when inspector-mechanic information changes. A change in inspector-mechanic information can be addition or deletion of an inspector, change in inspector-mechanic licensing or classification. The station license shall be printed on the VIRS printer automatically when triggered by the receipt of a new license data file from the VID or on demand from the Station Menu. If an inspection is in progress when the new license data file is received the analyzer shall print the new license following the conclusion of the inspection, just before returning to the inspection menu.

[12/9/98 (NC) Print new station license if technician and/or license file received from VID.]

The format for the station license report is found in Section 5.

1.26 Year 2000 Compliance

All dates entered or stored on the analyzer shall be Year 2000 compliant. Years shall be entered as four (4) numeric characters (yyyy). Dates shall be entered and stored as mm/dd/yyyy.

1.27 Aftermarket Suppliers

Parties other than the suppliers of the complete NCAS analyzers may provide components and service only to non-secure components of analyzers. (Access to secure portions of analyzers necessary to service non-secure components is available through analyzer vendors.) Candidate components and service procedures (other than those contained in the analyzer service manuals) must be certified by the State to meet the requirements of this specification prior to being applied to any analyzers in the field. Examples of components that may be certified for aftermarket service are keyboards, monitors, printers, and scanners and any other devices approved by the state.

1.28 Analyzer ID Number (NCAS ID)

Each NCAS analyzer shall have a unique identification number. Each analyzer manufacturer shall be assigned a two-digit alpha prefix by DAQ, in collaboration with DMV, for the analyzer ID.

The first alpha digit of the analyzer's unique ID shall represent the analyzer's manufacturer.

All existing BAR-90 analyzers will maintain their current designations (for example, Allen = 'AT', Bear = 'BA', ESP = 'ES', Snap-On/Sun = 'SE').

BAR 97 analyzers (conducting only the tailpipe test), shall be assigned the first alpha digit indicating the analyzer manufacturer with the second alpha digit being an "X", (i.e., Sun = SX, and ESP = EX), with the exception of SPX whose designation will be "SP".

BAR97 analyzers that are certified to conduct both the idle test and the OBDII test will receive a "D" designation (i.e., Sun = SD, ESP = ED, SPX=BD, and WW = WD, etc.).

Stand-alone analyzers capable of conducting **both safety and** the OBDII test shall **receive any designation for their second alpha digit other than those letters already used. (i.e. "A", "D", "E", "P", "S", "T", or "X")** The alpha designation of "Z" or "K" should be the primary second alpha digit of choice. (i.e., Sun = SZ, ESP = EZ, SPX=BZ, WW = WZ, and WW = WK, etc.)

Stand-alone analyzers capable of conducting only the Safety test shall receive an "S" as their second alpha digit of the unit (i.e., Sun = SS, ESP = ES, SPX=BS, and WW = WS, etc.)

Whenever an analyzer is converted from one manufacturer to another, the first alpha designation of ID shall be that of the final analyzer manufacturer setup. The second alpha digit, determined at time of implementation, should provide a unique designation.

Six (6) numeric characters, for example "AT123456", will follow the two-digit alpha prefix. The analyzer manufacturer shall establish each analyzer ID as a unique identifier for the unit, multiple uses of the same NCAS ID will not be allowed. The manufacturer's representative or the state representative shall input the NCAS ID during initial field configuration of the unit. These designations will be typed into the analyzer and will not be automatically assigned by the analyzer, i.e. not hard coded.

The analyzer ID shall be assigned and maintained from the field service menu. The analyzer shall not allow testing in any mode without a complete and unique NCAS analyzer ID. Following entry of the full eight-character ID the analyzer will store this ID and use the ID in all future records. The NCAS analyzer ID shall be printed on the reports and displayed on the status screen. [5/1/98 (NC) Analyzer number can be changed from state enforcement menu.]

1.29 Personal Digital Assistant (PDA)

North Carolina recognizes the contribution that can be provided to the I/M program through the use of handheld computers, or personal digital assistants (PDAs). These devices combine the computing, telephone/fax, and networking capabilities of desktop computers used in today's analyzers with the versatility and convenience of handheld units.

Recognizing the potential of these units, especially with regard to the upcoming Onboard Diagnostic Testing, North Carolina will consider allowing certification and use of PDAs in the I/M program. However, each manufacturer must work with the State in determining how best to meet the requirements of the NCAS Specification. Because the technology of these units is continually changing, the State of North Carolina does not wish to restrict the use of

these units in the I/M program. However, as with all NCAS-certified analyzers, PDAs must still meet all functionality requirements specified herein.

The NCAS Specification will continue to be revised as manufacturers work with the State in developing PDAs for use in the North Carolina I/M program.

2 Section 2 – NCAS Software Functions

PURPOSE: This section describes the software functions of the North Carolina Analyzer System for performing vehicle inspections.

2.1 General

The microcomputer software shall control the inspection sequence and equipment processes. This software, at a minimum, shall require the inspector-mechanic to proceed in the following sequence when performing a vehicle inspection:

1. Enter the inspector-mechanic access code number;
2. Enter vehicle identification number and county;
3. Analyzer initiates VID contact for test record retrieval;
4. Connect the OBDII scanner to the DLC (if an OBDII inspection is being performed) and perform the OBDII scan;
5. Conduct the safety inspection, perform the visual under hood tampering inspection and enter the results;
6. Connect the RPM pickup (for idle-exhaust emissions inspections);
7. Perform the exhaust emissions inspection;
8. Successfully apply a sticker to the vehicle;
9. For OBDII and emissions tests, analyzer initiates VID contact to download test results and retrieve updated analyzer files; and
10. When the inspection of the vehicle is complete, the inspector-mechanic name, vehicle identification information and the inspection results, including, as applicable, OBDII readiness codes and pass/fail results, shall be printed on the Vehicle Inspection Receipt/Statement (VIRS).

A description of these tasks is detailed in the subsections that follow.

A series of warning messages will be displayed to the inspector-mechanic at the time the analyzer is initially turned on each day or at some other appropriate time(s) as designed by the manufacturer. These warning messages will provide the indications of:

1. Expiration dates of licensed inspector-mechanic with licenses (inspector-mechanic license for emissions and or safety inspections) which will expire within the next 30 day period;
2. When the available IM, SI, MT **paper** stickers or IM, SI e-sticker authorizations for each class assigned to the analyzer is reaching a level that will require replenishing. (This number will be variable and will be specific to the analyzer and managed under the State Inspection Menu Item 7 “Sticker/E-Sticker Management”.); following prompt will be displayed while the e-sticker authorization inventory is below the specified limit.

“YOU HAVE xx E-STICKER AUTHORIZATIONS LEFT IN INVENTORY FOR CLASS XX. PLEASE PURCHASE E-STICKER AUTHORIZATIONS”.

3. A reminder that a four-point calibration is due (for BAR-90 and BAR-97/OBDII analyzers). The reminder will include the due date, and will be displayed whenever the calibration is due within 10 days. A single-key entry shall be used to acknowledge this reminder.

2.2 Station Number and Inspector-Mechanic Access Codes

The NCAS shall be designed to require the inspector-mechanic's twelve (12) digit license (either electronically, manually or scanned) and special five (5) digit access code to be manually entered by the inspector-mechanic before a State inspection can begin. Since leading characters of the inspector-mechanic access code may be zero, this field should be designated as an "alpha" field to allow the analyzer to recognize leading zeros. For example, the analyzer should recognize the difference between access code "380" and access code "00380". Only one inspector-mechanic will be performing an inspection at any time. The access code shall neither be displayed nor printed at any time. This special access code shall be linked to the inspector-mechanic's license number. The analyzer software shall be designed to automatically abort the inspection if the inspector-mechanic has not been issued an appropriate license number. Access shall be denied if the inspector-mechanic's license has expired, is locked out, or is not found in the analyzer. After the second failed attempt of entering the identification number or access number (either electronically, manually, or by using a scanner), the analyzer shall request that only the keyboard be used. After the third failed attempt to enter a valid identification number or a valid access code from the keyboard, the analyzer will return to the Main Menu.

The NCAS shall have the capacity for storage of all inspectors supplied from the VID.

2.2.1 Receive Inspector(s) Data

When an inspector-mechanic table for a station is updated on the VID, the complete updated inspector-mechanic table shall be transmitted by the VID to the analyzer.

This file shall contain the license information for both emissions and safety inspectors, including name, license number, certification status and expiration dates.

The analyzer software shall not allow changes to the "Technician Information File" from the analyzer. Inspector-mechanic information can only be changed from the VID.

Upon receiving the inspector-mechanic information from the VID, the analyzer software shall not be required to validate the inspector-mechanic information received from the VID.

Upon receiving data from the VID, if the inspector-mechanic's license number that is performing the current emissions inspection has been deleted, the analyzer shall allow the inspector-mechanic to complete the inspection.

The analyzer shall allow display of the updated list of inspector-mechanics, and shall provide an option to print the list, if desired. During any screen display or printing of the inspector-mechanic information, the analyzer shall not display the actual inspector-mechanic license numbers or their access codes at any time.

The analyzer shall print a new station license when the inspector-mechanic data changes, and following receipt of a new station license data file from the VID.

The microcomputer shall be designed to allow the station number, inspector-mechanic's license number, drivers license number, drivers license expiration date and each inspector-mechanic's access code to be changed only by authorized DMV representatives, under controlled access conditions acceptable to the State. Changing these numbers shall be done from the VID by file transfer to the analyzer of all the required information for each inspector-mechanic with access to the analyzer.

The inspector-mechanic's name and the station license shall be printed on the vehicle inspection receipt/statement.

A similar method shall be used to transmit authorized State Enforcement license data to the analyzer.

2.3 Test Applicability

The NCAS shall not accept any vehicle older than model year listed in Table 2.3.1 below for an inspection. Vehicles inspected are based on a 35-year rolling window.

Any attempt to make such an entry shall cause the NCAS to display "DO NOT TEST VEHICLES OLDER THAN MODEL YEAR [insert the model year from Table 2.3.1] " and the analyzer shall direct the inspector-mechanic to abort the inspection.

Table 2.3.1

Effective Date	Oldest Model Year Accepted for Safety Testing
January 1, 2004	1969
January 1, 2005	1970
January 1, 2006	1971
January 1, 2007	1972
January 1, 2008	1973
etc...	

Test requirements for program counties will be performed as described in Tables 2.3.2 and 2.3.3 that follow.

From the period between July 1, 2002, and January 1, 2006, vehicles in the counties of Cabarrus, Durham, Forsyth, Gaston, Guilford, Mecklenburg, Orange, Union, and Wake are subject to the following testing:

Table 2.3.2

Vehicle Type	Pre-1968	1968- [insert MY from table 2.3.1] less 1 MY	[insert MY from table 2.3.1]-1995	1996 through present
LD Gasoline ¹	S ⁷	S / T ⁸	S / T / E ⁹	S / T / O ¹⁰
LD Diesel ²	S	S	S	S
LD Other ³	S	S	S	S
HD Gasoline ⁴	S	S / T	S / T / E	S / T / (O) ¹¹
HD Diesel ⁵	S	S	S	S
HD Other ⁶	S	S	S	S

Notes:

- 1) LD Gasoline refers to gasoline-powered vehicles, bi-fueled vehicles capable of exclusive gasoline operation, or gasoline/electric hybrid vehicles which are less than or equal to 8500 lbs. gvwr."
- 2) LD Diesel refers to diesel-powered vehicles which are less than or equal to 8500 lbs. gvwr.
- 3) LD Other refers to all vehicles which are less than or equal to 8500 lbs gvwr that are not powered by gasoline or diesel (i.e., LPG, LNG/CNG, etc. powered vehicles)
- 4) HD Gasoline refers to gasoline-powered vehicles, bi-fueled vehicles capable of exclusive gasoline operation, or gasoline/electric hybrid vehicles which are greater than 8500 lbs. gvwr
- 5) HD Diesel refers to diesel-powered vehicles which are greater than 8500 lbs. gvwr
- 6) HD Other refers to all vehicles that are greater than 8500 lbs gvwr that are not powered by gasoline or diesel (i.e., LPG, LNG/CNG, etc. powered HD vehicles).
- 7) S = Safety Inspection
- 8) T = Tampering Inspection
- 9) E = Exhaust Test (preconditioned idle tailpipe test) – Vehicle must be operated on gasoline during emissions test.
- 10) OBDII testing will be performed on LD gasoline vehicles.
- 11) OBDII testing will be performed on HD gasoline vehicles (see footnote 4 above) based on the "HD OBDII Model Year" field in Network.dat.
- 12) In reference to notes 7 & 8 above, vehicles not subject to emission/OBDII inspections, the analyzer will automatically determine the correct safety/safety-tampering test sequence based on Model Year.
- 13) OBDII testing, **in addition with the tamper inspection**, will be performed on LD diesel vehicles (see footnote 2 above) based on the "LD Diesel OBDII Model Year" field in Network.dat.
- 14) OBDII testing, **in addition with the tamper inspection**, will be performed on HD diesel vehicles (see footnote 5 above) based on the "HD Diesel OBDII Model Year" field in Network.dat.
- 15) N = No Safety, Tamper or emission test required.

Beginning January 1, 2006, vehicles in the counties of Cabarrus, Durham, Forsyth, Gaston, Guilford, Mecklenburg, Orange, Union, and Wake are subject to the following testing:

Table 2.3.3

Vehicle Type	Pre - [insert MY from table 2.3.1]	[Insert MY from table 2.3.1]-1995	1996 through present
LD Gasoline	N ¹⁵	S / T	S / T / O
LD Diesel	N ¹⁵	S	S / (T/O) ¹³
LD Other	N ¹⁵	S	S
HD Gasoline	N ¹⁵	S / T	S / T/ (O) ¹¹
HD Diesel	N ¹⁵	S	S / (T/O) ¹⁴
HD Other	N ¹⁵	S	S

Notes:

Please see Table 2.3.2 for table field definitions and footnotes.

New counties will be incorporated into the program between July 1, 2003 and January 1, 2006, according to the following schedule:

July 1, 2003: Catawba, Cumberland, Davidson, Iredell, Johnston, Rowan

January 1, 2004: Alamance, Chatham, Franklin, Lee, Lincoln, Moore, Randolph, Stanly

July 1, 2004: Buncombe, Cleveland, Granville, Harnett, Rockingham

January 1, 2005: Edgecombe, Lenoir, Nash, Pitt, Robeson, Wayne, Wilson

July 1, 2005: Burke, Caldwell, Haywood, Henderson, Rutherford, Stokes, Surry, Wilkes

January 1, 2006: Brunswick, Carteret, Craven, New Hanover, Onslow

Vehicles in these counties will also be subject to testing as shown in Table 2.3.3 above. The analyzer shall be designed to automatically select the appropriate test sequence based on vehicle model year and county of registration. OBDII testing in new counties shall be incorporated into the program through COUNTY.DAT. Vehicle model years subject to OBDII testing and the OBDII start date will not be hard-coded but will be updateable via NETWORK.DAT.

If an OBDII test is selected prior to the implementation date for these new counties, the following prompt will be displayed: "OBDII TESTING HAS NOT BEEN IMPLEMENTED IN THIS COUNTY."

2.4 Vehicle Type Classification

2.4.1 Light Duty Motor Vehicle

A vehicle will be identified as a "Light Duty Motor Vehicle" if it is primarily designed for transportation of persons or property and has a manufacturer's gross vehicle weight rating (GVWR) less than or equal to eighty-five hundred (8500) pounds.

2.4.2 Heavy Duty Motor Vehicle

If the vehicle meets one of the following criteria, the vehicle will be identified as a "Heavy Duty Motor Vehicle". A motor vehicle primarily designed for:

1. Transportation of persons or property and has a manufacturer's gross vehicle weight rating (GVWR) more than eighty-five hundred (8500) pounds,
2. Use as a recreational motor vehicle that has a manufacturer's gross vehicle weight rating (GVWR) is more than eighty-five hundred (8500) pounds,
3. Use as an off-road utility vehicle.

2.5 Vehicle Make Entries

The analyzer software must be designed to accommodate all vehicle make names. The software shall include a list of all vehicle make names for the model year 1975 and later (see Section 3 for current list of make names). The four (4) position vehicle make code as identified on the vehicle registration card must be displayed and printed on the VIRS; this four (4) position code shall also be recorded on the test record. The software shall be designed to first display a list of vehicle makes. The inspector-mechanic shall then be instructed to select a vehicle make using the cursor and scrolling through the list or by typing in the first letter or two of the vehicle make so that the cursor goes directly to the first vehicle make with that letter, or a combination thereof, in it. The inspector-mechanic may also chose to enter the complete vehicle make code which will be edited against the displayed list of valid vehicle makes.

The vehicle make should be recorded in the NCAS the same as the make is recorded in the DMV Vehicle Registration System. If a vehicle make as presented on the Vehicle Registration Card is not contained in the reference table, the reference table has not been updated with the proper codes. If the vehicle make code is not in the table included as part of these specifications, the analyzer shall instruct the inspector-mechanic to enter the first four (4) positions of the vehicle make as presented (printed) on the vehicle registration.

2.6 OBDII Inspection

BAR-97/OBDII and OBDII-only analyzers shall include the hardware and software necessary to access the onboard computer systems on 1996 and newer vehicles, determine OBDII readiness, MIL status, and recover stored fault codes using the SAE standardized link.

The analyzer shall be designed to guide the inspector-mechanic through the proper OBDII, safety, and tampering inspection sequence for a particular vehicle, and record the results. The inspector-mechanic shall be presented a list of vehicle components to be inspected, in the following order: OBDII scan test sequence, safety components, tamper components.

Should a communication failure occur between the vehicle's Diagnostic Link Connector and the OBDII analyzer, the OBDII analyzer will require the inspector-mechanic to attempt to re-establish a connection at least three times. References for DLC locations will be displayed, upon request by the inspector-mechanic, via a separate text file maintained on the analyzer (DLCREF.DAT).

Information regarding OBDII test anomalies (such as "not ready" status of 1996 Subaru) will be maintained in the OBD Exception Table (EXCPTION.DAT). This table will also contain text to be displayed to the analyzer screen in the event an inspector needs information about a unique test scenario (such as a message presented for vehicles whose MIL turns off during the KOEO test).

The analyzer software shall be designed to invoke the requirements of 40 CFR51, except as noted in this Specification. Appendix H of this Specification contains the amendment to the On-Board Diagnostic Checks final rule.

2.7 Safety Inspection

The analyzer shall be designed to guide the inspector-mechanic through the proper safety inspection sequences for a particular vehicle and record the results. The inspector-mechanic shall be presented a list of vehicle components to be inspected.

For light duty and heavy-duty vehicles a HELP screen shall be displayed if the inspector-mechanic enters an "H" for an inspection item. The purpose of the HELP screen is to display the State rules for each inspected component.

2.8 Tampering Inspection

The analyzer shall be designed to guide the inspector-mechanic through the proper tampering inspection sequence and record the results. The inspector-mechanic shall be presented a list of vehicle components to be inspected.

The analyzer may allow access to an on-line pollution control equipment manual. This manual will prompt the inspector-mechanic for the vehicle information necessary to identify which pollution control devices should be installed on a particular vehicle (that is, PCV, evaporative control, and air injection system, etc.). The analyzer shall return to the inspection at the point of departure when the pollution control devices query is complete. This manual shall also be accessible from outside the State Inspection Menu.

2.9 Idle Emissions Inspection

The analyzer shall be designed to guide the inspector-mechanic through the proper safety and emissions inspection sequences for a particular vehicle, and record the results. The inspector-mechanic shall be presented a list of vehicle components to be inspected, in the following order: safety components, tamper components, tailpipe emissions test sequences.

BAR-90 and BAR-97/OBDII analyzer software shall be designed to invoke the requirements of the Code of Federal Regulations: 40CFR51, Appendix B to Subpart S – Test Procedures,

Section IV – Preconditioned IDLE TEST, except as noted in this Specification. Appendix E of this Specification contains the text of this portion of the Federal Regulation for vehicles required to undergo an idle exhaust emissions inspection.

The analyzer shall be designed to automatically run the appropriate test sequence after vehicle identification information is entered.

The State will provide additional test sequences to the manufacturers if a software update is necessary.

When a vehicle undergoing an idle exhaust emissions inspection has met RPM, flow rate and dilution conditions, the exhaust emissions test sequence shall begin and the display shall show the word TESTING and time remaining in the test sequence. For each test mode, the analyzer shall record the emission readings and test sequence number to the test record at the end of the TESTING period.

Appendix D contains exhaust emission test sequences for certain vehicles equipped with ZF-4 automatic transmissions. Appendix I contains a matrix listing various exhaust emissions test scenarios with appropriate analyzer responses. This matrix may be used to help evaluate software integrity during analyzer software certification and testing.

2.9.1 Criteria for Emissions Testing

2.9.1.1 Stability

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

1. Readings averaged over a period of two (2) seconds for CO+ CO₂ meet the dilution thresholds;
2. Engine RPM has been within specified thresholds for at least one (1) second.

2.9.1.2 Restart Conditions

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 threshold is outside specified thresholds for greater than one (1) second;
2. Engine RPM is outside specified thresholds for at least one (1) second; and
3. Sample flow rate is not adequate to prevent triggering the low flow lockout.

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 analyzer shall allow the inspector-mechanic three (3) attempts before displaying a message asking the inspector-mechanic to abort the test. The same message shall be displayed after each subsequent unsuccessful attempt.

2.9.2 Vehicle Preconditioning for Emissions Testing

The analyzer shall prompt the inspector-mechanic through an appropriate preconditioning sequence:

1. Preconditioning sequence 1 is for all 1975 and later vehicles, except as noted in sequences 2, 3, and 4.
2. Preconditioning sequence 2 is for 1981-1989 Ford Motor Company, and 1984-1985 Honda Prelude vehicles.
3. Preconditioning sequence 3 is for the following vehicles, if equipped with automatic transmissions: 1984-1986 BMW, 1986-1991 Peugeot model 505, and 1987 BMW models 635Csi, 735I, and L7.
4. Preconditioning sequence 4 is for 1985-1988 Volvo model 740 vehicles with ZF-4 automatic transmissions.

The manufacturer shall provide for the capability to utilize as many different preconditioning procedures as can be contained in the analyzer. The preconditioning procedure number shall be documented on the test record.

The analyzer software shall be designed to require the inspector-mechanic to perform the preconditioning sequence before proceeding with the test. The preconditioning period shall begin as soon as the RPM is stable and within the proper range. The engine speed and the time remaining shall be displayed during the preconditioning period.

2.9.3 Engine RPM Detection for Emissions Testing

Prompts may be provided to assist the inspector-mechanic in locating an RPM signal on vehicles equipped with Direct Ignition System (DIS). Based on the vehicle identification information entered by the inspector-mechanic, the analyzer shall advise the inspector-mechanic regarding 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. Analyzers shall be provided with all the software and hardware that is necessary to make them capable of reading engine speed on all vehicles.

Prompts shall be provided if information is available in a Master Reference Table format for the type of vehicle being inspected.

The analyzer shall record the engine RPM on the test record at the time the emission test results are determined.

2.9.4 Dual Exhaust Capability for Emissions Testing

A dual sample probe of a design certified by the analyzer manufacturer to provide equal flow in each leg shall be provided. The equal flow requirement is per 40CFR51, Appendix D to Subpart S – Steady-State Short Test Equipment, Section I(a)(5). Appendix F of this specification contains the text of this portion of the Code of Federal Regulations.

2.9.5 Standards for Emissions Testing

2.9.5.1 Emission Limits

1. The software shall select emissions standards, for comparison to emissions test results, based on vehicle year and vehicle type. From vehicle information entered, the analyzer's microcomputer shall choose the proper Emission Standards.
2. Each vehicle Emission Standard contains HC and CO, Pass/Fail values. Emission standard category values and the criteria for selecting categories shall be designed in a manner that allows for easy modification or addition, without modifying the entire software package.
3. Dilution measurements shall be based on the sum of CO and CO₂. The analyzer's microcomputer shall prevent testing if the CO + CO₂ value, vehicle exhaust gas flow rate or the engine speed signal are outside the specified thresholds.
4. There shall be software capability for additional standards categories in the NCAS.

[5/1/98 (NC) Emission limits do not come from VID]

2.9.5.2 Limits for Emissions Testing

Time-outs, dilution limits, RPM limits, and low exhaust sample flow limits shall be per applicable sections of 40CFR51, as contained in Appendices F and G of this Specification.

2.10 Blind Test

The NCAS shall not allow any escape or reset to interrupt a test in progress. Once exhaust emission analysis or an OBDII scan has begun, no results are to be displayed until after the test record is written to disk and a final pass/fail determination has been made.

2.11 Data Storage and Recall Capability

In the event that no communication can be made with the VID after two attempts, or a no-match is received from the VID after successful communication, the analyzer shall have the capability to recall and display any of the failed vehicle test records in NCAS.DAT or NCAS.HST for retest. Recall shall be initiated by searching NCAS.DAT and NCAS.HST for records with matching vehicle identification number or license plate number. If located, the previous test record will be automatically retrieved without inspector intervention. The inspector-mechanic shall not have the ability to modify the vehicle identification information (year, VIN, make, body style, or fuel type) on the recalled test record. The inspector-mechanic shall be required to reenter the odometer for subsequent tests. The analyzer shall be capable of displaying the previous test results, but shall not allow them to be changed. The test record for this vehicle shall indicate that it was retested.

2.12 Print and Record Decision Criteria

The NCAS shall be programmed to print the vehicle inspection receipt/statement (VIRS), and record the test results. The sample receipt/statement layout is in Section 5. Vehicle inspection receipt/statements for vehicles failing the emissions test shall also include

information on the probable causes of failure, warranty repairs, and waivers, and error code information will be provided on the second page of the VIRS for vehicles failing an OBDII inspection. The required wording is in Section 5.

2.13 Incomplete Inspection

In the event of a tailpipe emissions inspection not being completed due to time-out, sample dilution, RPM limit, and/or low sample flow, the analyzer will print a receipt showing no charge and listing the problem in the exhaust emission test results space. If the problem is a sample dilution, the CO₂ and CO readings shall be printed.

[1/12/99 – In regards to printing a receipt, this section conflicts with 3.12.5. Waiting for clarification from state]

[8/24/00 (NC): Section 2.13 appears to refer to sampling error abort, rather an inspector-selected (manual) abort (discussed in 3.12.5). Some analyzers do not currently print VIRS on any abort. Specification requirement in this regard may be changed in the future.

For vehicles undergoing an OBDII inspection, failure to locate the DLC will result in an abort, with no inspection record written to the disk, no VIRS written, and no fee collected.

Failure to properly connect to the DLC, or failure to properly download OBDII information will result in a failure. A second page will be printed for the VIRS indicating that the vehicle's on-board diagnostic system could not be checked due to a damaged, tampered, or inoperable connector or diagnostic information could not be properly downloaded. For this scenario, a full test will be performed (including safety/tampering), and a test record will be written to the disk and a full test fee collected.

Vehicles with too many unset readiness codes will be rejected from testing (abort). The NCAS shall print out a special VIRS listing the unset readiness codes and advising the motorist on how to proceed. An abort test record will be written to the disk, no safety or tampering test will be performed, and no fee will be collected.

Vehicles with too many unset readiness codes but with a KOEO failure or a MIL commanded on status will result in a failed test. A full test will be conducted including downloading DTCs for MIL commanded on status, and a safety and tampering inspection will be performed. The NCAS shall print out a failure VIRS. A full test record will be written to the disk, and a full test fee will be collected.

2.14 Double blind Entry

Double-blind entry is defined as follows:

1. The inspector-mechanic shall enter the value on the screen and when data entry is completed press the <ENTER> key to continue.
2. Values entered may be viewed as the characters are entered. This is not true for password or access code entries that shall be not be visible, but may be represented as "Xs" for character count.
3. The analyzer shall blank the field and require the inspector-mechanic to enter the value again without the benefit of seeing the first entry.
4. At the completion of the second data entry the inspector-mechanic shall again press the <ENTER> key to indicate that the process has been completed.
5. If the two (2) values do not match then the process must begin again.

6. The inspector-mechanic shall be required to enter exactly the same value twice in a row before the process can continue.

2.15 Enforcement State Audit Menu

The NCAS will uniquely flag all calls placed to the VID under this menu, thus allowing the VID to differentiate between calls made from the Station Menu and calls made from the Enforcement State Audit Menu.

2.16 Lockout Processing

1. The status (on/off) of the lockouts shall be transmitted by the VID to the analyzer. If a lockout(s) is set, then subsequent emission inspections shall be prohibited until the applicable lockout(s) has been cleared. Lockouts received from the VID during a Begin Test communications session shall affect all inspections following the current inspection in process. This is to avoid motorist inconvenience.
2. The analyzers will lockout from emissions testing if the maximum number of offline inspections has been performed within the specified maximum number of days. Lockouts for offline inspections are placed in LOCKOUT.DAT based on the values for maximum tests and maximum number of days stored in the VIDCOMM.DAT file. These values can be adjusted for each station by DMV. The maximum number of days is a sliding window of time. The software will count the number of offline tests in the previous maximum days time period. If the maximum number of offline tests has not been exceeded the software will allow new emissions inspections. If this lockout is set, by exceeding the offline test number, the analyzer must make contact with the VID and upload all stored records, indicated by successful completion of the communications session. At that time, if the "DMV/State no communication" field in VIDCOMM.DAT is set to 000, the lockout is to be automatically reset by the analyzer and the current offline test count reset to zero. However, if the "DMV/State no communication" field in VIDCOMM.DAT is set to 999, the offline inspection lockout must be manually cleared from the "Enforcement Menu" (either immediately before or immediately after a data file refresh). Simply performing a data file refresh will not be sufficient to clear this lockout. If this lockout is cleared from the "Enforcement Menu" but no data file refresh is performed, the analyzer will reapply the lockout when a new inspection is attempted.

[5/1/98 (NC) DMV will adjust max values through VID management tools not on analyzer]

[7/09/02 (NC) Safety-only inspections do not count toward the offline limit. However, once an offline limit is reached, the lockout will apply toward safety inspections, as well as safety/exhaust, safety/OBD, all reinspections, and waivers. All other analyzer functions will be allowed.]

[7/09/02 (NC): This lockout may also be cleared remotely by setting the "DMV/State no communication" field for the given analyzer on the VID from "999" to "000". Then a Data File Refresh must be initiated on the analyzer. Once the Data File Refresh has completed successfully the analyzer will have uploaded any stored data and received indication from the VID that the "DMV/State no communication" in VIDCOMM.DAT is to be changed from "999" to "000" thus allowing the lockout to be automatically cleared via a data file refresh. If DMV wishes to keep this analyzer from automatically clearing the lockout in the future the "DMV/State no communication" must be changed back to "999" on the VID; the analyzer will receive the change on its next successful VID communication.]

[11/30/06 (NC) Based on the start of the E-Stricker State Date, safety-only inspections will count toward the offline limit. Ref Section 3.7A]

3. Receiving a "DMV/State NCAS Lockout" shall prevent the NCAS from performing any inspections, exhaust emissions, OBDII scan, or safety-only, and waiver issuance.

4. Receiving a “NCAS State Safety Lockout” shall prevent the NCAS from conducting an exhaust emissions inspection or an OBDII inspection. Safety-only and waiver issuance will still be allowed.
5. Gas-bench related lockouts on BAR-97/OBDII analyzers would only apply to exhaust emission inspection sequences. OBDII inspections may still be performed with idle (exhaust emission inspection) lockouts in place.

2.17 Receive DMV Messages

1. DMV messages shall be transmitted by the VID to the analyzer. Even if multiple messages are in queue in the VID only one (1) message is sent to the analyzer in any communications session.
2. The file name where the message will be held will be called C:\MAILIN\DMVMAIL.TXT.
3. All messages will be in a text file formatting of variable length with up to seventy-six (76) characters per display line.

[5/26/98 (MCI) Maximum number of lines is 999]

4. If a message is received during an emissions inspection it shall be displayed at the end of the emissions inspection.
5. The analyzer shall display DMV messages on the screen and shall always print a copy of the message to the general-purpose printer. A prompt for the option to print additional copies shall also be provided.
6. Once a message has been displayed and printed, the analyzer shall delete the message.

2.18 Updates to OBD Exception Table

It is anticipated that vehicles with unusual OBD readiness criteria (such as multiple monitors which always test as “not ready”) or unusual test characteristics (such as those vehicles whose MIL turns off during the KOEO test) will be periodically identified. These identified vehicles within EXCPTION.DAT will be updated at the VID and the entire exception table will be transmitted to the analyzers during normal analyzer communication sessions, as necessary.

2.19 Receive Updates of Analyzer Lockout Status

The status (on/off) of the lockouts shall be transmitted by the VID to the analyzer during every inspection logon and upon request by the analyzer (Data File Refresh and Lockout Status menu items). The VID shall return the state of the following lockout conditions to the analyzer:

- DMV/State NCAS Lockout
- DMV/State Safety lockout
- Station License Suspended
- Station License Revoked
- Station License Expired
- Failure to Pay for Stickers

Failure to Pay for Certification Stickers

Failure to Pay for Communication Services

Virus Detection

Cabinet Area Tampering (for BAR-90 and BAR-97/OBDII analyzers)

State disk drive tampering (for BAR-90 and BAR-97/OBDII analyzers)

If a lockout(s) is set, then subsequent affected inspection types shall be prohibited until the applicable lockout(s) has been cleared.

The current inspection can proceed.

Lockouts received from the VID during a Begin Test communications session shall affect all inspections following the current inspection in process. This is to avoid motorist inconvenience.^[12/2/98 (NC) Except for "Emissions Inspection Lockout", if a lockout is set subsequent Safety-Only inspections shall be prohibited.]

2.20 Internet Connectivity

Although not required, Internet connectivity is a recommended feature of the NCAS. If provided, the NCAS shall allow the user to load and operate software from the Internet service provider software of their choice, either through a selection on the NCAS menu or through a separate PC mode also made available on the NCAS menu. All analyzers with Internet capabilities must also be equipped with virus detection software as described in Section 2.21.

2.21 Virus Detection Software

Virus detection software shall be provided with any NCAS capable of accessing the Internet. This virus detection software must be updateable via VID download and shall verify the integrity (i.e. check for infection/corruption) of all files downloaded to the NCAS from the Internet. If an infected file is encountered, the software shall correct or delete the file, as necessary, and post a pop-up message advising the user of the file, detected virus, and corrective action performed. The pop-up message shall require user acknowledgement before continuing (user click "OK" button). The NCAS shall lock itself out if unable to correct or delete the infected file. The "Virus detection" field in LOCKOUT.DAT shall be set to "Y" and must be cleared before the NCAS may perform inspections or communicate with the VID. The NCAS shall display text advising the inspector-mechanic of the file corruption and lockout.

3 Section 3 - NCAS Display and Program Requirements

PURPOSE: This section describes the computer screen displays and the software programming requirements of the North Carolina Analyzer System.

3.1 General Description

This subsection describes the display prompts and programming criteria for the State inspection/test sequence. These items shall be standardized to facilitate the training of licensed inspector-mechanics. Manufacturers may propose, for State approval, alternative methodologies for the presentation of information and data entry as long as the substance and the priority of the sequence is not significantly modified.

The North Carolina Analyzer System (NCAS) manufacturers shall utilize all of the following options to make the analyzer user friendly:

1. Direct cursor addressing or first letter selection versus a scrolling display;
2. Data entry using the bar code scanner on bar coded Vehicle Identification Number (VIN) and Division of Motor Vehicles (DMV) inspector-mechanic badges;
3. Method of displaying DATA ENTRY ERROR MESSAGES; and
4. Development of HELP screens to assist inspector-mechanics with data entry.

Other options may be proposed for approval by the state.

Data entry from one item to another shall not proceed until a valid entry has been made. For idle exhaust emission tests, the State inspection shall utilize vehicle identification and visual information to determine what inspection criteria and emission test standards are appropriate for the particular vehicle being inspected. Once the emissions inspection or test sequences have been initiated, the inspector-mechanic shall be prohibited from editing any vehicle identification or inspection information. Where editing is allowed, the inspector-mechanic shall have the ability to return to a previous display prompt without depressing more than three (3) keys. At that point the inspector-mechanic shall see the prior information and be permitted to insert and delete characters without having to retype the whole field.

Unless otherwise specified in the programming criteria of this rule, the analyzer shall display an appropriate error message in response to an invalid or missing entry by the inspector-mechanic.

Data that is entered using the keyboard or a bar code scanner shall indicate successful entry/scanning and immediately display the data for the inspector-mechanic to review. The following sections include the minimum of menus manufacturers are required to provide. Manufacturers may break the menus down further to increase user friendliness or expedite certain operations. The State reserves the right to require modification of any menu it believes does not meet the minimum requirements.

3.2 Main Menu

When the analyzer is turned on, the screen shall display messages of required analyzer maintenance, if applicable (for example, two-point gas calibration and leak check, etc. for BAR-90 and BAR-97/OBDII analyzers). The analyzer screen shall then display the following menu options:

- S STATE INSPECTION MENU
- E ENFORCEMENT STATE AUDIT MENU
- F STATION MENU

These main menu options will be available for all analyzer types (BAR-90, BAR-97/OBDII, and OBDII-only analyzers). Individual sub-menu options specific to each analyzer type are described in the following sections.

3.2.1 Activation of Menu Items

The analyzer shall allow the inspector-mechanic to activate the State Inspection Menu options by entering an S, the Enforcement State Audit Menu by entering an E, and the Station Menu by entering an F, or the functional equivalents approved by the State. Other menu structures may be submitted to the State for approval. A brief description of each item in the menu follows.

3.2.2 Main Menu Option Description

1. State Inspection Menu. The State Inspection Menu will list the procedures available relevant to State inspections. Once the selection S is made from the Main Menu, the inspector-mechanic will be prompted to enter an access number to gain access to the State Inspection Menu.
2. Enforcement State Audit Menu. The Enforcement State Audit Menu will list the procedures that are available only to State representatives and manufacturer representatives. The selection of E from the Main Menu will cause the analyzer to prompt the DMV Inspector to enter a State identification number to gain access to the menu.
3. Station Menu. The Station menu contains procedures for updating data files from the VID, networking diagnostics, lockout updates, and view of communications logs.

3.3 State Inspection Menu

3.3.1 Initiation

1. For BAR-90 and BAR-97/OBDII analyzers, the screen shall display the following menu items:

State Inspection Menu

1. Safety and Emissions Inspection
2. Safety Inspection only
3. Reinspection
4. Reinspection Using Waivers/Waiver
5. Analyzer Maintenance
6. Reprint Receipt/Statement

7. Stickers/E-Stickers Management
 8. Training Mode
 9. Feedback Report
 10. DLC Location Reference Information
 11. Print Inspection Fee Pie Chart
 99. Return to Main Menu
- Select Option Desired; Enter Number _____

2. OBDII-only analyzers shall display the following menu items:

State Inspection Menu

1. Safety and Emissions Inspection
 2. Safety Inspection only
 3. Reinspection
 4. Reinspection Using Waivers/Waiver
 5. Analyzer Maintenance
 6. Reprint Receipt/Statement
 7. Stickers/E-Stickers Management
 8. Training Mode
 9. Feedback Report
 10. DLC Location Reference Information
 11. Print Inspection Fee Pie Chart
 99. Return to Main Menu
- Select Option Desired; Enter Number _____

3. When the inspector-mechanic has entered a valid menu option number, the analyzer shall initiate the associated procedure. If the value entered is not a valid number, an error message shall be displayed to the screen. After four (4) successive invalid entries are made, the analyzer shall automatically return to the Main Menu. If a BAR-90 or BAR-97/OBDII analyzer failed a leak check or a two-point gas calibration, the analyzer will not allow the selection of options involving an idle exhaust emission inspection (State Inspection Menu selections 1, 3, and 4 and the Enforcement State Audit Menu (Selection E of the Main Menu)), although OBDII testing will still be allowed (for BAR-97/OBDII analyzers).

3.4 Safety and Emissions Inspection

Safety and Emission Inspection sequence shall be initiated by an entry of 1 from the State Inspection Menu. This subsection describes the programming criteria and the required sequence of menus used in the Safety and Emissions Inspection.

3.5 Inspector-mechanic ID

When Safety and Emissions Inspection is selected from the State Inspection Menu, the inspector-mechanic will then be prompted to:

1. Electronically enter, scan or manually enter from the keyboard their ten (10) to twelve (12) character Emissions Inspector-mechanic License Number; and
[12/16/98 (NC) The license number bar code will contain up to 12 characters. Compare as left justified, trailing spaces.]
2. Enter from the keyboard their five (5) digit Access Code.
3. The analyzer shall search the file TECH.DAT containing the authorized Inspectors for a ten (10) to twelve (12) digit identification number. If the following conditions are met the test can proceed:
 - (a) A valid emissions inspector-mechanic license is found matching the entered license number;
 - (b) The Identification Number entered and the Access Code match; and
 - (c) The system date is not greater than the inspector-mechanic license expiration date.
4. The analyzer shall write the inspector license number, the inspector license number source (scanned or manually entered via keyboard), the inspector last name (from TECH.DAT), inspector first name (from TECH.DAT), and inspector middle initial (from TECH.DAT) in the appropriate fields in NCAS.DAT.
5. After any failed attempt to enter the proper identification number with matching access code, the analyzer will display the appropriate error message and then will return to the Main Menu.

3.5.1 Display Prompts

1. "Please Scan or Enter your Inspector-mechanic License ID Number
2. Please Enter Your access code"

3.5.2 Programming Criteria

1. Search inspector-mechanic file for inspector-mechanic license and access code. If found and license expiration is valid, and no lockout exists (suspended or revoked), then the test proceeds. Otherwise display error message and then return to the main menu.
2. Inspector-mechanics are licensed separately for emissions, OBDII, and safety. Each license has an expiration date and lockout status in the TECH.DAT file record for each inspector-mechanic.
3. In order to conduct a safety-emissions inspection (or safety-OBDII inspection) both the emissions license and the safety license (or OBDII license and safety license) must have an expiration date equal to or greater than the system date and no emissions (or OBDII) or safety lockout, and valid safety/emissions (or safety/OBDII) stickers (or certificates, if electronic certificate management is used) must be available.
4. In order to conduct a safety-only inspection the safety license must have an expiration date equal to or greater than the system date and no safety lockout, and valid safety stickers (or certificates, if electronic certificate management is used) must be available.

3.5.3 Error Messages

1. This license number is not found on file – Try Again or Contact the Helpline
2. This license is not valid to conduct test selected

3. Your access code is incorrect
4. Your license has expired
5. Your license has been suspended or revoked – Contact DMV Enforcement

3.6 VIN and License Plate

The VIN must be scanned from the DMV Registration Card, scanned from the vehicle, or manually entered twice by the inspector-mechanic. The VIN will be the primary means of tracking the inspection history of a vehicle.

[12/28/98 (NC) DMV Registration's VIN bar code contains leading identifier of "T".]

[4/20/07 (NC) VINs scanned directly off of the vehicle must be accepted if 1) VIN has leading identifier of "T" or 2) if there is no leading identifier of "T" acceptance of the VIN must meet all of the following criteria: VIN must contain exactly 17 alphanumeric characters consisting of a mixture of either 0-9 or A-Z excluding I, O, Q; No special characters such as, !, @, #, \$, etc., or all alphas or all numeric shall be accepted.]

3.6.1 Display Prompts

1. "Please ask the customer for their DMV Registration Card"
2. "Please scan the Bar Codes on the DMV Registration Card or enter the VIN and License Plate using the keyboard"
3. "Please re-enter the VIN using the keyboard"
4. "Please enter the vehicle license plate number"
5. "Please select one of the following:"
 - (a) Vehicle is registered in North Carolina
 - (b) Vehicle is currently registered Out-of-State
 - (c) Current vehicle registration is unknown.
6. "Is this vehicle information correct? Y/N"

3.6.2 Error Messages

1. Scan could not be read – Please enter from the keyboard
2. Both entries of the VIN do not match.
3. VIN exceeds 17 characters in length – please recheck the VIN

3.6.3 Programming Criteria

1. The analyzer shall first show display prompts and attempt to accept input from the bar code scanner or the keyboard.
2. If the analyzer receives proper input from the bar code scanner or keyboard the inspector-mechanic will be asked to approve the inputs. [12/2008 (NC) - The analyzer must ask if the VIN information is correct. A response of "NO" will force inspector-mechanic to re-enter the information. A "YES" response will allow inspection process to continue.]
3. The analyzer shall write the VIN and VIN source (scanned or manually entered via keyboard) in the appropriate fields in NCAS.DAT.
4. Manual entry from the keyboard will require a second entry of the VIN and license plate in the double blind manner described above and will require use of reentry prompt above. If the second entry does not match the first entry, the error message shall be displayed and the entry process shall start again from the beginning. [5/17/08 (NC) After 4 sets of double blind entry attempts, the inspection will abort and return to Main Menu.]
5. Current Registration Indicator shall be: N = North Carolina, O = Out-of-State, and U = Unknown.

6. The analyzer will not proceed until proper entry is obtained or the inspection is aborted. No record will be written and nothing will print.
7. If the VIN that is scanned or entered by keyboard contains an "I", "O" or "Q", display the following message:

“This VIN contains one of the following characters of “I”, “O”, or “Q” which is NOT acceptable for vehicles (including motorcycle and trailers) for model year 1983 through YYYY*. Please verify the VIN has been entered correctly. Press “Y” to accept the VIN or press “N” to re-enter the VIN.”

*Current Calendar Year + 1

Any entry of “Y” will accept the VIN and inspection will continue to the “Please enter the vehicle license plate number” prompt” if the VIN was scanned or will return to “Please re-enter the VIN using the keyboard” prompt for second blind entry if VIN was manually entered. An entry of “N” will return analyzer to “Please scan the Bar Codes on the DMV Registration Card or enter the VIN and License Plate using the keyboard” prompt for new VIN entry. [9/20/08 (NC) Added steps to ensure proper VINS are entered into the system and meeting the requirements of Section 9

3.7 Network Communications

- A. The NCAS shall attempt the initial network contact immediately after entering the VIN, ID and license plate number and current registration indicator of the vehicle to be inspected. Contact shall be attempted for every emissions or OBDII inspection. Following entry of the VIN and vehicle license plate number the analyzer shall automatically initiate a call to the network. [11/03/06 (NC) Based on the E-Sticker Start Date all safety-only inspection must meet the same inspection requirements as an OBDII inspection including but not limited to VID contact, number of off line tests, start test date and time, etc.]

1. Display Prompts:

“PERFORMING NETWORK ACCESS, PLEASE WAIT”

2. The analyzer shall make the telephone call and wait for a response from the VID. If after 45 seconds the analyzer doesn't receive a response from the VID analyzers shall hang-up and redial. [5/1/98 (MCI) This is a function of the EDTR software.]
 - (a) The communications software shall make a total of two (2) phone call attempts to connect to the VID. On all OBD units, if a dial tone is not detected upon the first phone call the following message shall be displayed:

“ATTENTION - NO DIAL TONE DETECTED. Check to be sure that the analyzer is plugged into the correct phone line.”

If network communications have not been achieved after the second phone call, the analyzer shall proceed with the emissions inspection without connecting to the VID.

[8/24/00 (NC): Is the inspection station charged for calls for which the VID was down or for which no connection was made? These should be free calls.]

- (b) At the end of a second unsuccessful attempt, the analyzer shall display the following prompt:

“CANNOT ACCESS NETWORK. PROCEED WITH THE INSPECTION.”

- (c) In such an event, the analyzer shall proceed with the inspection in the same manner as if a "No Match" message has been received following the second network access call. The analyzer shall write a “C” in the “VIN Match” field of NCAS.DAT, indicating no communication was established with the VID. The analyzer shall enable the inspector-mechanic to enter the vehicle information (Year, Make, Engine Size, etc.) into the analyzer.

3. Each analyzer unit will be allotted a certain number of Emission Tests that can be performed without VID contact over a period of time. Both the number of no contacts and the number of days over which they are allotted will be set through the VID and stored in the VIDCOMM.DAT file.

[7/25/02 (NC) Safety-only inspections do not count toward the offline limit. However, once an offline limit is reached, the lockout will apply toward safety inspections, as well as safety/exhaust, safety/OBD, all reinspections, and waivers. All other analyzer functions will be allowed.]

[11/03/06 (NC) Based on the E-Sticker Start Date safety-only inspection will count toward the offline limit and conform to conditions for lock out status.]

- (a) For most stations, the allowance will be 50 tests over 30 days, and this will be the default setting for station start-up.

- (b) Every test for which a record is generated will count toward the running total.

4. For all non-OBD analyzers, if after security login fails on first attempt, and the communications security validation is rejected, the analyzer shall display the following message:

“COMMUNICATIONS SECURITY VIOLATION - INVALID ANALYZER UNIT PHONE NUMBER. CHECK TO BE SURE THAT THE ANALYZER IS PLUGGED INTO THE CORRECT PHONE LINE. MAKE THE NECESSARY CORRECTIONS AND PRESS THE (*function key*) TO CONNECT TO THE VID”

- (a) The analyzer shall allow the inspector-mechanic to make the necessary corrections (i.e. plug the analyzer into the correct phone line) and attempt to connect to the VID by pressing a (*function key*). If the analyzer still fails the security login after the second attempt and the communications security validation is rejected, the analyzer shall not allow the emissions test inspection to proceed. The analyzer shall display the following message:

“COMMUNICATION SECURITY VIOLATION. INVALID ANALYZER UNIT PHONE NUMBER. CHECK TO BE SURE THAT THE ANALYZER IS PLUGGED INTO THE CORRECT PHONE LINE. THE INSPECTION CANNOT PROCEED, CONTACT TECHNICAL SUPPORT”

(b) The ANI security validation failure shall be "self-correcting", if the analyzer is plugged into the correct phone line.

5. If security login fails due to a "TOKEN" violation, the VID will send the following message to the analyzer and the analyzer shall display the following message:

“COMMUNICATION SECURITY VIOLATION INCORRECT IDENTIFICATION
PASSWORD. CONTACT TECHNICAL SUPPORT IF THIS PROBLEM PERSISTS.”

The inspector-mechanic will note the violation and continue the test.

B. Analyzer Initiated Actions

After connecting to the VID network, the analyzer shall transmit the following data:

- VIN/License plate number
- Stored emissions/safety test records, if any (NCAS.DAT)
- Calibration records, if applicable (CAL.DAT)
- Request current lockout status
- Stored sticker inventory records, if any (CERTINV.DAT)
- Missing, voided, stolen sticker data & waiver data, if any (STICKER.DAT)
- Stored enforcement audit records, if applicable (AUDIT.DAT)
- Number of electronic authorizations in inventory for each inspection class.

1. Programming Criteria:

- (a) If a vehicle match is found, the VID shall transmit to the analyzer applicable information for the vehicle under test, in addition to any other pending transactions. The analyzer shall write a “M” in the “VIN Match” field of NCAS.DAT, indicating a VIN match has been made.
- (b) Once a match has been made and the vehicle data has been transferred from the VID to the analyzer unit no changes or corrections are allowed to the VIN or license plate number. If changes or corrections have to be made, the inspector-mechanic must abort the inspection. The new test shall again require entry of correct VIN and license plate number.
- (c) If a "No Match" condition is returned by the VID on the first attempt (note: attempts are to be counted by the analyzer unit) for a North Carolina-licensed vehicle, then the analyzer shall prompt the inspector-mechanic with the following Display Prompts:

Display VIN and Plate

“NO VEHICLE MATCH HAS BEEN FOUND. VERIFY THAT THE VIN AND
LICENSE PLATE HAVE BEEN ENTERED CORRECTLY. MAKE ANY
NECESSARY CHANGES AND PRESS (*function key*) TO PROCEED.”

- (d) This message will not be displayed and the test will proceed if
- Two VID calls have already been made on VIN/license plate.
 - The initial call was based on data scanned from a DMV registration or renewal form.

[1/13/99 (NC) Ignore condition b) because the VIN bar code on the registration contains the same lead identifier (L) as the VIN bar code on most vehicles]

[1/13/99 (MCI) Handle response bit 51 – Invalid VIN same as no match (msgs)]

[1/13/99 (NC) Should the VID return an Invalid Station bit set (currently response bit 52) the analyzer shall abort the inspection, writing no data to disk and following display of the following message return to the Main Menu: “AN INVALID STATION NUMBER IS BEING USED BY THIS ANALYZER. THE INSPECTION CANNOT PROCEED AND WILL BE TERMINATED. PLEASE CHECK THE STATUS PAGE TO DETERMINE THE STATION NUMBER BEING USED. THE PROBLEM MAY BE ON YOUR ANALYZER OR AT DMV. CONTACT DMV ENFORCEMENT, YOUR MANUFACTURER OR MCIWORLD.COM TECHNICAL SUPPORT FOR ASSISTANCE.”]

[1/13/99 (NC) Should the VID return Test Is Locked Out bit set (currently response bit 53) the analyzer shall abort the inspection, writing no data to disk and following display of the following message return to the Main Menu: “THE STATE HAS DETERMINED THIS INSPECTION CANNOT PROCEED AND WILL BE TERMINATED. CONTACT YOUR LOCAL DMV ENFORCEMENT OFFICE FOR ASSISTANCE.”]

- (e) The analyzer shall allow the inspector-mechanic to make changes to the VIN and/or vehicle license plate number, and after such changes the analyzer shall prompt the inspector-mechanic to press a (*function key*) to initiate a second call to the VID. If no changes are made, the (*function key*) shall cause the test to proceed directly to manual entry.
- (f) If "No Match" is found after two total attempts, then the analyzer shall proceed with the emissions inspection in accordance with the "No Match" criteria. The analyzer shall write an “R” in the “VIN Match” field of NCAS.DAT, indicating no record match was made with the VID (after successful communication). The analyzer must be able to differentiate between the first and the second "No Match" message. The analyzer shall display the following message:

“NO MATCH OF THIS VEHICLE INFORMATION HAS BEEN FOUND.
PLEASE ADVISE THE CONSUMER TO RETAIN THE VEHICLE INSPECTION
REPORT AS PROOF OF INSPECTION FOR FUTURE REGISTRATION
PROCESSES.”

[1/13/99 (NC) Also display this message for no match condition in which no second call was made.]

C. VID Responses

1. 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) that are waiting for transmission to the analyzer. These messages are listed below. The automatic transaction and message updates will occur on every session initiated by the analyzer except during a communications system test transaction. The communications interface will provide the analyzer application with the appropriate status information to determine which transactions occurred following network session initiation. Not all messages are sent in each communications session, specifically LICENSE.DAT and DMVMAIL.TXT may not always be received and COUNTY.DAT, NETWORK.DAT, EXCPCTION.DAT and DLCREF.DAT are rarely sent.

[1/6/99 (MCI) Safe to assume test record received if any of bits 57-61,63 sets.]

- (a) Receive Vehicle Data
- (b) Receive TSB and Recall Information
- (c) Receive System Date/Time Update
- (d) Receive Lockout Status
- (e) Receive Inspector-Mechanic Data (TECH.DAT)

- (f) Receive Enforcement Inspector Data (ENFACC.DAT)
 - (g) Receive Lockout Data (LOCKOUT.DAT)
 - (h) Receive License Data (LICENSE.DAT)
 - (i) Receive DMV mail Messages (DMVMAIL.TXT)
 - (j) Receive OBD Exception Data (EXCPTION.DAT)
 - (k) Receive Fees Data (FEES.DAT)
 - (l) Receive County Data (COUNTY.DAT)
 - (m) Receive Updates to Readiness Codes (NETWORK.DAT)
 - (n) Receive DLC Updates (DLCREF.DAT)
 - (o) Receive VID Part Exemption Number
 - (p) Receive Days Allocated for Re-inspection (NETWORK.DAT)
 - (q) Receive Purchaser Data (EBUYER.DAT)
 - (r) Receive Authorization to Continue with Inspection [10/15/2007 Authorization to continue will be based on date of test, registration due date and any flags that be set (i.e. VIDDCOM.DAT, etc.)]
[8/24/00 (ERG): DMV registration info (including the county of registration) is not currently sent to the analyzer upon initial VID phone call (per MCI) This should be automatically sent].
 - (s) Receive E-Sticker Authorization Inventory for each Inspection Class (EAUTHINV.DAT)
2. The following vehicle data in the proper test record format, if available, shall be transmitted by the VID to the analyzer and used as defaults.
- (a) Vehicle Model Year
 - (b) Vehicle Body Style (1 – 11)
 - (c) Vehicle Type Code (A,B,M,T)
 - (d) Vehicle Make
 - (e) Number of cylinders
 - (f) Engine size (cc)
 - (g) Fuel type code
 - (h) County of Registration
 - (i) Current Odometer
 - (j) Next Inspection Due Date – Year
 - (k) Next Inspection Due Date – Month
[10-18-2007 – Next inspection due date will be calculated by the VID.]
[8/24/00 (ERG): DMV registration info (including the county of registration) is not currently sent to the analyzer upon initial VID phone call (per MCI) This should be automatically sent].
 - (l) Previous individual section results and overall inspection result (if within past 61 days)
 - Record Inspection Disposition
 - Inspection Class
 - Safety Inspection Disposition
 - Headlights
 - Parking Lights
 - Tail Lights
 - Clearance Lights
 - Foot Brake or Vehicle/Trailer/Motorcycle Brake
 - Steering Mechanism
 - Horn
 - Rear View Mirrors

- Beam Indicator/Light Switch
- License Plate Light
- Stop Light
- Directional Signals
- Emergency Brake
- Windshield Wiper
- Tires
- Exhaust System
- Window Tinting
- Reflectors
- Tampering Inspection Disposition
- Catalytic Converter
- Air Injection System
- PCV Valve
- Unleaded Gas Restrictor
- EGR Valve
- Thermostatic Air Control (TAC)
- Fuel Evaporation Control
- O2 Sensor
- Gasoline Tank Cap
- Exhaust Emission or OBDII Inspection Disposition

(m)VID sys_id

(n) Current registration due date

3. If the current test type has been selected as “1” (Initial) and the status bits returned by the VID indicate that a previous failed inspection (not passing) is on file for this vehicle and for the same station where the test is currently being performed the inspector-mechanic shall be advised and prompted to adjust the test type to (Reinspection/ Reinspection Using Waivers):

(a) Display Prompts:

“A previous initial inspection is on file for this vehicle, this inspection may be a Reinspection.”

If no repairs have been performed or no repair form is available you may want to abort this inspection and inquire about repairs.

“Do you want to change the inspection to a Reinspection? Y/N”

(b) Programming Criteria:

If an initial test has been changed to a reinspection test, because the status returned indicated a previous test failure, the inspection shall follow the normal reinspection test procedures.

4. If the current test type has been selected as reinspection and the status bits returned by the VID indicate that:

- No previous failed inspection (not passing) is on file for this vehicle at this inspection station, the inspector-mechanic shall be advised and prompted to adjust the test type to “Initial”.
- The last inspection was more than 60* days ago and this inspection is a paid inspection.
[*10/19/07 (NC) 60 days in, lieu of 30 days. Currently this will become effective 1/01/09 but is subject to change. This number (days) will be sent by VID from NETWORK.DAT (Days Allocated for Re-inspection).]
- The last inspection was not performed at this station and this inspection is a paid inspection.

Then the analyzer shall display the following prompts:

a) Display Prompts:

“No previous inspection is on file for this vehicle, this inspection may be an Initial inspection.

Do you want to change the inspection to an Initial Inspection? Y/N”

[2/15/99 (NC) See spreadsheet. Also, the value of the “test is paid/free” bits are for informational purposes only. The final determination as to whether a test is paid or free is the responsibility of the inspector-mechanic.

b) Programming Criteria:

If a reinspection test has been changed to an initial test, because the status returned indicated a no previous test failure, the inspection shall follow the normal initial test procedures.

5. Refer to Appendix I for a matrix listing various test scenarios with appropriate analyzer responses.
6. During VID contact, the VID will perform a comparison of the e-sticker authorizations inventory sent by the analyzer against those stored on the VID. If there is a mismatch in the count, an e-sticker sequence lockout will be set and transmitted to the analyzer. Upon receiving this type of lockout the following message will be displayed.

“VID/ANALYZER E-STICKER AUTHORIZATION COUNT MIS-MATCH HAS OCCURRED. LOCKOUT WILL OCCUR AT COMPLETION OF THIS TEST. CONTACT YOUR LOCAL DMV. PRESS ENTER TO CONTINUE.”

Upon proper entry to continue, the analyzer will continue with the inspection and lockout will be set before next inspection can begin.

3.7.1 Test Start Date and Time

The inspection start date and time, along with the time the inspection ended, is to be included on the test record. For safety-emission (or safety-OBDDII) inspections the start date/time is when: 1) the connection to the VID was established and the date/time message is received from the VID; or 2) at the point the analyzer determines the communication attempt to the VID failed. For safety-only inspections the start date/time is determined when the inspector ID is accepted and the inspection begins. Inspection end time is the point the pass/fail determination is made and the data record is written to the disk.

3.7.2 Current/Previous Odometer

The Current Odometer field from the previous inspection will be received from the VID (or the NCAS local records) and will be used to populate the Previous Odometer field in NCAS.DAT and the Previous Odometer field on the VIRS for the current inspection. If no connection is made to the VID, or if no Previous Odometer value is sent from the VID (or found on the NCAS local records), the Previous Odometer field in NCAS.DAT and the Previous Odometer field on the VIRS will be left blank for the current inspection. The inspector mechanic will be prompted for entry of current odometer (default blank) as described in Section 3.9.2.3.

3.7.3 Receive Recall Information

1. Emissions related Technical Service Bulletins (TSB) or recall information, if available from the VID, shall be transmitted to the analyzer for use during the emission inspection.
2. The initial information that will appear on the analyzer screen will be the pertinent vehicle information as provided by the VID. The inspector-mechanic shall be prompted to review this information to ensure its accuracy. If manufacturer issued emission-related TSB or recall information is transmitted by the VID, the analyzer shall display the emission-related information in the format below prior to continuing with the inspection.
3. The analyzer shall provide the option to print the complete text of the TSB and emissions recall information at time of display.
4. For vehicles that fail the emission inspection, a summary of the TSB and recall information consisting of the first line (beginning with "*&", no quotes) of the message, shall be printed on the VIRS, or at the bottom of the Emissions Failure Information page or on subsequent pages.

[5/1/98 (NC) Print for all emissions and tamper failures, not for safety failures. Format to be added to spec]

[1/27/99 (NC) EDTR spec - up to 20 TSBs and 3 recall msgs in each file. Print first line of each and carry-over to second page if necessary.]

5. Examples:

***** EMISSION-RELATED TSB INFORMATION *****

TSB #: 81-4 Make: AMC

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 Concorde with four-cylinder engine and M/T.

Defects: EGR valve changed to improve performance.

Fix: Install appropriate EGR valve and forward delay valve.

***** EMISSIONS RECALL *****

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

3.8 Failing contact with the VID or a “No Match” status from the VID

1. The analyzer shall search the C:\NCASDATA\NCAS.DAT and C:\NCASDATA\NCAS.HST file for the VIN.
[2/24/99 (MCI) If record found, do not transfer VID sys ID field.]
2. If a previous vehicle inspection is found then all appropriate vehicle data shall be taken for use by the inspection process as though it had been received from the VID.
3. Display Prompt:
 - a) “No match of vehicle data was found.”
 - b) “Is this vehicle being tested for a Motor Vehicle Dealer? Y/N”
 - c) If the response is “Y”, then prompt:
“Enter Dealer Identification Number:”
If the response is “N”, then prompt:
“Please enter the following Vehicle Owner Information:
 - 1) First Name
 - 2) Last Name
 - 3) Street Address
 - 4) City
 - 5) State [Note: not in test record. 2/10/99 (NC) Okay not to ask since this info is not printed.]
 - 6) Zip code”
- d) Programming Criteria:
 - 1) Analyzer will loop until either a valid dealer identification number or vehicle owner information is inputted.
 - 2) These answers are mandatory for either dealer ID number or owner information fields and some data must be present in each field as required.

[5/1/98 – Vehicle owner information is not printed on VIRS.]

[02/18/99 (MCI) Vehicle owner information not required to be transferred to new test record. (DMV) Would be convenient for user if entries are preselected with information found (if any) if reentry is required.]

3.9 Safety and Emissions Inspection Sequences

For vehicles subject to an exhaust (idle) emissions test, the Safety and Emissions Inspections Sequences shall be accomplished in the order indicated: 1) Safety; 2) Tampering; and 3) Emissions. For vehicles subject to an OBDII inspection, the OBDII inspection will precede the safety and tampering inspection sequences. This will prevent vehicles not testable due to too many unset readiness monitors from receiving unnecessary safety and tampering inspections. However, the following information will be collected for vehicles subject to either an idle exhaust emissions test or an OBDII inspection prior to initiation of either test.

3.9.1 Vehicle Location

3.9.1.1 Display Prompt

The following prompt will be displayed to assist the inspector-mechanic in the data entry:

“Please enter the following vehicle information.

1. County (as on Registration Card, if shown): _____
2. County Codes: (Select Counties indicated in the COUNTY.DAT file that are emissions counties and list as shown as 1-9 in the example below. Note: List of applicable counties, listed alphabetically, to be updated according to Section 2.3, Test Applicability.)
 1. Cabarrus County
 2. Durham County
 3. Forsyth County
 4. Gaston County
 5. Guilford County
 6. Mecklenburg County
 7. Orange County
 8. Union County
 9. Wake County
 10. None of the Above (List remaining 91 North Carolina Counties)
 11. Out-of-State Vehicle”

3.9.1.2 Error Messages

The analyzer will display the following error messages as indicated by the programming criteria:

1. Error message one (1). This field requires an entry; and,
2. Error message two (2). You must use one of the county codes listed at the bottom of the screen.

3.9.1.3 Programming Criteria

This paragraph describes the display prompts, error messages and programming criteria for entry of the vehicle information. When the entries are complete, the inspector-mechanic will be given the opportunity to confirm or change the entries.

1. The analyzer shall display error message one (1) at the bottom of the screen if the inspector-mechanic does not have an entry for each item.
2. The analyzer shall display error message two (2) at the bottom of the screen if the inspector-mechanic does not enter one (1) of the listed county codes.
3. If "None of the Above" or "Out-of-State Vehicle" is selected, the screen shall display a warning:

"You have selected an emissions inspection for a vehicle that may not require one. Do you wish to continue with an emissions inspection?"

The inspector-mechanic may then decide to continue with an emissions inspection, change to a safety-only inspection, or abort.

4. The COUNTY.DAT file shall be used as the source of county names, county codes and inspection types, based on criteria presented in Section 2.3, Test Applicability. The initial list displayed shall be all county names that require emissions inspections. If an emissions or OBDII inspection is selected for a county not requiring an emissions inspection, the screen shall display a warning:

"You have selected an emissions inspection for a vehicle that may not require one. Do you wish to continue with an emissions inspection?"

The inspector-mechanic may then decide to continue with an emissions inspection, change to a safety-only inspection, or abort.

If a safety-only inspection is selected for a county requiring an emissions inspection, the screen shall display a warning:

"You have selected a safety-only inspection for a vehicle that may require an emissions inspection. Do you wish to continue with a safety-only inspection?"

The inspector-mechanic may then decide to continue with a safety-only inspection, change to an emissions inspection, or abort.

[5/1/98 (NC) Entry does not have to be cross-referenced with registration indicator entry.]

This paragraph describes the display prompts, error messages and programming criteria for entry of the vehicle information. When the entries are complete, the inspector-mechanic will be given the opportunity to confirm or change entries.

3.9.2 Vehicle Information

3.9.2.1 Vehicle Type

Display prompt one (1):

“Please enter the vehicle body style: _____

1. SEDAN
2. STATION WAGON
3. PICKUP
4. SPORT/UTILITY VEHICLE
5. MINIVAN
6. FULL-SIZE VAN
7. MOTORHOME
8. BUS
9. HEAVY DUTY TRUCK
10. TRAILER
11. MOTORCYCLE

3.9.2.1.1 Programming Criteria

If vehicle body style is Trailer, then vehicle type = “T”

If vehicle body style is Motorcycle then vehicle type = “M”.

3.9.2.2 GVWR

If the vehicle body style selected from above is a Sedan, Station Wagon, Pickup, Sport/Utility Vehicle, Minivan, Full Sized Van, Motor home, Bus or Heavy Duty Truck then determine if the GVWR is greater than 8500 pounds:

1. Display prompt two (2): “Is the gross vehicle weight rating (GVWR) of this vehicle in excess of 8500 pounds? Y/N”
If the answer is No, then the vehicle type = “A”; if the answer is Yes, display the following prompt:
2. Display prompt three (3): “Please enter the gross vehicle weight rating (GVWR) of this vehicle: _____”

The NCAS shall require entry of the gvwr, no decimal places, before the inspection is allowed to proceed. If the entered gvwr is greater than 8500 pounds, then the vehicle type = “B”. The entered gvwr will be written to the gvwr field of NCAS.DAT.

3.9.2.3 Vehicle Fuel

Display prompt four (4):

“Please enter the fuel type: _____

1. G GASOLINE
2. B BI-FUEL (alternative fuel and gasoline are not mixed in tank)
3. P LIQUID PROPANE GAS (LPG) ONLY
4. N LIQUID/COMPRESSED NATURAL GAS (LNG/CNG) ONLY
5. D DIESEL FUEL

6. E ELECTRIC POWER ONLY”
7. H HYBRID (gasoline-capable; i.e. gasoline/electric, gasoline/hydrogen, etc.)
8. I HYBRID (non-gasoline)
9. O Other (any fuel type not already listed)
10. F Fuel Cell Vehicles

3.9.2.3.1 Programming Criteria

For BAR-97/OBDII analyzers and OBDII-only analyzers performing OBDII inspections:

All 1996 and newer light-duty gasoline powered vehicles and bi-fueled vehicles capable of exclusive gasoline operations, or gasoline/electric hybrid vehicles will be subject to an OBDII inspection (as described in Section 2.3, Test Applicability).

In addition, heavy-duty gasoline powered vehicles, bi-fueled vehicles capable of exclusive gasoline operations, or gasoline/electric hybrid vehicles will also be subject to an OBDII inspection. The beginning model year of heavy-duty vehicles subject to OBDII testing is listed in the “HD OBDII Model Year” field in Network.dat.

For both light-duty and heavy-duty vehicles, if the fuel type is “D” (operated on diesel fuel), display error message 2 (below) to check on converting the inspection to safety-only unless diesel vehicles are subject to an OBDII inspection. The beginning model year of diesel vehicles subject to OBDII testing is listed in the “LD DIESEL OBDII Model Year” and/or “HD DIESEL OBDII Model Year” field in Network.dat.

For BAR-90 and BAR-97/OBDII analyzers performing an idle emissions inspection:

If the fuel type selected is “B”, then determine if vehicle is running on gasoline:

Display prompt five (5):

“This vehicle must be operated on gasoline for the emission inspection. Do you want to continue with this inspection? Y/N.” (N=abort)

If the fuel type is not “G”, “B” or “H” (operated on gasoline) display error message 2 (from section Vehicle Information Overall Error Messages below) to check on converting the inspection to safety-only.

3.9.2.4 Vehicle Model Year, Mileage, Engine Information, Exhaust

Display prompt six (6):

“Enter the vehicle model year (4 digits): XXXX”

Vehicle Odometer Reading: _____ (do not enter the tenths digit)

Number of Cylinders: _____ (enter "R" for rotary engines)

Engine Displacement _____
Measured in _____ (L) Liters
(C) Cubic Centimeters
(I) Cubic Inches

[02/2009 (NC) Engine displacement range value should reflect all possible sizes for class of vehicle. i.e. for light duty gasoline range 0.1L(min.) -20.0L (max.) Number of cylinders and engine displacement for electric vehicles must accept zero (0) value.]

Does the vehicle have dual exhaust? _____ Y/N

3.9.2.5 Vehicle Make

Display prompt seven (7):

“Enter the Motor Vehicle make as shown on the vehicle Registration Card: Select the appropriate make from the list as follows:”

Domestic Light Duty Motor Vehicles:

Make Code	Vehicle Make
AMER	AMERICAN MTRS
AVAN	AVANTI
BRIC	BRICKLIN
BUIC	BUICK
CADI	CADILLAC
CHEC	CHECKER
CHEV	CHEVROLET
CHRY	CHRYSLER
CONS	CONSULIER
DESO	DESOTO
DODG	DODGE
EDSE	EDSEL
EGIL	EAGLE
FORD	FORD
FRAS	FRASIER
GMC	GMC
HENR	HENRY J
HUD	HUDSON
HUMM	HUMMER
INTT	INTERNATIONAL TRAVELALL
JEEP	JEEP
KAIS	KAISER
LASA	LASALLE
LINC	LINCOLN
MERC	MERCURY

NASH	NASH
OLDS	OLDSMOBILE
PACK	PACKARD
PLYM	PLYMOUTH
PONT	PONTIAC
RAMB	RAMBLER
SHEL	SHELBY
SOLE	SOLECTRIA
STRN	SATURN
STUD	STUDEBAKER
WILL	WILLYS

Foreign Light Duty Vehicles

Make Code	Vehicle Make
ACUR	ACURA
ALFA	ALFA ROMEO
ASTO	ASTON MARTIN
AUDI	AUDI
AUST	AUSTIN
BENT	BENTLEY
BERT	BERTONE
BMW	BMW
BUGA	BUGATTI
CAP	CAPRI
CITR	CITROEN
DAEW	DAEWOO
DAIH	DAIHATSU
DATS	DATSUN
DELO	DELOREAN
FERR	FERRARI
FIAT	FIAT
GEO	GEO
HILL	HILLMAN MINX
HOND	HONDA
HYUN	HYUNDAI
INFI	INFINITI
ISU	ISUZU
JAGU	JAGUAR
JENS	JENSEN
KIA	KIA
LADA	LADA
LAMB	LAMBORGHINI
LNDR	LAND ROVER
LEXS	LEXUS

LNCI	LANCIA
LOTU	LOTUS
MASE	MASERATI
MAZD	MAZDA
MERK	MERKUR
MERZ	MERCEDES BENZ
MG	MG
MINI	MINI COOPER
MITS	MITSUBISHI
MORG	MORGAN
NISS	NISSAN
OPEL	OPEL
PANT	PANTERA
PEUG	PEUGEOT
PORS	PORSCHE
RANG	RANGE ROVER
RENA	RENAULT
ROLL	ROLLS ROYCE
ROVE	ROVER
SAA	SAAB
SCI	SCION
STLG	STERLING
SUBA	SUBARU
SUNB	SUNBEAM
SUZI	SUZUKI
TOYT	TOYOTA
TRIU	TRIUMPH
TVR	TVR
VAUX	VAUXHALL
VOLK	VOLKSWAGEN
VOLV	VOLVO
YUGO	YUGO

Heavy Duty Motor Vehicles:

Make Code	Vehicle Make
CHEV	CHEVROLET
DAF	DAF
DAIM	DAIMLER
DIAT	DIAMOND T
DODG	DODGE
DREO	DIAMOND REO
FORD	FORD
FRHT	FREIGHTLINER

FWD	FWD
GMC	GMC
INTL	INTERNATIONAL
IVEC	IVECO
JEEP	JEEP
KW	KENWORTH
MACK	MACK
MAN	MAN TRUCK
MITS	MINIBUS
OSHK	OSHKOSH
PTRB	PETERBILT
VOLV	VOLVO
WHIT	WHITE

“NOTE: IF VEHICLE DOES NOT APPEAR WITHIN MAKE TABLES, MAKE CODE IS CONSIDERED 1ST 4 POSITIONS OF MAKE NAME.”

Display prompt eight (8):

“If the vehicle make being inspected is not displayed, type in the first four (4) positions of the make name as shown on the vehicle registration card:

”

[11/13/98 (NC) Vehicle make field in test record is 5 bytes. Record left justified, space fill.]

[2/24/99 (NC) For motorcycles/trailers, don't display vehicle make list. Proceed to display prompt eight(8). Note: same as previous version software.]

[2/18/09 (NC) Clarifying up to the first four characters of vehicle make can be accepted when the vehicle make is not listed.]

3.9.2.6 Vehicle Information Overall Error Messages

The following error messages will be displayed as indicated in the programming criteria:

1. Error message one (1). This vehicle will be inspected as a heavy duty motor vehicle, because the GVWR is greater than eight thousand five hundred (8500) pounds;
2. Error message two (2). North Carolina tests only vehicles that are capable of being powered by gasoline for emissions. Do you want to proceed with a Safety Inspection Only?
3. Error message three (3). The State does not require emission tests for motorcycles. Do you want to proceed with a Safety Inspection Only?
4. Error message four (4). The State does not require emission tests for trailers. Do you want to proceed with a Safety Inspection Only?
5. Error message five (5). The odometer reading must be the mileage reading in numbers. If the mileage is not known enter zeroes;
6. Error message six (6). The odometer reading seems high for this vehicle. Please check and confirm the reading;
7. Error message seven (7). The odometer reading seems low for this vehicle. Please check and confirm the reading; and

8. Error message eight (8). “This vehicle cannot be given an emissions inspection with this analyzer. The current test will be aborted.
Press enter to continue.”
9. Error message nine (9). “An OBDII inspection is required for this vehicle. This vehicle cannot be given an OBDII inspection with this analyzer. The current test will be aborted.
Press enter to continue.”
10. Error message ten (10). “Inspection is not allowed at this time. An inspection cannot occur more than two (2) months prior to the registration expiration date (month). The current test will be aborted. Press enter to continue.”
[5/02/08 (NC) As indicated by the VID]
11. Error message eleven (11). “Vehicle does not need to be inspected due to the age of the vehicle. The current test will be aborted.”
Press enter to continue.”

3.9.2.7 Vehicle Information Overall Programming Criteria

1. Display prompt one (1) will be displayed for all vehicles. Display prompts two (2) and three (3) will be per the programming criteria above. Display prompts four (4), six (6), and seven (7) shall then be displayed to the screen sequentially for data entry. For vehicles requiring an idle exhaust emission inspection and using a dual fuel system, display prompt five (5) will also be used. Display prompt five (5) is not applicable to vehicles subject to an OBDII inspection. If the vehicle type is "T", the analyzer will omit display prompts two (2), three (3), four (4) and five (5) and display prompt six (6) will omit the odometer reading, previous odometer reading, number of cylinders, engine size, and dual exhaust queries.
2. If the vehicle type is "M" or "T" and a Safety and Emissions Inspection was selected, the analyzer shall display error message three (3) or four (4), respectively. If the inspector-mechanic confirms that the vehicle type is correct, the inspection selected shall be converted to a Safety Inspection Only.
3. Based on the model year entered in display prompt six (6), GVWR entered in display prompts two (2) and three (3), and criteria listed in Section 2.3, Test Applicability, the analyzer shall confirm the proper test-type selection and shall, when necessary, prompt for a test-type conversion to a safety-only, as appropriate. The term “safety-only” is a general term meaning a safety-only or a safety-tampering inspection that is based on the criteria in Section 2.3. The inspector-mechanic shall have the option of continuing with the safety-emissions, converting to a “safety” type test, or aborting the test. No test record will be written for an aborted test.
4. For BAR-90 and BAR-97/OBDII analyzers: For those vehicles subject to a heavy-duty exhaust emissions test per Section 2.3, Test Applicability (confirmed by entry for display prompts two and three), the analyzer shall display error message one (1).
5. For OBDII-only analyzers: for those vehicles subject to a heavy-duty exhaust emissions test per Section 2.3, Test Applicability (confirmed by entry for

- display prompts two and three), the analyzer shall display error message eight (8). After the inspector-mechanic presses enter, the test will be aborted and no record will be written.
6. For vehicles subject to an idle exhaust emissions test, if the fuel type is not “G” or “B” (operated on gasoline), error message two (2) will be displayed in order to determine if a safety-only test should be performed. If the answer is Yes, then the inspection type shall be converted to a Safety Inspection. Error message two (2) is not applicable to vehicles subject to an OBDII inspection.
 7. The vehicle model year must be four (4) numerals and the year cannot be more than the present year plus one (1). If the year entered is older than the test cutoff year listed in Table 2.3.1, the analyzer shall display error message eleven (11) stating that this vehicle does not require an inspection due to its age. The inspection shall be aborted and no record will be written.
 8. The current odometer reading must be a numeric entry. The odometer reading shall be recorded to the test record as the numeric entry. If no odometer reading is available, enter "0" (zero). Error message five (5) will be displayed if an invalid entry is attempted. Error message six (6) shall be displayed if the mileage is higher than ninety-nine thousand (99,000) for a vehicle five (5) years old or less. Error message seven (7) shall be displayed if the mileage is less than one hundred thousand (100,000) for a vehicle fifteen (15) years old or older.
 9. Display prompt seven (7) will assist the inspector-mechanic in entering the vehicle make names. This shall utilize a method, approved by the state, which maximizes user friendliness preferably via direct cursor selection or the first few letters of the name. For example, the inspector-mechanic 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 were the correct make, the Enter key would be pressed. If it is not the correct make, the inspector-mechanic would at least be close and only have to move the cursor a short distance to the correct one.
 10. For OBDII-only analyzers, if an emissions inspection is selected for a pre-1996 gasoline fueled vehicle (as described in Section 2.3, Test Applicability), the analyzer shall display error message eight (8). After the inspector-mechanic presses enter, the test will be aborted and no record will be written.
 11. For BAR-90 analyzers, if an emissions inspection is selected for a 1996 or newer gasoline fueled vehicle (as described in Section 2.3, Test Applicability), the analyzer shall display error message nine (9). After the inspector-mechanic presses enter, the test will be aborted and no record will be written.
 12. The NCAS shall automatically determine test type (OBDII or emission inspection) based on information presented in Section 2.3, Test Applicability.
 13. (Effective Based on E-Sticker Start Date) Upon VID contact if the test date is more than two months prior to the current registration date (month/year), the analyzer shall display error message ten (10) as indicated by the VID. Upon proper entry to continue, the test will be aborted and no record will be written.
[03/12/2008 (NC) This subnote is removed since the “overridedate field was agreed upon of not being needed by DMV.]
 14. After all vehicle information has been entered, if the vehicle being inspected is a 1983 or newer model year and the Vehicle Type is "A", "B" "M" or "T" and the VIN

contains an "I", "O" or "Q", the following message shall be displayed and the inspection shall be aborted:

“The letters "I", "O" and "Q" are not valid entries for the VINs of 1983 through YYYY* model year vehicles (including motorcycles and trailers). The test will be aborted. Please contact DMV for assistance. Press “enter” to continue”.

* Present Year + 1.

An entry of “Enter” will abort the inspection and return to the Main Menu.
[09/20/08 (NC) To ensure VIN entries meet industry standards the check for “I”, “O”, “Q” have been added.]

3.10 OBDII Inspection Sequences

This section describes the display prompts, error messages and programming criteria to be used for performing an OBDII inspection. Vehicles subject to an OBDII inspection are listed in Section 2.3, Test Applicability. The manufacturers shall develop the displays necessary to guide the inspector-mechanic through the required steps of the North Carolina Emissions Inspection. All values recorded during the OBDII inspection shall be written to the appropriate fields in NCAS.DAT. Specific test sequences and programming criteria are outlined in the following sections. Appendix I contains a matrix listing various test scenarios with appropriate analyzer responses. This matrix may be used to help evaluate software integrity during analyzer software certification and testing.

3.10.1 Applicability

The analyzer will prompt the inspector to perform the OBDII check on all gasoline and diesel light-duty and heavy-duty vehicles whose model years are equal to or newer than the vehicle model years contained in the “LD OBDII Model Year”, “HD OBDII Model Year”, LD Diesel OBDII Model Year”, or “HD Diesel OBDII Model Year” fields in NETWORK.DAT.

The OBDII section of the test will be bypassed if OBDII Enabled field in NETWORK.DAT is “F”. Display prompt: "OBDII TESTING HAS NOT BEEN IMPLEMENTED IN NORTH CAROLINA."

Alternative test information for vehicles with unusual OBDII test characteristics will be included in the OBD Exception Table (EXCPTION.DAT). This table will only include those vehicles with unusual OBDII test characteristics, such as vehicles with certain monitors always set to “not ready”, vehicles that always test with a large total number of overall monitors “not ready”, or vehicles that require special advisory screens during testing (such as the screen presented for vehicles whose MIL turns off during the KOEO test). During an OBD inspection, the NCAS shall attempt to make a match between the vehicle being inspected and the proper record in EXCPTION.DAT using a vehicle make and model year search. If a match is made, and no vehicle model is listed for matched record, test criteria from EXCPTION.DAT shall be automatically applied by the NCAS for the current inspection. If one or more matched records are found with associated models, the NCAS shall display the complete list of models from EXCPTION.DAT and query the inspector-

mechanic whether or not the vehicle model is any of those displayed. If the inspector-mechanic answers “Yes”, test criteria from EXCPTION.DAT shall be automatically applied by the NCAS for the current inspection. If the inspector-mechanic answers “No”, no match has been made and the analyzer shall apply the program-wide NETWORK.DAT readiness criteria to the current inspection. Similarly, if no vehicle make and model year match is found in EXCPTION.DAT, the analyzer shall apply the program-wide NETWORK.DAT readiness criteria to the current inspection. If a match is made and the “Brief KOEO MIL” field is blank, the analyzer shall display the text message listed in the “Advisory Screen” field of EXCPTION.DAT prior to the start of the OBDII test.

When a vehicle has been identified as one requiring a unique test procedure, the NCAS shall provide an information screen at the appropriate point advising the inspector/mechanic how to proceed with the inspection. This information screen shall display text listed in the “Advisory Screen” field in EXCPTION.DAT for that particular vehicle, as indicated in the programming criteria for that portion of the inspection.

3.10.2 OBDII (Key On, Engine Off) Prompts:

“PERFORM THE “KEY ON, ENGINE OFF” (KOEO) CHECK TO DETERMINE IF THE INSTRUMENT PANEL MALFUNCTION INDICATOR LIGHT (MIL) TURNS ON WHEN THE IGNITION KEY IS TURNED TO THE “KEY ON, ENGINE OFF” POSITION.

DOES THE MIL TURN ON WHEN THE KEY IS PLACED IN THE “KEY ON, ENGINE OFF” POSITION?

“Y” - YES, THE MIL TURNS ON.

“N” - NO, THE MIL DOES NOT TURN ON.

WHEN THE MALFUNCTION INDICATOR LIGHT (MIL) TURNS ON, IT WILL EITHER DISPLAY “SERVICE ENGINE SOON,” “CHECK ENGINE,” THE WORD “CHECK” ALONG WITH THE INTERNATIONAL ENGINE SYMBOL, OR SOME COMBINATION OF THESE DEPENDING ON THE VEHICLE MAKE.”

3.10.2.1 Programming Criteria:

The analyzer will ask the inspector to perform a key-on/engine-off check to see if the Malfunction Indicator Light/Check Engine Light (MIL) turns on while the engine is not running. The analyzer shall prompt the inspector to enter a No if the MIL does not turn on while the engine is not running. The analyzer software shall be designed so that the inspector for this field can only enter a “Y” or “N”. If the inspector does not enter a value, display error message 1. If the inspector enters a value other than a “Y” or “N”, display error message 2. When the entry is complete the inspection results will be displayed to the screen, and the inspector-mechanic will be given the opportunity to confirm or change the entry. When the entry is confirmed, the results will be entered into the OBDII MIL Bulb Check field in NCAS.DAT.

Vehicles identified as ones for which the MIL illuminates very briefly when the key is turned to the KOEO position and then goes out will be included in EXCPTION.DAT. These EXCPTION.DAT records will have a value of “Y” in the “Brief KOEO MIL” field. For these vehicles, the NCAS shall, prior to the start of the KOEO test, display the text message listed in the “Advisory Screen” field of EXCPTION.DAT. This text will be displayed directly below the MIL prompt text. If no vehicle match is found in EXCPTION.DAT, or if the “Brief KOEO MIL” field is blank for a vehicle match found in EXCPTION.DAT, no “Advisory Screen” text will be shown during the KOEO check.

The help message for this screen shall contain the following text: “The Malfunction Indicator Light (MIL) is the official term for the warning light that is illuminated by the vehicle’s OBDII system when a malfunction occurs. Depending on the vehicle make, the MIL will either display “Service Engine Soon,” “Check Engine,” the word “Check” along with the international engine symbol, or some combination of these. The MIL must come on when the ignition key is turned to the “key on, engine off” position. This is to allow inspectors to check that the MIL is capable of illuminating if a malfunction were to occur. On most vehicles, the MIL will stay illuminated as long as the key is in the **on** position. However, on some vehicles, the MIL will illuminate very briefly when the key is turned to the “key on, engine off” position and then go out.”

3.10.2.2 Error Message:

1. NO VALUES HAVE BEEN ENTERED--TRY AGAIN.
2. INVALID ENTRY. PLEASE SELECT “Y” or “N”

3.10.3 OBDII Engine Off Prompt:

RETURN TO KEY OFF POSITION

PRESS ENTER TO CONTINUE

3.10.3.1 Programming Criteria: OBDII Engine Stop Prompt:

The analyzer will prompt the inspector to turn the key to the off position. The analyzer will instruct the inspector to press the ‘enter’ key to continue. The vehicle must be shut down for at least 12-seconds before returning to the key-on/engine-running position. This 12-second delay must be part of the NCAS OBDII test. During this period the inspector will be prompted to **connect the NCAS OBDII cable to the vehicle’s data link connector.**

3.10.4 OBDII Hookup:

The analyzer must be equipped with a standard SAE J1978 OBDII connector and communications link to allow an RPM signal, OBDII readiness codes, Malfunction Indicator Light (MIL) command status, fault codes (if any), RPM during OBDII scan, PCM-VIN number (when available), PID Count and PCM Module ID to be downloaded from the on-board computer for applicable vehicles. The SAE J1978 OBDII connector must be such to allow the inspector the ability to connect to a vehicle freely (either remotely with a 25 foot range or with a cord of sufficient length to allow analyzer access to a vehicle 25 feet away).

The equipment design and operation must meet all Federal requirements (contained in 40 CFR 85.2207-2231) and all recommended SAE practices (such as, but not limited to, J1962, J1978, and J1979) for OBDII system inspections. Although not currently feasible, it is expected future NCAS upgrades will include equipment design and operation modifications to allow communication using Controller Area Network (CAN) protocol as defined in SAE J2284.

The OBDII interrogation process shall be fully integrated into the NCAS analyzer system. It must be automated and require no inspector intervention to collect and record the OBDII data retrieved via the OBDII diagnostic link.

3.10.5 OBDII Connector Prompt:

LOCATE THE VEHICLE'S OBDII DIAGNOSTIC LINK CONNECTOR. ATTACH THE NCAS OBDII PORT TO THE VEHICLE CONNECTOR AND PRESS CONTINUE.

ENTER "H" FOR INFORMATION REGARDING THE DIAGNOSTIC LINK CONNECTOR LOCATION

ENTER "A" IF THE OBDII DIAGNOSTIC LINK CONNECTOR CANNOT BE LOCATED. THE TEST WILL BE ABORTED.

IF THE OBDII CONNECTOR IS DAMAGED, TAMPERED OR INOPERABLE, PRESS "C".

3.10.5.1 Programming Criteria:

The analyzer will prompt the inspector for an OBDII diagnostic link connection for all light-duty and heavy-duty gasoline and/or diesel vehicles registered in an active emission county (as specified in COUNTY.DAT) and whose model years are equal to or newer than the vehicle model years contained in the "LD OBDII Model Year", "HD OBDII Model Year", "LD Diesel OBDII Model Year" and "HD Diesel OBDII Model Year" fields in NETWORK.DAT. Counties will be brought into the program according to the Test Required and the Test Start Date fields in COUNTY.DAT (program implementation is also listed in Section 2.3, Test Applicability).

The analyzer will be designed to provide assistance to the inspector with references for OBDII connector locations using the DLCREF.DAT file. When "H" is pressed during this portion of the test (after the OBDII connector prompt is displayed), the text message from DLCREF.DAT will be displayed on the analyzer screen. After the DLCREF text message is displayed, the analyzer shall allow the inspector to press "enter" to return to the previous test screen.

If the inspector has pressed "A", the analyzer shall abort the inspection. The analyzer shall display the following prompt:

"THIS TEST HAS BEEN ABORTED BECAUSE THE OBDII DIAGNOSTIC LINK CONNECTOR CANNOT BE LOCATED. ADVISE THE MOTORIST TO DETERMINE THE LOCATION OF THE DIAGNOSTIC LINK CONNECTOR FROM THEIR MECHANIC OR VEHICLE DEALERSHIP AND RESUBMIT THEIR VEHICLE FOR INSPECTION.

PRESS ENTER TO CONTINUE.”

After the inspector has pressed “enter”, the analyzer will return to the Main Menu. No inspection record shall be written to the disk.

If the inspector enters “C” indicating a damaged, tampered or inoperable connector:

- (a) A ‘C’ will be written to the OBDII Inspection Disposition field in NCAS.DAT,
- (b) A ‘F’ will be written to the Record Inspection Disposition field in NCAS.DAT,
- (c) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the “F” Record Inspection Disposition field in NCAS.DAT;
- (d) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A rejection (fail) VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST RESULT sections of the VIRS,
- (e) A second page will be printed for the VIRS indicating the vehicle’s on-board diagnostic system could not be checked due to a damaged, tampered, or inoperable connector.

3.10.6 OBDII Readiness Evaluation, Malfunction Indicator Light (MIL) Status, and Diagnostic Trouble Code (DTC) Check:

3.10.6.1 Start Engine Prompt

START ENGINE. PRESS CONTINUE.

3.10.6.2 Programming Criteria:

- (a) An attempt shall be made to establish communication to the OBDII system using a Mode \$01, PID \$00 requests on approved protocols, according with SAE J1979. Note that if the response to the Mode \$01, PID \$00 request indicates none of the PIDs \$01-\$20 are supported, communication may have been erroneously established with the transmission control module (TCM). In this event, the Mode \$01, PID \$00 request should be resent in order to establish communication with the PCM.

The analyzer shall identify the correct communications protocol and store the associated protocol letter into the NCAS Record. Communications protocol letters to be used are as follows for:

- V – J1850 VPW, Variable Pulse Width
- P – J1850 PWM, Pulse Width Modulation
- I – ISO 9141-2
- K – ISO 14230-4 Key Word Protocol 2000
- C – ISO 15765-4 CAN (11 bit identifier)
- D – ISO 15765-4 CAN (29 bit identifier)
- U – Not identified or unknown

In the case where the protocol cannot be identified as one of the above listed protocols, the Protocol field shall be populated with a “U”. This may occur if a new protocol is devised after the writing of this Specification.

Total PID Count value should be determined by incrementing a counter by one for each supported OBDII-related PIDs in the proper Mode/PID response message. PCM Module ID should be retained and stored in the 2-character hexadecimal format. PID Count, PCM Module ID, and communication protocol shall all be written to the appropriate fields in NCAS.DAT.

- (b) If no response is received from the on-board computer to the Mode \$01, PID \$00 request, the analyzer will display the following prompt.

THE OBDII CONNECTION CANNOT BE CONFIRMED -- PLEASE PRESS “T” TO TRY AGAIN.

After “T” is selected, the following prompt should be given:

SWITCH THE IGNITION KEY OFF. REMOVE AND RECONNECT THE OBDII PORT TO THE VEHICLE’S DLC. WAIT 12 SECONDS, RESTART THE VEHICLE’S ENGINE AND PRESS ENTER TO TRY TO ESTABLISH COMMUNICATION WITH THE ANALYZER.

The analyzer must allow the inspector unlimited attempts to gain a confirmed OBDII connection, but as a minimum the analyzer must require the inspector to select “T” (try again) at least two (2) times. If the inspector does not request the analyzer to try again at least twice, the analyzer shall display the following prompt:

PLEASE SELECT “T” TO TRY AGAIN. YOU MUST ATTEMPT TO ESTABLISH COMMUNICATION WITH THE VEHICLE AT LEAST THREE TIMES.

- (c) If no communication is received after the second try again prompt, the analyzer shall display the following prompt:

NO COMMUNICATION HAS BEEN ESTABLISHED WITH THE ANALYZER.
PLEASE SELECT “T” TO TRY AGAIN, OR PRESS “A” TO END THE OBDII PORTION OF THE TEST.

If the inspector selects “T”, the analyzer shall reattempt to establish communication with the on-board computer. If the inspector selects “A”:

- (1.) An ‘N’ will be written to the OBDII Inspection Disposition field in NCAS.DAT,

- (2.) An 'F' will be written to the Record Inspection Disposition field in NCAS.DAT,
- (3.) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the "F" Record Inspection Disposition field in NCAS.DAT.
- (4.) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A rejection (fail) VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST RESULT sections of the **VIRS**, with a message indicating that the vehicle's on-board diagnostic system did not respond to the request for data, and a second page describing the failure, as shown in Section 5.

For vehicles whose's fuel type was either "G", "B" or "D", after successful communication has been established with the OBDII system, the RPM of the engine must be determined. If the reading is equal to zero (0) RPMs, the analyzer will display the following prompt:
[NOTE: 01/15/08 (NC) Hybrid vehicles with fuel type designation of "H", a zero (0) RPM reading is acceptable.]

"ENGINE MUST BE RUNNING FOR AN OBDII TEST TO CONTINUE. TEST MUST START OVER. PRESS ENTER TO CONTINUE."

After the proper entry to continue, the analyzer will return to the command prompt to "START ENGINE" as previously described in starting an OBDII inspection. If after a second attempt to complete the OBDII inspection and the engine RPM is still equal to zero (0), analyzer will display the following prompt:

"ATTEMPT TO RECORD RPM HAS FAILED. IS THE ENGINE RUNNING? Y/N"

An entry of "Y" or "N" as entered by the inspector-mechanic will be recorded in the field labeled "Engine Running" in NCAS.DAT and the OBDII test will continue as described in this Section.

- (d) After the Mode \$01, PID\$00 interrogation is successfully completed and the information is stored in the appropriate fields in NCAS.DAT, the test system shall send a Mode \$01, PID \$01 request in accordance with SAE J1979 to the on-board computer to determine the evaluation status of the OBDII system, what monitors are supported by the on-board diagnostic system, the readiness evaluation for applicable monitors in accordance with SAE J1979, the number (listing) of emission-related trouble codes stored in memory, and the Malfunction Indicator Light (MIL) command status. If a response is received from the Mode \$01 PID \$01 request, based on the returned data, the analyzer shall determine which on-board monitors are supported by the OBDII system and the readiness code status of the applicable monitors.

- (e) Possible monitors include the following:
- (1) Misfire (continuous)
 - (2) Fuel system (continuous)
 - (3) Comprehensive component (continuous)
 - (4) Catalyst (once/trip)
 - (5) Heated catalyst (once/trip)
 - (6) Evaporative system (once/trip)
 - (7) Secondary air system (once/trip)
 - (8) Air conditioning system (once/trip)
 - (9) Oxygen sensor (once/trip)
 - (10) Oxygen sensor heater (once/trip)
 - (11) EGR system (once/trip)
- (f) The possible monitors shall always be displayed on screen displays and printing in the order listed above. In addition, “(if available)” shall be listed after “Misfire”, “Fuel system”, and “Comprehensive component” on screen displays and printing.
- (g) Continuous monitors are those for which the applicable system/condition is checked continuously during vehicle operation; once/trip monitors are only checked when the vehicle is driven in a certain manner (i.e., over a predefined driving cycle expected to occur in customer service). According to Federal regulation (40 CFR 86.099-17), a vehicle manufacturer is not required to store a readiness code for the continuous operating monitors; however, some may choose to do so.
- (h) Possible readiness code responses include: completed, not completed, and not supported/not enabled. A response that a monitor is not supported or not enabled means that, for this particular vehicle, that monitor is not applicable. Hence, when a ‘not supported/not enabled’ response is given, the analyzer will not fail the vehicle for that code or include that code in the overall readiness determination count.
- (i) All readiness code values will be written to the appropriate test record fields in NCAS.DAT for each inspection using the following format:
- Not supported/not enabled = 0,
- Completed = 1,
- Not completed = 2,
- (j) NETWORK.DAT provides program-wide OBDII test criteria such as monitor-specific readiness criteria and the overall allowable number of “not ready” monitors. However, as

stated earlier in OBDII Test Applicability, if a vehicle match is found in EXCPTION.DAT, and that matched record contains alternate readiness criteria, the alternate criteria from EXCPTION.DAT shall take precedence over those values listed in NETWORK.DAT for the current inspection. The NCAS shall automatically apply the alternate readiness criteria in a manner transparent to the inspector-mechanic.

- (k) The NCAS will evaluate the MIL command status based on the data returned via the OBDII link from the vehicle on-board diagnostic system. The status of whether the MIL has been commanded to be illuminated will be recorded in the OBDII MIL Commanded Status field of NCAS.DAT. A “F” will be recorded for a “commanded on” status and a “P” for a “not commanded on” status”
- (l) If the MIL is commanded on, the NCAS shall send a Mode \$03 request to the on-board computer to determine the stored OBDII-related powertrain trouble codes. The NCAS will repeat this cycle until the number of codes reported equals the number expected based on the previous Mode \$01 response.
- (m) If a Ready Code has been defined as “F” in NETWORK.DAT (or EXCPTION.DAT, if applicable), and the monitor is “NOT COMPLETE”, then the overall readiness OBDII Ready Result will receive a status of “F”, even if the number of “not-ready allowable” codes has not been exceeded. The test must then proceed as described in the following sub-section (o). If a Ready Code has been defined as “P” in NETWORK.DAT (or EXCPTION.DAT, if applicable), then this monitor will not be included in the overall readiness determination count, even if the status is “NOT COMPLETE”. If a Ready Code has been defined as “N” in NETWORK.DAT (or EXCPTION.DAT, if applicable), then this code will be used in the overall readiness determination count.
- (n) Assuming no vehicle match is made in EXCPTION.DAT, the NCAS shall determine overall readiness status by comparing the number of supported monitors that have a value of “N” listed in NETWORK.DAT with total the number of “not ready” monitors allowed listed in NETWORK.DAT. The NETWORK.DAT field entitled “Phase 1 Not Ready Allowed” lists the number of “not ready” monitors allowed for vehicles of model years greater than or equal to the year listed in the “LD (or HD) OBDII Model Year” field in NETWORK.DAT but less than the year listed in the “Phase 2 Start Year” field in NETWORK.DAT. The field entitled “Phase 2 Not Ready Allowed” lists the number of “not ready” monitors allowed for vehicles of model years greater than or equal to the year listed in the “Phase 2 Start Year” field of NETWORK.DAT. All 1996 through 2000 model year vehicles will be allowed two (2) “not ready” monitors, 2001 and newer vehicles will be allowed one (1) “not ready” monitor. For that scenario, the “Phase 1 Not Ready Allowed” will be “2”, “Phase 2 Start Year” will be “2001”, and “Phase 2 Not Ready Allowed” will be “1”. Identical readiness criteria will be applied to both light-duty and heavy-duty vehicles. As previously described, if a vehicle match is made in EXCPTION.DAT, and that matched record contains readiness criteria, the EXCPTION.DAT readiness criteria will be automatically used for the current inspection.

- (o) If a monitor with a Ready Code defined as “F” in NETWORK.DAT (or EXCPTION.DAT, if applicable) has a status of “NOT COMPLETE”, or if the number of “N” Ready Codes that have a status of “NOT COMPLETE” is exceeded as described in item (n) above, AND;

(1) If the vehicle FAILS the KOEO test but the MIL is NOT commanded on, then;

- (i) An ‘F’ will be written to the following fields in NCAS.DAT: OBDII Ready Result, OBDII MIL Bulb Check, OBDII Inspection Disposition, and Record Inspection Disposition.
- (ii) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the Record Inspection Disposition field in NCAS.DAT.
- (iii) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A “Failed” VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST RESULT sections of the VIRS, with a second page printed describing the failure, as shown in Section 5.

(2) If the vehicle PASSES the KOEO test but the MIL IS commanded on, then;

- (i) An ‘F’ will be written to the following fields in NCAS.DAT: OBDII Ready Result, OBDII Fault Result, OBDII Inspection Disposition, and Record Inspection Disposition.
- (ii) The DTC(s) that was (were) found will be written to the OBDII Fault Codes field in NCAS.DAT.
- (iii) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the Record Inspection Disposition field in NCAS.DAT.
- (iv) (iv) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A “Failed” VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST RESULT sections of the VIRS, with a second page printed describing the failure, as shown in Section 5.
- (v) The VIRS will list the DTCs with an appropriate label of the trouble code associated with the failure.

(3) If the vehicle passes the KOEO test and the MIL is not commanded on, then;

- (i) An ‘F’ will be written to the OBDII Ready Result field in NCAS.DAT, an “R” will be written to the OBDII Inspection Disposition field in

NCAS.DAT, and an “R” will be written to the Abort Code field in NCAS.DAT. This will be a forced abort, and the “Record Inspection Disposition” field in NCAS.DAT will be left blank. Any NCAS.DAT records written to disk after an OBDII test “not-ready” abort shall be stored until the next safety-emissions inspection beginning test call, at which time the inspection record will be transmitted to the VID.

- (ii) The analyzer shall display the following prompt:

“THIS VEHICLE HAS TOO MANY UNSET READINESS CODES TO BE ELIGIBLE FOR TESTING AT THIS TIME. PLEASE ADVISE THE MOTORIST TO RETURN FOR AN INSPECTION AT A LATER DATE, OR CONTACT THEIR SERVICE DEALER FOR ASSISTANCE.

PRESS ENTER TO CONTINUE”

- (iii) The analyzer shall proceed to Section 5, NCAS VIRS and Printer Function Specifications. The “NOT-READY REJECTION” VIRS as shown in Section 5.6 shall be printed. The readiness status of all monitors will be printed on the VIRS.
 - (iv) Also on the VIRS, the analyzer will print a message recommending that the motorist contact their service dealer for assistance with any OBDII requirements or problems with their vehicle, as listed in the text box of the Section 5.6 Sample VIRS.
 - (v) No safety or tampering inspection shall be performed. No test fee will be collected for the inspection
- (p) If the vehicle meets the readiness criteria, FAILS the KOEO test, but the MIL is NOT commanded on:
- (1) A ‘P’ will be written to the OBDII Ready Result in NCAS.DAT, and a “P” will be written to the OBDII Fault Result in NCAS.DAT.
 - (2) An ‘F’ will be written to the OBDII MIL Bulb Check, OBDII Inspection Disposition, and Record Inspection Disposition fields in NCAS.DAT.
 - (3) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the Record Inspection Disposition field in NCAS.DAT.
 - (4) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A “Failed” VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST

RESULT sections of the VIRS, with a second page printed describing the failure, as shown in Section 5.

- (q) If the vehicle meets the readiness criteria, passes the KOEO test, and the MIL is commanded on:
 - (1) A 'P' will be written to the OBDII Ready Result and the OBDII MIL Bulb Check fields in NCAS.DAT.
 - (2) An 'F' will be written to the OBDII Fault Result, OBDII Inspection Disposition, and Record Inspection Disposition fields in NCAS.DAT.
 - (3) The DTC(s) that was (were) found would be written to OBDII Fault Codes in NCAS.DAT.
 - (4) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the Record Inspection Disposition field in NCAS.DAT.
 - (5) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A "Failed" VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST RESULT sections of the VIRS, with a second page printed listing the DTCs with an appropriate label of the trouble code associated with the failure, as shown in Section 5.

- (r) If the vehicle meets the readiness criteria, the MIL is not commanded on and the vehicle passes the KOEO test:
 - (1) A 'P' will be written to the OBDII Ready Result, OBDII Fault Result and OBDII Inspection Disposition fields in NCAS.DAT.
 - (2) The analyzer shall proceed to the safety and tampering inspection sequences. The safety and tampering inspection results will determine the Record Inspection Disposition field in NCAS.DAT.
 - (3) Once the safety and tampering inspections are complete, the NCAS will proceed to Section 5, NCAS VIRS and Printer Function Specifications. The NCAS will print out the appropriate VIRS based on the Record Inspection Disposition field in NCAS.DAT.

- (s) If the vehicle meets the readiness criteria, FAILS the KOEO test and the MIL is commanded on:
 - (1) A 'P' will be written to the OBDII Ready Result in NCAS.DAT.
 - (2) An "F" will be written to OBDII MIL Bulb Check, OBDII Fault Result, OBDII Inspection Disposition, and Record Inspection Disposition fields in NCAS.DAT.
 - (3) The DTC(s) that was (were) found would be written to OBDII Fault Codes in NCAS.DAT.

- (4) The analyzer shall proceed to the safety and tampering inspection sequences. However, safety and tampering inspection results will not change the Record Inspection Disposition field in NCAS.DAT.
- (5) Once the safety and tampering inspections are complete, the analyzer will proceed to Section 5, NCAS VIRS and Printer Function Specifications. A rejection (fail) VIRS will be printed. FAIL shall be printed on both the OBDII portion and the OVERALL TEST RESULT sections of the VIRS, with a second page printed listing the DTCs with an appropriate label of the trouble code associated with the failure, as shown in Section 5.

3.10.6.3 Reconfirmation of OBDII (Key On, Engine Off) Prompts

Prompt one (1):

“BECAUSE THE VEHICLE FAILED THE FIRST MIL BULB TEST, A SECOND “KEY ON, ENGINE OFF” (KOEO) TEST MUST BE PERFORMED. THE ENGINE MUST BE TURNED OFF AND ANALYZER CABLE MUST BE DISCONNECTED FROM THE VEHICLE. PRESS ENTER TO CONTINUE”.

Prompt two (2):

“PERFORM THIS SECOND “KEY ON, ENGINE OFF” (KOEO) CHECK TO DETERMINE IF THE INSTRUMENT PANEL MALFUNCTION INDICATOR LIGHT (MIL) TURNS ON WHEN THE IGNITION KEY IS TURNED TO THE “KEY ON, ENGINE OFF” POSITION.

DOES THE MIL TURN ON WHEN THE KEY IS PLACED IN THE “KEY ON, ENGINE OFF” POSITION?

“Y” - YES, THE MIL TURNS ON.

“N” - NO, THE MIL DOES NOT TURN ON.

WHEN THE MALFUNCTION INDICATOR LIGHT (MIL) TURNS ON, IT WILL EITHER DISPLAY “SERVICE ENGINE SOON,” “CHECK ENGINE,” THE WORD “CHECK” ALONG WITH THE INTERNATIONAL ENGINE SYMBOL, OR SOME COMBINATION OF THESE DEPENDING ON THE VEHICLE MAKE.”

3.10.6.4 Programming Criteria:

Upon completion of the OBDII test and prior to the starting of the safety and tampering inspection sequence, a reconfirmation of the Key On, Engine Off (KOEO) prompt will be performed on vehicles meeting the following OBDII requirements. For only those vehicles that have passed the readiness criteria, the MIL was not commanded-on but failed the KOEO, i.e. a “P” was written to the OBDII Ready Result and the OBDII Fault Result and an “F” was written to the OBDII MIL Bulb Check field in NCAS.DAT, the analyzer shall display prompt one (1).

Upon proper entry to continue, prompt two (2) will display. The analyzer will ask the inspector to perform a key-on/engine-off check to see if the Malfunction Indicator Light/Check Engine Light (MIL) turns on while the engine is not running. The analyzer shall

prompt the inspector to enter a No if the MIL does not turn on while the engine is not running. The analyzer software shall be designed so that the inspector for this field can only enter a “Y” or “N”. If the inspector does not enter a value, analyzer shall display “NO VALUES HAVE BEEN ENTERED – TRY AGAIN”. If the inspector enters a value other than a “Y” or “N”, analyzer shall display “INVALID ENTRY. SELECT “Y”, or “N”. When the entry is complete the inspection results will be displayed to the screen, and the inspector-mechanic will be given the opportunity to confirm or change the entry. When the entry is confirmed, the results will be entered into the OBDII MIL Bulb Check field in NCAS.DAT overwriting what is already in NCAS.DAT.

3.10.7 Recording of Additional OBDII Parameters:

In addition to the vehicle operation data listed above, additional requests shall also be sent in accordance with SAE J1979 to the on-board computer to determine, Calibration Identification Number (CAL ID), Calibration Verification Number (CVN), number of warm-ups since DTCs cleared (CAN vehicles only) and distance traveled since DTCs cleared (CAN vehicles only). For heavy-duty vehicles “if distance traveled since DTCs cleared” is not available, enter time since DTCs cleared (CAN vehicles only).

Once communications is established between the analyzer and the OBDII system as described above, the analyzer shall check for response to Mode \$09 PID\$04. If a response is obtained indicating CAL ID is supported, the analyzer shall create a table of all responding ECUs with a count of their corresponding reporting PIDs. After all ECUs have responded, the analyzer shall identify the ECU which has the highest PID Count. The ECU with the highest PID Count will be the powertrain ECU from which the analyzer shall then:

- 1) Use Mode \$09 PIDs \$3 and \$04 to request and store the first reported Calibration ID (CALID) of the control unit with the highest number of PIDs as noted above and records the CAL ID.
- 2) If “Check CVN” in NETWORK.DAT is set to “Y”, the analyzer shall check the identified ECU as noted above to see if it will respond to Mode \$09 PID \$06. If it does respond, then Mode \$09 PIDs \$05 and \$06 shall be used to request and store the first reported Calibration Verification Number (CVN) of the identified control unit as described above.
- 3) If the OBDII system does not respond to the Mode \$09 PID \$04 the analyzer shall not request CAL ID or CVN since they are not supported.

3.11 Safety Inspection Sequences

This section describes the display prompts, error messages and programming criteria for safety inspection of the vehicle. The vehicle type will determine the sequence of Safety Inspection prompts, and a safety inspection will be performed, whether a vehicle is subject to an idle emissions test or an OBDII scan. For vehicles subject to an OBDII inspection, the OBDII inspection will precede the Safety and Tampering inspection sequences. However, for those vehicles subject to tailpipe emissions test, Safety and Tampering inspection sequences will precede the tailpipe emissions test. When all the entries are complete the inspection results will be displayed to the screen, and the inspector-mechanic will be given the opportunity to confirm or change the entries. When the entries are confirmed the

information will be copied to the test record, and the inspector-mechanic will no longer be able to alter the safety inspection information.

3.11.1 Display Prompts

The following display prompts will guide the inspector-mechanic through the safety inspection process and aid in the entry of the required information:

1. Display prompt one (1):

“SAFETY INSPECTION SYSTEMS

Enter P(pass), F(fail), C(corrected), H(help) or N(not applicable) for each system:

_____ Headlights
_____ Parking Lights
_____ Tail Lights
_____ Beam Indicator Light/Switch
_____ License Plate Light
_____ Stop Lights
_____ Directional Signals
_____ Horn
_____ Windshield Wiper
_____ Rear View Mirrors
_____ Foot Brake
_____ Emergency Brake
_____ Steering Mechanism
_____ Tires
_____ Exhaust System
_____ Clearance Lights (Buses, Trucks, and Trailers)
_____ Reflectors
_____ Window Tinting”

2. Display prompt two (2):

“SAFETY INSPECTION SYSTEMS TRAILER

Enter P(pass), F(fail), C(corrected), H(help) or N(not applicable) for each system:

_____ Tail Lights
_____ Stop Light
_____ Clearance Lights
_____ Directional Signals
_____ License Plate Light
_____ Tires
_____ Brakes
_____ Reflectors”

3. Display prompt three (3):

“SAFETY INSPECTION SYSTEMS MOTORCYCLE

Enter P(pass), F(fail), C(corrected), H(help) or N(not applicable) for each system:

_____ Brakes
_____ Headlights
_____ Tail Lights
_____ Stop Lights
_____ Directional Signals
_____ License Plate Light
_____ Steering Mechanism
_____ Horn
_____ Tires
_____ Rear View Mirrors
_____ Exhaust System”

3.11.2 Error Messages

The analyzer will display the error messages as indicated by the programming criteria.

1. Error message one (1). This field requires an entry.
2. Error message two (2). Invalid entry-You must enter one of the choices listed at the top of the screen.

3.11.3 Programming Criteria

1. For vehicle types "A" and "B" the analyzer will present display prompt one (1) to the screen. The cursor shall move automatically to the next system when a "P", "F", "C", or "N" is entered. For display prompt one (1) an "N" may only be entered for Reflector, Clearance Lights, and Window Tinting.
2. If the vehicle type is "A", "B", "M", or "T" and the inspector-mechanic enters an "H" for Help, the analyzer shall display the appropriate regulation help text file provided by the State. Three files will be provided, one for vehicle types "A" and "B" (AUTOREG.TXT), one for vehicle type "M" (CYCLEREG.TXT), and one for vehicle type "T" (TRAILREG.TXT). The analyzer shall display the appropriate text file in a manner that allows the inspector-mechanic to scroll up and down in the file. The analyzer shall provide a single-keystroke method of exiting the file and shall return to the point in the inspection screen from which Help was selected.
3. For vehicle type "T" the analyzer will present display prompt two (2) to the screen. The cursor shall move automatically to the next system when a "P", "F", "C", or "N" is entered. For display prompt two (2) an "N" may only be entered for Lighting Signaling Devices, and Reflectors.
4. For vehicle type "M" the analyzer will present display prompt three (3) to the screen. The cursor shall move automatically to the next system when a "P", "F", "C", or "N" is entered. For display prompt three (3) and "N" may only be entered for Direction Signals.

5. When the inspector-mechanic has completed the safety inspection items, the analyzer will display the results to the screen. The inspector-mechanic will be able to edit the inspection results. When the inspector-mechanic confirms that all the entries are complete, the results will be recorded to the test record. Failed inspection subsystems will be listed with an F, not applicable inspection subsystems will be listed with an N, passed subsystems will be listed with a P, and any item which has been corrected during the course of the inspection will be listed with a C.
6. For the Safety Inspection item "Window Tinting," an entry of any disposition other than "N" will require a fee to be added. No fee is added for an entry of "N." This fee will be found in the FEES.DAT file.
7. The analyzer will proceed to the Tampering Inspection Sequences.

3.12 Tampering Inspection Sequences

The tampering inspection sequences will be performed for all vehicles (excluding motorcycles and trailers) for which a Safety Inspection is performed and the vehicle year is equal to or newer than the test cutoff year listed in Table 2.3.1, and meet all other idle emission inspection or OBDII scan requirement criteria. The following display prompts will guide the inspector-mechanic through the tampering inspection process and aid in the entry of the data required:

1. Display prompts.

Display prompt one (1):

“TAMPERING INSPECTION SYSTEMS

Enter P(pass), F(fail), C(corrected), H(help), E (Exemption), or N(not applicable) for each item:

_____ Catalytic Converter
_____ Air Injection System
_____ PCV Valve
_____ Unleaded Gas Restrictor
_____ Exhaust Gas Recirculation (EGR) Valve
_____ Thermostatic Air Control
_____ Evaporative Emissions System
_____ Oxygen Sensor
_____ Gasoline Tank Cap”

2. Display prompt two (2):

“Do you need to enter a DMV Parts Exemption Number? (Yes/No)”

3. Display prompt three (3):

“Please enter your DMV Parts Exemption Number.”

4. The analyzer will display the error messages as indicated by the programming criteria.
 - (a) Error message one (1). This field requires an entry.
 - (b) Error message two (2). Invalid entry-Number is not in proper format.

5. Programming criteria.
 - (a) The analyzer will record the valid entries in the test data record for those vehicles that receive a tampering inspection test.
 - (b) An entry is required for each item of the display prompt.
 - (c) All fields shall initially be blank, the inspector-mechanic will enter the appropriate disposition.
 - (d) An “H” entry in any item the analyzer will present help screen information contained in the Safety Inspection, Emission Inspection, Windshield Certificate Replacement, Regulations, included as Appendix G to this Specification, in the format described above.”
 - (e) For vehicles requiring a tailpipe test, if any emissions device has been tampered, the vehicle fails and will not be issued a sticker. However, DMV regulations require the tailpipe test to be performed. The tailpipe results are to be recorded to the test record file, but are not to be displayed to the screen or printed on the VIRS.
 - (f) For vehicles requiring an OBDII scan, if any emissions device has been tampered, the vehicle fails and will not be issued a sticker/e-sticker authorization. The results of the OBDII scan will be displayed on the screen and printed on the VIRS.
 - (g) The analyzer shall proceed to the Idle Exhaust Emission Inspection Sequences for those vehicles subject to an idle exhaust emissions test.
 - (h) For vehicles requiring an OBDII inspection, the OBDII inspection will precede the safety and tampering inspections, so for these vehicles, the tampering inspection marks the end of the overall vehicle inspection (excluding OBDII tests resulting in aborts, as described (i) below). No “fail” results in the Record Inspection Disposition field of NCAS.DAT will be overwritten during testing (a “fail” received during the OBDII test shall remain regardless of safety/tampering results). The analyzer shall proceed to Section 5, NCAS VIRS and Printer Function Specifications.
 - (i) Vehicles subject to an OBDII inspection but which receive a “not ready” test abort (as described in the programming criteria described in Section 3.10.6) will be rejected from testing immediately and will not receive safety or tampering inspections. The analyzer shall proceed to Section 5, NCAS VIRS and Printer Function Specifications immediately after the “not ready” test abort.
 - (j) Vehicles subject to the “Tampering Inspection” may receive a “parts exemption” exempting that item(s) from the inspection. An entry of “E”, “P”, or “N” will be allowed if a parts exemption number was received upon VID contact. The parts exemption number received from the VID will be recorded in NCAS.DAT

- (k) For all other conditions (i.e. no VID contact, no vehicle match, Parts Exemption Number not received, etc.) where an “E” is entered, prompt two (2) will be displayed asking if a Parts Exemption will be used.
 - i. An entry of “NO” will return back to the tampering inspection menu for correction and a normal inspection to continue. Any entry of “E” for any Tampering Inspection Item will not be allowed.
 - ii. An entry of “YES” in response to prompt two (2) will display prompt three (3) requesting the Parts Exemption Number. This will require a double blind entry. Accepted Parts Exemption Number will be recorded in NCAS.DAT. Parts Exemption number can only be accepted if prefix is “PEN” followed by 8 numbers, (i.e. “PEN12345678”).
 - 1. Error message two will be displayed if the Parts Exemption Number is not entered in acceptable format. If a Parts Exemption Number cannot be accepted or not needed, the inspection must be aborted and inspection restarted.
 - 2. Upon successful acceptance of the Parts Exemption Number **per ii above, an “E” will automatically be populated for the tamper item requesting the exemption.**
 - 3. **After acceptance of the initial PEN,** an entry of “E” will be allowed for any of the **remaining** tamper inspection items.
 - a. The analyzer will treat the entry of “E” as if a “P” was entered for that part. [10/4/08 (NC) Clarification of PEN added.]

3.13 Idle Exhaust Emission Inspection Sequences

This section describes the display prompts, error messages and programming criteria for the emission inspection of the vehicle. Vehicles subject to an idle exhaust emissions test are listed in Section 2.3, Test Applicability. The manufacturers shall develop the displays necessary to guide the inspector-mechanic through the required steps of the North Carolina Emissions Inspection.

3.13.1 General Requirements

The test sequence shall include at least the following vehicle parameters: HC, CO, CO₂, and engine RPM.

1. The analyzer shall prompt the inspector-mechanic to test the vehicle in as-received condition, to place the transmission in neutral or park, to turn off all accessories, and to verify that the engine is running at normal operating temperature (based on a temperature gauge reading or a touch test on the radiator hose for being up to normal operating temperature, and visual observation for overheating).
2. The analyzer shall, as a minimum, prompt the inspector-mechanic to connect/disconnect the tachometer or OBDII connector, insert/remove the sample probe into/from the tailpipe, execute each step of the test sequence, and return the vehicle to its as-received condition.
3. The test timer governing the overall test sequence shall start at the start of sampling.
4. A separate mode timer shall govern the modes within the test sequence and shall start when the specified conditions are met.

3.13.2 First and Second Chance tests

3.13.2.1 First-Chance Test

The first-chance test shall be in accordance with 40CFR51, Appendix B to Subpart S, Section (IV), included in Appendix E to this Specification, except as noted herein.

- (1) Preconditioning Mode. Per 40CFR51, Subpart S, Appendix B, Section (IV)(c)(1), for all 1975 and newer vehicles, except for vehicles equipped with ZF-4 automatic transmissions. Due to reported damages occurring to these vehicles, California has directed a change in the emissions testing preconditioning sequence for certain BMW, Peugeot, and Volvo models, as described in Appendix D. Incorporate the same preconditioning procedures into the North Carolina Analyzer System (NCAS) software, in lieu of any other preconditioning sequences, and with the following exception:
 - The NCAS vehicle type entries are not sufficient to isolate ZF-4 automatic transmissions. Upon a match of vehicle make and model year criteria, additional inquiry is required to determine whether the car is a model equipped with the ZF-4 automatic transmission.
- (2) Idle Mode. Per 40CFR51, Subpart S, Appendix B, Section (IV)(c)(2).
- (3) The pass/fail determination is made based on a comparison of the HC and CO readings to the idle Emission Standards, per Appendix C to this Specification, selected for the particular vehicle. If any pair of readings shows passing scores for both HC and CO then the vehicle has passed. If all readings fail for either HC, CO, or both, then the vehicle has failed the idle mode.
- (4) If the vehicle passes, the reported scores shall be the passing readings for which $HC + (151 * CO)$ is a minimum among all passing readings. In addition to storing these readings, the analyzer shall also store the start time of the readings (i.e., the start of the five-second averaging period). If the vehicle fails, calculate the scores in the same manner and enter them into the record. Proceed to the second-chance test and report only the scores obtained from it.
- (5) 40CFR51, Subpart S, Appendix B, Section (IV)(c)(2)(E): This option is NOT to be exercised for the NCAS.
- (6) Enter preconditioning code "9" in the test record for all first-chance preconditioning sequences.

3.13.2.2 Second-Chance Test

The second-chance test shall be in accordance with 40CFR51, Appendix B to Subpart S, Section (IV), included in Appendix E to this Specification, except as noted herein. If the vehicle fails the first-chance idle test, the test timer shall reset to zero and a second-chance test shall be performed. The test shall abort if it cannot be completed before 425 seconds have elapsed.

- (1) Preconditioning Mode. Per 40CFR51, Subpart S, Appendix B, Section (IV)(d)(1), except as noted herein.

There are four (4) second-chance preconditioning sequences that will be used by the analyzer. The major instructions to be included in the displays are to be developed by the manufacturers for the preconditioning sequences. The analyzer shall prompt the inspector-mechanic through the steps of the preconditioning sequence and record the sequence number to the test record.

- a. Second-chance preconditioning sequence 1 is for all 1975 and later catalyst or oxygen sensors equipped vehicles, except as noted below in sequences 3, and 4 and is per 40CFR51, Subpart S, Appendix B, Section (IV)(d)(1). Enter preconditioning sequence code "1" in the test record.
- b. Second-chance preconditioning sequence 2 is in addition to Section 3.13.2.2(1) above, for 1981-1989 Ford and 1984-1985 Honda Prelude vehicles, and per 40CFR51, Subpart S, Appendix B, Section(IV)(d)(2). Enter preconditioning sequence code "2" in the test record.
- c. Second-chance preconditioning sequences 3 and 4 are for vehicles equipped with ZF-4 automatic transmissions, and are in lieu of other preconditioning sequences. Due to reported damages occurring to these vehicles, California has directed a change in the emissions testing preconditioning sequence for certain BMW, Peugeot, and Volvo models, as described in Appendix D. Incorporate the same preconditioning procedures into the North Carolina Analyzer System (NCAS) software, with the following exceptions:
 - The NCAS vehicle type entries are not sufficient to isolate ZF-4 automatic transmissions. Upon a match of vehicle make and model year criteria, additional inquiry is required to determine whether the car is a model equipped with the ZF-4 automatic transmission.
 - Enter preconditioning sequence code "3" or "4" in the test record.

- (2) Idle Mode. The mode shall last a minimum of 30 seconds and a maximum of 90 seconds. The mode timer shall start when the vehicle engine speed is between 350 and 1100 RPM and the concentration of CO+CO₂ is at least six percent. The idle mode shall continue as long as engine speed is between 350 and 1100 RPM, CO+CO₂ level is above six percent, idle mode time is less than 90 seconds and passing readings have not been obtained. If engine speed exceeds 1100 RPM or falls below 350 RPM the mode timer shall reset to zero and resume timing. If the engine stalls the test shall abort. If CO+CO₂ falls below six percent at any time. the test shall abort and a prompt to check probe insertion shall occur.

- a. The pass/fail analysis shall begin after an initial time delay of 10 seconds. The emission levels for HC and CO shall be analyzed at a minimum sampling rate of 2Hz. A reading is a simple average of

the emission levels over the last five seconds. Readings shall be taken as running averages. If readings less than or equal to 100 ppm HC and 0.5 percent CO are obtained any time between the start of the pass/fail analysis and the minimum mode time, the vehicle shall pass and the mode shall end immediately.

- b. The pass/fail determination is made based on a comparison of the HC and CO readings to the idle emission standards selected for the particular vehicle. If any pair of readings shows passing scores for both HC and CO then the vehicle has passed. If all readings fail for either HC, CO, or both, then the vehicle has failed the test.
- c. If the vehicle fails, the reported scores shall be the readings for which $HC + (151 * CO)$ is a minimum. If the vehicle passes, the reported scores shall be the passing readings for which $HC + (151 * CO)$ is a minimum among all passing readings. In addition to storing these readings, the analyzer shall also store the start time of the readings (i.e., the start of the five second averaging period).

3.13.3 Display Prompts

The following display prompts will assist the inspector-mechanic in entering the data required for the emission inspection process.

1. Display prompt one (1):

“Press a key when ready to begin the emission inspection”; and

2. Display prompt two (2):

“The vehicle has failed the first-chance emission inspection and may require additional preconditioning to prevent a pattern failure.”

The inspector-mechanic will not select the preconditioning sequence, it shall be selected based on vehicle information previously entered. Preconditioning sequence options are as follows:

1. All 1975 and later vehicles, except:
2. 1981-1989 Ford Motor Company, and 1984-1985 Honda Prelude vehicles;
3. 1984-1986 BMW, 1986-1991 Peugeot model 505, and 1987 BMW models 635Csi, 735I, and L7 vehicles, with ZF-4 automatic transmissions;
4. 1985-1988 Volvo model 740 vehicles with ZF-4 automatic transmissions, which have no overdrive switch on the gear selector, and the shift quadrant reads P-R-N-D-3-2-1;
5. No second-chance preconditioning sequence desired.” (The VIRS shall record a failed emissions inspection.)

3.13.4 Error Messages

The following error messages shall be displayed as indicated in the programming criteria.

1. Error message one (1). This field requires an entry.

2. Error message two (2). Invalid entry-You must enter one (1) of the choices listed on the screen.

3.13.5 Programming Criteria

1. The analyzer screen shall initially display prompt one (1). The analyzer shall proceed with the emission inspection sequence described above.
2. Just prior to the start of the first chance emissions measuring sequence the first test record shall be written to disk. The value for the Emission Inspection Disposition shall be "F"; HC results, CO results and CO₂ results shall also be "F"; and Record Inspection Disposition shall be "F". Emission reading values shall be set to zero (0).

[03/02/99 (NC) Test record NOT written to disk until end of test. VIRS shall still be printed per Section 2.17]

3. Early exit from the emissions sampling sequence shall be allowed. In the event the abort key is pressed prior to the completion of the first or second chance emissions measuring the analyzer will record the final emissions readings (if any), RPM, record the end time and set the Abort Code to "M". The value for the Emission Inspection Disposition shall be "F"; HC results, CO results and CO₂ results shall also be "F"; and Record Inspection Disposition shall be "F". In the event of early exit no VIRS shall be printed.

[1/12/99 – In regards to printing a receipt, this section conflicts with 2.17. 3/2/99 – test record not saved but print VIRS]

4. The analyzer shall record the engine RPM, the HC, the CO, the CO₂ and the O₂ (optional) in the NCAS Test Record. The readings for HC and CO shall be compared to the standards listed in Appendix C to this Specification. The vehicle shall fail the emissions inspection if the reading for either HC or CO exceeds the standard. The vehicle shall fail the emission inspection if the dilution reading (the sum of CO + CO₂) is less than six percent (6%).
5. The Emission Inspection Disposition shall be "P" if the vehicle passes the initial emission inspection or the emissions reinspection, and "F" if it fails either an initial inspection or reinspection. The analyzer shall record the preconditioning option selected (if applicable), the engine RPM, the HC, the CO, the CO₂, the O₂ (optional) and the Emission Inspection Results to the new test record. If the inspector-mechanic enters a nine (9), the analyzer shall proceed to print the VIRS.
6. If the vehicle fails the first-chance emission test, display prompt two (2) shall be shown to the screen. If the inspector-mechanic does not enter a value, the analyzer shall display error message one (1) at the bottom of the screen. If the inspector-mechanic enters a value that is not listed, the analyzer shall display error message two (2) at the bottom of the screen. If the inspector-mechanic enters a one (1), two (2), three (3), or four (4), the analyzer shall proceed with corresponding preconditioning sequence described above, and the results of the emission inspection after the second-chance preconditioning shall be written by the analyzer to the test record. If the inspector-mechanic enters a nine (9), the analyzer shall proceed to print the VIRS.
7. If the vehicle passes the emission test without second-chance preconditioning, the analyzer shall record the preconditioning sequence as nine (9).

3.14 Safety-Emissions Inspection Fee Prompt

If the "Open Market Safety-Emissions Inspection Fee" field in FEES.DAT is set to "N", the NCAS will automatically calculate and assign the appropriate test fee from the values listed

in FEES.DAT. This calculation will be based on the appropriate inspection fee, sticker fee (if applicable), and window tint fee (if applicable). However, if the “Open Market Safety-Emissions Inspection Fee” field in FEES.DAT is set to “Y”, the NCAS shall allow the inspector-mechanic to enter the desired inspection fee using the logic and prompts presented in this section. The appropriate overall test fee will then be calculated by the analyzer based on the inspection fee entered by the inspector-mechanic, the sticker fee from FEES.DAT (if applicable), and the window tint fee from FEES.DAT (if applicable). The sticker and window tint fees will not be displayed and the inspector-mechanic will not be able to change these values. The maximum allowable safety-emissions inspection fee will be the value listed for the safety-emissions inspection in FEES.DAT.

Regardless of the fee structure used (automatically assigned or open-market), the NCAS shall record the inspection fee (either safety-only or safety-emissions), sticker fee, window tinting fee, and total fee in NCAS.DAT. This information shall also be printed on the VIRS.

The following display prompts, error messages and programming criteria will guide the inspector-mechanic through the procedure of entering a test fee if the “Open Market Safety Emissions Inspection Fee” field in FEES.DAT is set to “Y”. If the “Open Market Safety-Emissions Inspection Fee” field in FEES.DAT is set to “N”, these display prompts, error messages, and programming criteria shall be bypassed.

3.14.1 Display Prompts

1. Display prompt one (1):
“Would you like to charge \$XX.XX for the safety-emissions inspection? Y - N
(Does not include sticker or window tint fees, if applicable)”
2. Display prompt two (2):
“Please enter desired safety-emissions inspection fee, including cents.
Press “enter” to continue”

3.14.2 Error Messages

1. Error message one (1):
“The safety-emissions inspection fee cannot exceed \$XX.XX. Please correct
inspection fee amount.
Press “enter” to continue”
2. Error message two (2):
“No value has been entered. Please enter safety-emissions inspection fee, including
cents.
Press “enter” to continue”
3. Error message three (3):
“Incorrect fee format entered. Please enter correct safety-emissions inspection fee in
dollars and cents.

Press “enter” to continue”

3.14.3 Programming Criteria

The analyzer screen shall initially display prompt one (1). The default safety-emissions inspection fee that is to be displayed (shown as \$XX.XX in display prompt one (1)) will be the value listed for the safety-emissions inspection in FEES.DAT. The cursor will automatically be positioned on the “Y”. The inspector-mechanic will be able to either press the “Y” key or the “enter” key to accept the default value. A “yes” entry will assign the default inspection fee from FEES.DAT to the inspection.

Display prompt two (2) will be shown if the inspector-mechanic selects “N”. The safety-emissions inspection fee will be displayed as it is entered into the analyzer. The inspection fee must not be greater than the value listed for the safety-emissions inspection in FEES.DAT. If the inspection fee does exceed this value, error message one (1) will be displayed. If the inspector-mechanic presses the “enter” key before entering an inspection fee, error message two (2) will be displayed. Error message (3) will be displayed if the inspection fee is not entered in dollars and cents.

~~3.15 (Current until such time E-Sticker Start Date takes affect.) Issuing the Sticker and Printing the Vehicle Inspection Receipt/Statement (VIRS)~~

~~The following display prompts, error messages and programming criteria will guide the inspector-mechanic through the procedure of printing a receipt/statement at the end of the inspection. Receipt/statement paper may be reloaded during the receipt/statement printing process providing no inspection data is lost or compromised (see Appendix A to this Specification).~~

~~3.15.1 Display Prompts~~

~~The following display prompts will be displayed as indicated in the programming criteria:~~

~~Display prompt one (1):~~

~~“Is next sequential sticker voided or damaged, missing or stolen? Y—N”~~

~~Display prompt two (2):~~

~~“Scan or carefully enter sticker number _____”~~

~~Display prompt three (3):~~

~~Identify the disposition of the next sequential sticker:~~

~~_____ Voided/Damaged
_____ Missing~~

~~_____ Stolen _____~~
~~_____ Cancel and Re-enter _____~~

~~Display prompt four (4):~~

~~Enter the expiration date of the 'old' North Carolina inspection sticker that was on the vehicle before this inspection. If there is no sticker, enter 00/0000. If it is an out of state sticker, enter 00/0000.~~

~~Display prompt five (5):~~

~~"Is this vehicle for sale by a dealership? (Y/N)"~~

~~Display prompt six (6):~~

~~"Expiration date of the new sticker is MM/YYYY. Indicate MM/YYYY expiration on sticker per DMV Regulations and apply sticker to vehicle." (where MM/YYYY is 12 months from today)~~

~~Display prompt seven (7):~~

~~"Expiration date of the new sticker is MM/YYYY. Indicate MM/YYYY expiration on sticker per DMV Regulations and apply sticker to vehicle." (where MM/YYYY is 12 months from date of sticker on vehicle)~~

~~_____~~
~~_____ Display prompt eight (8):~~

~~_____ "Was the sticker successfully applied to the vehicle? _____ Y/N"~~

~~_____~~
~~_____ Display prompt nine (9):~~

~~_____ "Identify the disposition of sticker XXXXXXXXX:~~

~~_____ Voided/Damaged~~
~~_____ Missing~~
~~_____ Stolen"~~

~~Display prompt ten (10):~~

~~_____ "Please enter number of Vehicle Inspection Receipt/Statements (VIRS) to print: _____"~~

3.15.2 Error Messages

The following error messages will be displayed as indicated in the programming criteria:

- ~~1. Error message one (1). This field requires an entry.~~

~~2. Error message two (2). The number of the next available sticker for class XX is not the number as identified on the analyzer. Identify the disposition of the next sticker:~~

- ~~===== Voided/Damaged~~
- ~~===== Missing~~
- ~~===== Stolen~~
- ~~===== Cancel and Re-enter~~

~~3. Error message three (3). The sticker type entered does not match the type of inspection completed. Do you wish to attempt entry again or abort test? Select one: _____~~

- ~~— Attempt Entry~~
- ~~_____ Abort Test~~

~~3.15.3 Programming Criteria~~

~~1. Process Flow:~~

- ~~a) Determine overall inspection result~~
- ~~b) Issue sticker if overall result is "P"~~
- ~~c) Calculate TIN if overall result is "P"~~
- ~~d) Write the final test record to NCAS.DAT~~
- ~~e) Initiate phone call to VID~~
- ~~f) Print the VIRS~~

~~2. Final results and printing of VIRS.~~

~~If the overall result of the inspection was "P" and a sticker was issued, then the analyzer shall calculate a "Transaction Identification Number" (TIN). The TIN will be calculated and written to the inspection record, and printed on all copies of the VIRS. [01/28/99 (MCI) Updated TIN algorithm spec - v1.01]~~

- ~~(1) The analyzer shall write the final NCAS.DAT record.~~
- ~~(2) Once the analyzer has received the proper responses to its prompts, the analyzer shall determine the overall inspection results, write the final data record, and initiate a phone call to the VID. After the analyzer has attempted to initiate a phone call to the VID, successful or not, the analyzer shall print the VIRS on the analyzers printer.~~
- ~~(3) Display Prompts:~~
 - ~~(a) Attempting to transmit data to VID.~~

~~3. Printing Vehicle Inspection Report/Statement (VIRS). This report must be presented to the customer. Messages:~~

- ~~(1) The test results could not be transmitted to VID.~~
- ~~(2) The printer is out of paper. Please correct this problem and press any key to continue.~~
- ~~(3) The printer is not responding. Please correct the problem and press any key to continue. If the problem cannot be resolved, please contact your service vendor.~~

~~4. If the analyzer determines that the vehicle did not pass all sections of the inspection, the Record Inspection Disposition is F. In the test record, the analyzer shall index the number of~~

~~receipt/statements printed. The analyzer will also record the receipt/statement number and the Record Inspection Disposition to the test record.~~

~~{11/16/98 (NC) The requirement to record the number of receipt/statements printed (field 14; offset 86) has been dropped. Recording "01" is fine.}~~

- ~~5. If the analyzer determines that the vehicle has passed all sections of the inspection, the Record Inspection Disposition in the test record is "P". The inspector-mechanic will be prompted to enter the sticker number on hand at the end of the inspection. The stickers are categorized as IM, SI, or MT. Sticker numbers will be bar coded and may be scanned or entered from the keyboard. The analyzer will use display prompt one (1) to confirm the next sequential sticker is not voided or damaged, missing, or stolen. If the inspector-mechanic enters "yes" to display prompt one (1), the analyzer will display prompt three (3) to identify the disposition of the sticker as calculated by analyzer. Display prompt 3 shall be used to gather the disposition of the next sticker and shall also allow the inspector-mechanic to cancel the current entry and attempt re-entry of the sticker number. **Display prompt three (3) will NOT display the next sequential sticker number as calculated by the analyzer.** The analyzer shall record all relevant information for this record in STICKER.DAT, including date, station license number, analyzer number, inspector license number, sticker class, sticker number, reason code and VIN. After the inspector-mechanic has entered the disposition of the next sequential sticker, the analyzer will again display prompt one (1). This cycle will be repeated until the inspector-mechanic answers "No" to the next sticker being damaged, voided, missing or stolen.~~
- ~~6. Once the inspector-mechanic enters "No" for display prompt one (1), the analyzer will use display prompt two (2) to confirm the next available sticker number as calculated by the analyzer matches the number of the next available sticker assigned to the analyzer. If the entered number matches the next available sticker number as calculated by the analyzer, the analyzer shall record the receipt/statement number, the sticker number and the inspection disposition to the test record.~~
- ~~7. If the sticker number entered at display prompt two (2) does not match the next sticker number on file in the analyzer, the inspector-mechanic must identify the disposition of the missing sticker(s). Error message 2 shall be used to gather the disposition of the next sticker as calculated by analyzer and shall also allow the inspector-mechanic to cancel the current entry and attempt re-entry of the sticker number. **Error message two (2) will NOT display the next sequential sticker number as calculated by the analyzer.** The analyzer shall record the appropriate sticker disposition in STICKER.DAT, and will also record all other relevant information for this record in STICKER.DAT, including date, station license number, analyzer number, inspector license number, sticker class, sticker number, reason code and VIN. Display prompt two (2) will then be repeated. This cycle will be repeated until the sticker number entered by the inspector-mechanic is the same as the sticker number identified by the analyzer.~~
- ~~8. If the sticker type entered at display prompt two (2) does not match the inspection type, the analyzer shall display error message three (3). If the inspector-mechanic chooses to retry, display prompt two (2) will again be displayed.~~
- ~~9. The Bar Code Format for stickers is as follows:~~

- ~~a) Leading identifier character “+” for individual stickers.~~
 - ~~b) Sticker number = 8 characters. First character alpha to designate sticker type (IM, SI, or MT), second character alpha to designate series number, followed by six (6) numeric.~~
 - ~~c) Allowable letters for the first alpha character of IM stickers shall be “A”, “B”, “C”, “D”, “E”, “F”, “G”, “H”, or “I”. Allowable letters for first alpha character of SI stickers shall be “N”, “P”, “Q”, “R”, “S”, “T”, “U”, “V”, “W”, “X”, “Y”, or “Z”. Allowable letters for the first alpha character of MT stickers shall be “J”, “K”, “L”, or “M”.~~
 - ~~d) Leading identifier character “B” for sticker booklets.~~
 - ~~e) Do not save, display or print the leading identifiers “+” or “B” characters.~~
- ~~10. Display prompt four (4) will be used to collect the expiration date of the “old” inspection sticker. If the inspector mechanic enters an expiration date of 00/0000, the analyzer shall display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~
- ~~11. If the date entered at display prompt four (4) indicates the “old” inspection sticker has expired by 12 months or more, the analyzer shall again display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~
- ~~12. If the date entered at display prompt four (4) indicates the “old” inspection sticker has expired by less than 12 months, the analyzer shall display prompt five (5).~~
- ~~a) If the inspector mechanic enters “yes” to display prompt five (5), the analyzer shall display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~
 - ~~b) If the inspector mechanic enters “no” to display prompt five (5), the analyzer shall display prompt seven (7) (MM/YYYY will be 12 months from date of sticker on vehicle). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~
- ~~13. If the date entered at display prompt four (4) indicates the “old” inspection sticker has not expired, the analyzer will display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~
- ~~14. If the inspector mechanic answers no to display prompt eight (8), the analyzer will display prompt nine (9) to identify the disposition of the damaged sticker. **Display prompt nine (9) WILL display the number of the damaged sticker.** The disposition of any unsuccessfully applied sticker will be written to STICKER.DAT. The analyzer shall also record all other relevant information for this record in STICKER.DAT, including date, station license number, analyzer number, inspector license number, sticker class, sticker number, reason code, and VIN. This cycle will be repeated until the inspector mechanic answers “Yes” to the sticker being successfully applied to the vehicle.~~

- ~~15. Once the inspector-mechanic indicates the sticker has been successfully applied to the vehicle, the analyzer will display prompt ten (10) to query the inspector about how many VIRS copies to print. This field will accept entry of a single numeric digit (1 through 9) and will be selected via the "enter" key. The default value for this field will be one (1), so the inspector may print one VIRS with a single keystroke (via the "enter" key). If the one (1) is deleted and no additional number is entered, error message one (1) above shall be displayed. Once the inspector-mechanic selects the number of VIRSs to print, the analyzer will begin printing the receipt/statement(s) in the form described in Section 5. For pass inspections, only the first VIRS shall contain the "pass" certificate (if electronic certification issuance is employed).~~
- ~~16. Throughout this entire process, if the inspector-mechanic attempts to proceed past any required display prompts without an entry, the analyzer shall display error message one (1).~~
- ~~17. While printing the receipt/statement the display shall be "PRINTING RECEIPT/STATEMENT."~~
- ~~18. If a "no match" message was received from the VID, indicating the vehicle was not found on file, the following message shall be printed on the VIRS:
"No matching record was found on file for this vehicle on the State Host computer. It is your responsibility to contact DMV to resolve this issue and ensure credit for this inspection."~~
- ~~19. The analyzer shall then return to the Main Menu.~~

3.15 (Effective based on E-Sticker Start Date) Issuing the E-Sticker Authorization and Printing the Vehicle Inspection Receipt/Statement

The following display prompt, error messages and programming criteria will guide the inspector-mechanic through the procedure of printing a receipt/statement at the end of the inspection. Receipt/statement paper may be reloaded during the receipt/statement printing process providing no inspection data is lost or compromised (see Appendix A to this Specification).

3.15.1 Display Prompts

The following display prompts will be displayed as indicated in the programming criteria:

1. Display prompt one (1):

"Is this vehicle for sale by a dealership? (Y/N)"

2. Display prompt two (2):

"Please enter number of Vehicle Inspection Receipt/Statements (VIRS) to print: ____"

3.15.2 Error Messages

The following error message will be displayed as indicated in the programming criteria:

1. Error message one (1). This field requires an entry.

3.15.3 Programming Criteria

1. Process Flow:

- a) Determine overall inspection result
- b) Issue e-sticker authorization if overall result is "P"
- c) Calculate TIN if overall result is "P"
- d) Write the final test record to NCAS.DAT
- e) Initiate phone call to VID
- f) Print the VIRS

2. Final results and printing of VIRS.

If the overall result of the inspection was "P" and an e-sticker authorization was issued, then the analyzer shall calculate a "Transaction Identification Number" (TIN). The TIN will be calculated and written to the inspection record and will be printed on all copies of the VIRS. . [01/28/99 (MCI) Updated TIN algorithm spec - v1.01]

- (1) The analyzer shall write the final NCAS.DAT record.
- (2) Once the analyzer has received the proper responses to its prompts, the analyzer shall determine the overall inspection results, write the final data record, and initiate a phone call to the VID. After the analyzer has attempted to initiate a phone call to the VID, successful or not, the analyzer shall print the VIRS.
- (3) Display Prompts:
 - (a) Attempting to transmit data to VID.

3. Printing Vehicle Inspection Report/Statement (VIRS). This report must be presented to the customer. Messages:

- (1) The test results could not be transmitted to VID.
- (2) The printer is out of paper. Please correct this problem and press any key to continue.
- (3) The printer is not responding. Please correct the problem and press any key to continue. If the problem cannot be resolved, please contact your service vendor.

4. If the analyzer determines that the vehicle did not pass all sections of the inspection, the Record Inspection Disposition is F. In the test record, the analyzer shall index the number of receipt/statements printed. The analyzer will also record the receipt/statement number and the Record Inspection Disposition to the test record.

[11/16/98 (NC) The requirement to record the number of receipt/statements printed (field 14; offset 86) has been dropped. Recording "01" is fine.]

5. If the analyzer determines that the vehicle has passed all sections of the inspection, (the Record Inspection Disposition in the test record is "P"), the analyzer will then take the next available e-sticker authorization for the proper inspection category IM or SI, and record the corresponding e-sticker authorization inventory number along with the receipt/statement number and the inspection disposition into the test record.

[11/30/07 (NC) E-sticker authorization number recorded in test record will be the three digit number (zero padded) that corresponds to the e-sticker authorization in inventory used for the test.]

6. If there was VID contact per Section 3.7 and a “vehicle match” was found, the analyzer shall then display prompt one (1). The default value for this field will be “N”, so the inspector may continue with a single keystroke (via the “enter” key).

If the inspector-mechanic enters “N” to display prompt one (1), the analyzer shall record the “Next Inspection Due Date” as received from the VID. The analyzer will enter MM/YYYY (Next Inspection Due Date) into the test record and print it on the VIRS. [01/10/08 (NC) If for some reason the VID did not return the “Next Inspection Due Date”, the analyzer should then treat the calculation for the “Next Inspection Due Date” as if a “no VID contact” had taken place.]

- a) If the response is “Y”, the prompt:
 - i) Enter your Dealer Identification Number:
 - ii) Loop until field is filled out correctly.
 - iii) The analyzer shall establish the next inspection due date to be 12 months from the test date. The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.
7. If there was no VID contact or a “No Match” status from the VID, the Next Inspection Due Date will be 12 months from the test date. The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.
8. The analyzer will display prompt two (2) to query the inspector about how many VIRS copies to print. This field will accept entry of a single numeric digit (1 through 9) and will be selected via the “enter” key. The default value for this field will be one (1), so the inspector may print one VIRS with a single keystroke (via the “enter” key). If the one (1) is deleted and no additional number is entered, error message one (1) above shall be displayed. Once the inspector-mechanic selects the number of VIRSs to print, the analyzer will begin printing the receipt/statement(s) in the form described in Section 5.
9. Throughout this entire process, if the inspector-mechanic attempts to proceed past any required display prompts without an entry, the analyzer shall display error message one (1).
10. While printing the receipt/statement the display shall be "PRINTING RECEIPT/STATEMENT."
11. If a “no match” message was received from the VID, indicating the vehicle was not found on file, the following message shall be printed on the VIRS:
 - (1) “No matching record was found on file for this vehicle on the State Host computer. It is your responsibility to contact DMV to resolve this issue and ensure credit for this inspection.”
12. The analyzer shall then return to the Main Menu.

3.16 Safety Inspection

Safety Inspection Only sequence shall be initiated by an entry of 2 from the State Inspection Menu. The sequence will be very similar to that used for the Safety and Emission Inspection Effective with the starting of the E-Sticker program, safety inspections will contact the VID in the same manner as Safety and Emission Inspections and follow the same sequences per Section 3.5, 3.6 and 3.7. This subsection will describe the differences in the programming criteria and the sequence of menus used in the Safety Inspection Only and the Safety and Emissions Inspection.

1. Inspector-mechanic access will first be initiated.
2. All VIN and license plate vehicle data will be gathered as shown in Safety and Emissions Inspection above.

3.16.1 Display Prompts

The analyzer will display the following display prompts:

Display prompt one (1):

“You have selected Safety Inspection Only. Motor vehicles capable of being powered by gasoline, registered and/or based in an exhaust emission county are required to have a Safety/Emission Inspection unless specifically exempted in motor vehicle regulation.

Do you wish to continue this procedure? _____”

Display prompt two (2):

“In which county is the vehicle registered? _____

Press the Enter key when complete.”

3.16.2 Programming Criteria

1. The entry of the VIN and License Plate shall proceed in the same manner as described for Safety and Emission Inspection. This process is described above.

Following entry of the VIN and License Plate the analyzer shall search the C:\NCASDATA\NCAS.DAT and C:\NCASDATA\NCAS.HST file for the VIN. If a previous vehicle inspection is found then all appropriate vehicle data shall be taken for use by the inspection process. If a previous inspection** found was safety-only and was within the past 60* days the inspection shall become a safety-only re-inspection. If the previous inspection ** was a safety-emissions inspection the analyzer shall contact the VID and shall convert the inspection to safety-emissions re-inspection (either an idle exhaust emissions inspection or an OBDII inspection, as listed in Section 2.3, Test Applicability). [2/15/99 – See Appendix I spreadsheet]

[*10/19/07 (NC) 60 day rule, in lieu of previous 30 day rule, becomes affective 1/01/09. However, this number (30 or 60 days) will be sent by VID from NETWORK.DAT (Days Allocated for Re-inspection).]

[**02/05/08 (NC) whether using the 60 day rule or the 30 day rule, the analyzer is to consider the time from the most recent previous inspection on record. The initial inspection should not be used to calculate this time frame if there are multiple inspection records for the vehicle.]

2. Display prompt one (1) will be displayed to ensure that the inspector-mechanic has selected the proper inspection sequence for the vehicle. If the inspector-mechanic

indicates that the Safety Inspection Only is desired, the sequence will use display prompt two (2) to identify the county of registry. This county name will be recorded as three (3) characters of the County Code in the test record as Registration County as verified to the COUNTY.DAT file.

(NOTE: Listing Below is for example only, the source shall be found in the COUNTY.DAT file.)

<u>Code</u>	<u>County Name</u>	(presented here as reference, the following county code will be used as the record code)
OUTS	Out of State	000
ALAM	Alamance	001
ALEX	Alexander	003
ALLE	Alleghany	005
ANSO	Anson	007
ASHE	Ashe	009
AVER	Avery	011
BEAU	Beaufort	013
BERT	Bertie	015
BLAD	Bladen	017
BRUN	Brunswick	019
BUNC	Buncombe	021
BURK	Burke	023
CABA	Cabarrus	025
CALD	Caldwell	027
CAMD	Camden	029
CART	Carteret	031
CASW	Caswell	033
CATA	Catawba	035
CHAT	Chatham	037
CHER	Cherokee	039
CHOW	Chowan	041
CLAY	Clay	043
CLEV	Cleveland	045
COLU	Columbus	047
CRAV	Craven	049
CUMB	Cumberland	051
CURR	Currituck	053
DARE	Dare	055
DAVD	Davidson	057
DAVI	Davie	059
DUPL	Duplin	061
DURH	Durham	063
EDGE	Edgecombe	065
FORS	Forsyth	067
FRAN	Franklin	069

GAST	Gaston	071
GATE	Gates	073
GRAH	Graham	075
GRAN	Granville	077
GREE	Greene	079
GUIL	Guilford	081
HALI	Halifax	083
HARN	Harnett	085
HAYW	Haywood	087
HEND	Henderson	089
HERT	Hertford	091
HOKE	Hoke	093
HYDE	Hyde	095
IRED	Iredell	097
JACK	Jackson	099
JOHN	Johnston	101
JONE	Jones	103
LEE	Lee	105
LENO	Lenoir	107
LINC	Lincoln	109
MACO	Macon	111
MADI	Madison	113
MART	Martin	115
MCDO	McDowell	117
MECK	Mecklenburg	119
MITC	Mitchell	121
MONT	Montgomery	123
MOOR	Moore	125
NASH	Nash	127
NEWH	New Hanover	129
NORT	Northampton	131
ONSL	Onslow	133
ORAN	Orange	135
PAML	Pamlico	137
PASQ	Pasquotank	139
PEND	Pender	141
PERQ	Perquimans	143
PERS	Person	145
PITT	Pitt	147
POLK	Polk	149
RAND	Randolph	151
RICH	Richmond	153
ROBE	Robeson	155
ROCK	Rockingham	157
ROWA	Rowan	159
RUTH	Rutherford	161
SAMP	Sampson	163

SCOT	Scotland	165
STAN	Stanly	167
STOK	Stokes	169
SURR	Surry	171
SWAI	Swain	173
TRAN	Transylvania	175
TYRR	Tyrrell	177
UNIO	Union	179
VANC	Vance	181
WAKE	Wake	183
WARR	Warren	185
WASH	Washington	187
WATA	Watauga	189
WAYN	Wayne	191
WILK	Wilkes	193
WILS	Wilson	195
YADK	Yadkin	197
YANC	Yancey	199

County names, county codes and required inspection type shall all be taken from the COUNTY.DAT file. The method of selecting the county name will be similar in execution to the method used to select the vehicle make from the list of presented makes. If the inspector-mechanic indicates at display prompt one (1) that a Safety Inspection Only is not desired, the analyzer shall abort the inspection, and return to the Main Menu. Only a response of Y or N will be accepted for display prompt one (1).

3. The entry of the vehicle information shall proceed in the same manner as described for a Safety and Emission Inspection. This process is described above.
4. The safety inspection sequence shall proceed in the same manner as described for a Safety and Emission Inspection. This process is described above .
5. The tampering inspection sequence shall proceed in the same manner as described for a Safety and Emission Inspection. This process is described above.
6. The record shall first be written to disk when an overall inspection result is calculated from the results of the safety inspection sequence and the tampering inspection sequence. Aborting a Safety-only inspection shall not write an inspection record to disk.
7. The issuing of the Safety or Motorcycle/Trailer Safety sticker or the Safety (which includes Motorcycles (M) and Trailers (T) e-sticker authorization, and printing of the inspection receipt/statement shall proceed in the same manner as described for a Safety and Emission Inspection. This process is described above.
8. (Current until such time e-sticker start date takes affect.) No calls shall be placed to the VID for a safety-only inspection at either start or end of the inspection. Any NCAS.DAT records written to disk shall be stored until the next safety-emissions inspection begin test call, at which time the inspection record will be transmitted to the VID.

3.17 Reinspection Sequence

A reinspection sequence shall be initiated by an entry of 3 from the State Inspection Menu. This subsection describes the differences in the programming criteria and the sequence of menus from that used in the Reinspection and the Safety and Emissions Inspection.

3.17.1 Reinspection Initiation

Reinspection shall be initiated in the same way as an initial inspection except that the “reinspection” field shall have a “Y” recorded. The analyzer shall prompt for the reinspection type:

Prompt:

Select Reinspection type:

1. Safety-Emissions Reinspection
2. Safety-only Reinspection
3. Exit

Following selection of the reinspection type the analyzer shall:

1. Gather the VIN and License Plate data in the same manner as above.
2. If the reinspection type is Safety-emissions the analyzer shall initiate a call to the VID and attempt to find a vehicle match that will bring the previous test information to the analyzer. Failing VID communications or failing to find a match on the VID, the analyzer will attempt a local search of the NCAS.DAT and NCAS.HST files to locate previous inspection data.
3. (Current until such time e-sticker start date takes affect. At that time reinspection for a safety-only will follow the same procedures of that for a safety-emissions reinspection.) If the reinspection type is Safety-only the analyzer will first search the NCAS.DAT and NCAS.HST files for inspections less than 61 (NETWORK.DAT value plus 1) days old. If a safety-only inspection is found for this vehicle then the previous inspection data shall be used to conduct the reinspection. If no matching inspection records are found or a safety-emissions inspection record is found the analyzer shall contact the VID to locate previous inspection data.
4. All Reinspection test types will be uniquely identified in the “Inspection Type” field in NCAS.DAT to allow the VID to differentiate between retest type (Safety-Emissions, Safety-only, or Safety-OBDI).

Following local file search or contact with the VID, the analyzer will perform a normal inspection except as noted in the following sub-sections:

[1/27/99 & 5/24/02 (NC) For failed reinspection records, if the emission inspection disposition field (66) is not P, F, or R, previous test can be assumed as safety-only. This note applies to BAR90 and BAR97 units certified to the October 1998 specifications.]

3.17.2 Rejection Record

The rejection record shall be displayed on the screen. Only those items that failed inspection will be displayed if the reinspection occurs within 60* days of the most previous inspection**

and performed at the same station of the initial (most current) failed inspection. The inspection will convert to an initial inspection and all inspection items will be listed on the rejection summary if the initial (or most current) inspection occurred more than sixty (60)* days previously. There is no inspection fee if the vehicle is reinspected within 60* days. The description will be presented as described in Section 3. [2/15/99 See spreadsheet].

[10/19/07 (NC) *The sixty (60) day rule, instead of the previous 30 day rule, becomes affective 1/01/09. However, this number (days) will be sent by VID from NETWORK.DAT (Days Allocated for Re-inspection).]

[**02/05/08 (NC) whether using the 60 day rule or the 30 day rule, the analyzer is to consider the time from the most recent previous inspection on record. The initial inspection should not be used to calculate this time frame if there are multiple inspection records for the vehicle.]

1. The inspector-mechanic shall be allowed to enter the current odometer readings.
2. The inspector-mechanic shall NOT be allowed to enter or change any of the following vehicle information: VIN, License Plate, Current Registration Indicator, registration county, vehicle body style, vehicle type, fuel type, model year, cylinder, engine size, or make.
3. Entries of F or P will be allowed for all previously failed items on the screen in the Safety Inspection Summary and Tampering Inspection Summary sections and the change will be reflected in the new record. A change of a FAIL to a PASS in the Emission Inspection Summary will require a re-administering of the emission testing procedure. The results of the reinspection will be recorded on the rejection summary screen and a new test record will be created in the NCAS.DAT file.

3.17.3 Emission Reinspection

The emission reinspection portion of the reinspection (whether an idle inspection or an OBDII scan) will be activated if the analyzer determines from the VID test record that the vehicle failed the initial emission inspection, any component of the tampering inspection, or the exhaust system component of the safety inspection at the same station the test is currently being performed at. The emission inspection sequences shall proceed in the same manner as described in the Safety and Emission Inspection above.

3.17.4 Issuing the Sticker/E-Sticker Authorization and Printing the Inspection Receipt/Statement

Reinspection test end procedures are the same as for either the Safety-only or Safety and Emissions initial inspection. Test fee assignment, sticker/e-sticker authorization issuance and VIRS printing follow the same procedures. For Safety-only re-inspections no call will be placed to the VID, the inspection record will be stored in NCAS.DAT. However, beginning with the E-Sticker Start Date safety-only inspections/re-inspections will contact the VID in the same manner as the safety-emissions inspection/re-inspections with the record stored in NCAS.DAT. For Safety-emissions re-inspections a call shall be placed to the VID in the same manner as the conclusion of an initial inspection.

3.18 Reinspection Using Waivers/Waiver Sequence

A Reinspection Using Waivers/Waiver sequence shall be initiated by an entry of 4 from the State Inspection Menu. This subsection describes the differences in the programming criteria and the sequence of menus from that used in the Reinspection and the Safety/OBDII Inspection. The inspector-mechanic will be presented with a “Waiver” issued by a DMV Enforcement Officer prior to the inspector-mechanic initiating the Reinspection Using Waivers/Waiver sequence. A vehicle must have been re-inspected with the most recent inspection having an overall inspection disposition as “fail” (except for vehicles that could not be tested due to too many OBDII monitors set to not-ready) before a waiver can be issued and the initial inspection must have occurred not more than sixty (60) days prior. This 60-day requirement will be a function performed by NC DMV at the time of waiver issuance and not a function of the analyzers. If waiver is granted the motorist will return to the inspection station where the vehicle failed to pass the previous inspection. The inspector-mechanic will use their analyzer to enter the waiver authorization number to complete the inspection and issue a sticker or e-sticker authorization. [12/04/07 (NC) Waiver Authorization Number will be 11 characters long. They will consist of three (3) alpha (type of waiver) followed by 8 numeric. Type of Waivers: Repair Waiver (RER); Non-Communication Waiver (NCR); Not Ready Reinspection Waiver (NRR), Not Ready Initial Waiver (NRI), Damaged/Missing DLC Waiver (DDR)]

The following sections will describe the programming criteria and the sequence of menus used in the Reinspection Using Waivers.

3.18.1 Waivers

Waiver types:

1. Safety-Emissions Reinspection using a Repair Waiver
2. Safety-Emissions Reinspection using a Non-Communication Waiver
3. Safety-Emissions Reinspection using a Not-Ready Waiver
4. Safety-Emissions Not-Ready Waiver Initial Inspection
5. Safety-Emissions Reinspection using a Damaged/Missing DLC Waiver

Table 3.18.1.1

Previous Inspection Results That Must Be Meet to Accept Waiver Number

Reinspection or Waiver Type	Safety Inspection Disposition	Tamper Inspection Disposition	OBDII Inspection Disposition	OBDII Ready Results
Reinspection Repair RER	P	P	F	P or F
Reinspection Non Communication NCR	P	P	N	-
Reinspection Not Ready NRR	P	P	R	F
Waiver for Not Ready NRI	-	-	R	F
Waiver for Damaged/Missing DLC DDR	P	P	C	-

[11/03/2006 (NC) results with "-" represent fields that should be considered as "null" or "blank" in test records.]
 [11/7/2008 (NC) added the "or" statement for the RER waiver.]

3.18.2 Display Prompts

1. Display prompt one (1):

“Please scan or type the Waiver Authorization Number.
Press the Enter key when ready to continue.”

2. Display prompt two (2):

“A match cannot be found for the Waiver Authorization Number entered. Test will be aborted. Press Enter to continue.”

3. Display prompt three (3):

“Test results returned by VID do not qualify vehicle for waiver. Please contact DMV for resolution. Test will be aborted. Press Enter to continue.”

3.18.3 Error Messages

1. Error message one (1). Unable to read the Waiver Authorization Number. Please rescan.
2. Error message two (2). Unable to read the Waiver Authorization Number. Please retype the waiver number.

3.18.4 Reinspections Using Waivers Overall Programming Criteria

1. Inspector-mechanic access shall be done in the same method as the beginning of an emissions inspection.
2. Display prompt one (1) for waiver number
3. If the inspector-mechanic makes an unsuccessful attempt to scan the waiver authorization number with the bar code reader, error message one (1) shall be displayed.
4. Error message two (2) shall be displayed if the double blind entry of waiver authorization number does not match. If after two unsuccessful attempts of performing the double blind entries, the analyzer will return to the Main Menu
5. Utilizing the prefix of the waiver number, the analyzer shall select the proper waiver type:
 - i. RER - (Safety-Emissions Reinspection using a Repair Waiver)
 - ii. NCR - (Safety-Emissions Reinspection using a Non-Communication Waiver)
 - iii. NRR - (Safety-Emissions Reinspection using a Not-Ready Waiver)
 - iv. NRI - (Safety-Emissions Not-Ready Waiver Initial Inspection)
 - v. DDR - (Safety-Emissions Reinspection using a Damaged/Missing DLC Waiver)
6. Once the analyzer has received the proper responses to its prompts, the analyzer shall format a waiver authorization request and initiate a phone call to the VID.
 - i. If waiver number is found the inspection record results will be brought forward;
 - ii. If waiver number is not found, display prompt two (2).
 - iii. If waiver number is found, compare selected waiver type to test record results using table 3.18.1.1.
 - iv. If comparative results do not match, display prompt three (3).

7. If waiver type RER, NCR, NRR, DDR was selected,
 - i. The “reinspection” field shall have a “Y” recorded.
 - ii. **Enter** current odometer reading **which will be recorded** to NCAS.DAT.
 - iii. The entered waiver authorization number will be recorded in the test record **and must** be displayed on the inspection receipt. The entered waiver authorization number will overwrite any existing waiver authorization number found in the test record.
 - iv. The analyzer will proceed to complete sticker/e-sticker authorization issuance and print the Vehicle Inspection Receipt/Statement.
8. If waiver type NRI was selected then a complete inspection must be perform as if it was an initial inspection.
 - i. Complete the OBD test sequence without regard to monitor readiness.
 - ii. If vehicle has to many not-ready monitors as defined under the OBD test sequence, an “F” will be recorded in the NCAS.DAT field for OBDII Ready Result, but should be treated by the system “as if” a “P” was recorded.
 - iii. OBDII Inspection Disposition, MIL Commanded Status and other OBDII scan results in NCAS.DAT will be recorded based on actual scan results.
 - iv. The analyzer will proceed to the safety and tampering inspection sequences as in an initial emission inspection.
 - v. The entered waiver authorization number will be recorded in the test record that will be displayed on the inspection receipt.
 - vi. If the vehicle fails the overall test results an “F” will be placed in the Record Inspection Disposition, test fee assigned and VIRS printing per Section 5.
 - vii. If a subsequent Waiver Authorization number is required to pass the vehicle the new waiver authorization number will be recorded in NCAS.DAT overwriting any existing waiver authorization number found in the test record.
 - viii. If the analyzer determines that the vehicle has “passed” all sections of the inspection, the Record Inspection Disposition in the test record is “P”.
 - ix. The test end procedures are the same as an initial emission test. Test fee assignment, sticker/e-sticker authorization issuance and VIRS printing per Section 5. A call shall be placed to the VID in the same manner as the conclusion of an initial inspection.

3.18.5 (This section intentionally left blank for future use)

~~3.18.6 (Current until such time E-Sticker Start Date take Affect) Issuing the Sticker and Printing the VIRS due to Waivers~~

~~If the waiver authorization numbers match per preceding sections and/or vehicle has an overall inspection disposition of a “P”, the following display prompts, error messages and programming criteria will guide the inspector-mechanic through the procedure of printing a receipt/statement at the end of the waiver sequence.~~

~~3.18.6.1 –Display Prompts~~

~~1.—Display prompt one (1):~~

~~—“Is next sequential sticker voided or damaged, missing or stolen? Y—N”~~

~~2. Display prompt two (2):~~

~~“Scan or carefully enter sticker number _____”~~

~~3. Display prompt three (3):~~

~~Identify the disposition of the next sequential sticker:~~

~~_____ Voided/Damaged
_____ Missing
_____ Stolen
_____ Cancel and Re-enter~~

~~4. Display prompt four (4):~~

~~“Enter the expiration date of the 'old' North Carolina inspection sticker that was on the vehicle before this inspection. If there is no sticker, enter 00/0000. If it is an out-of-state sticker, enter 00/0000.”~~

~~5. Display prompt five (5):~~

~~“Is this vehicle for sale by a dealership? (Y/N)”~~

~~6. Display prompt six (6):~~

~~“Expiration date of the new sticker is MM/YYYY. Indicate MM/YYYY expiration on sticker per DMV Regulations and apply sticker to vehicle.” (where MM/YYYY is 12 months from today)~~

~~7. Display prompt seven (7):~~

~~“Expiration date of the new sticker is MM/YYYY. Indicate MM/YYYY expiration on sticker per DMV Regulations and apply sticker to vehicle.” (where MM/YYYY is 12 months from date of sticker on vehicle)~~

~~8. Display prompt eight (8):~~

~~“Was the sticker successfully applied to the vehicle? _____ Y/N”~~

~~9. Display prompt nine (9):~~

~~“Identify the disposition of sticker XXXXXXXX:~~

~~_____ Voided/Damaged
_____ Missing
_____ Stolen”~~

~~10. Display prompt ten (10):~~

~~“Please enter number of Vehicle Inspection Receipt/Statements (VIRS) to print_____.”~~

~~3.18.6.2 Error Messages~~

~~The following error messages will be displayed as indicated in the programming criteria:~~

- ~~1. Error message one (1). This field requires an entry.~~
- ~~2. Error message two (2). The number of the next available sticker for class XX is not the number as identified by the analyzer. Identify the disposition of the next sticker:
_____ Voided/Damaged
_____ Missing
_____ Stolen
_____ Cancel and Re-enter~~
- ~~3. Error message three (3). The sticker type entered does not match the type of inspection completed. Do you wish to attempt entry again or abort test? Select one:
_____ Attempt Entry
_____ Abort Test~~

~~3.18.6.3 Programming Criteria~~

- ~~1. Waivers are issued primary for emissions (IM stickers) but some safety only (SI stickers) may receive waivers. No Motorcycle Trailers stickers are issued using waivers through the analyzer. Sticker numbers are bar coded and may be scanned or entered from the keyboard.~~
- ~~2. The analyzer will use display prompt one (1) to confirm the next sequential sticker is not damaged, voided, missing, or stolen. If the inspector mechanic enters “yes” to display prompt one (1), the analyzer will display prompt three (3) to identify the disposition of the sticker as calculated by the analyzer. Display prompt 3 shall be used to gather the disposition of the next sticker and shall also allow the inspector mechanic to cancel the current entry and attempt re-entry of the sticker number. Display prompt three (3) will NOT display the next sequential sticker number as calculated by the analyzer. The analyzer shall record all relevant information for this record in STICKER.DAT, including date, station license number, analyzer number, inspector license number, sticker class, sticker number, reason code, and VIN. After the inspector mechanic has entered the disposition of the next sequential sticker, the analyzer will again display prompt one (1). This cycle will be repeated until the inspector mechanic answers “No” to the next sticker being damaged, voided, missing or stolen.~~
- ~~3. Once the inspector mechanic enters “No” for display prompt one (1), the analyzer will use display prompt two (2) to confirm the next available sticker number as calculated by the analyzer matches the number of the next available sticker assigned to the analyzer. If the entered number matches the next available sticker number as calculated by the analyzer, the analyzer shall record the receipt/statement number, the sticker number and the inspection disposition to the test record.~~

- ~~4. If the sticker number entered at display prompt two (2) does not match the next sticker number on file in the analyzer, the inspector mechanic must identify the disposition of the missing sticker(s). Error message 2 shall be used to gather the disposition of the next sticker as calculated by the analyzer and also allow the inspector mechanic to cancel current entry and re-enter the sticker number. Error message two (2) will NOT display the next sequential sticker number as calculated by the analyzer. The analyzer shall record the appropriate sticker disposition in STICKER.DAT, and will also record all other relevant information for this record in STICKER.DAT, including date, station license number, analyzer number, inspector license number, sticker class, sticker number, reason code, and VIN. Display prompt two (2) will then be repeated. This cycle will be repeated until the sticker number entered by the inspector mechanic is the same as the sticker number identified by the analyzer.~~
- ~~5. If the sticker type entered at display prompt two (2) does not match the inspection type, the analyzer shall display error message three (3). If the inspector mechanic chooses to retry, display prompt two (2) will again be displayed.~~
- ~~6. The Bar Code Format for stickers is as follows:
 - a) Leading identifier character "+" for individual stickers.
 - b) Sticker number = 8 characters. First character alpha to designate sticker type (IM, SI, or MT), second character alpha to designate series number, followed by six (6) numeric.
 - c) Allowable letters for the first alpha character of IM stickers shall be "A", "B", "C", "D", "E", "F", "G", "H", or "I". Allowable letters for first alpha character of SI stickers shall be "N", "P", "Q", "R", "S", "T", "U", "V", "W", "X", "Y", or "Z". Allowable letters for the first alpha character of MT stickers shall be "J", "K", "L", or "M".
 - d) Leading identifier character "B" for sticker booklets.
 - e) Do not save, display or print the leading identifiers "+" or "B" characters.~~
- ~~7. Display prompt four (4) will be used to collect the expiration date of the "old" inspection sticker. If the inspector mechanic enters an expiration date of 00/0000, the analyzer shall display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the Waiver Receipt/Statement.~~
- ~~8. If the date entered at display prompt four (4) indicates the "old" inspection sticker has expired by 12 months or more, the analyzer shall again display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the Waiver Receipt/Statement.~~
- ~~9. If the date entered at display prompt four (4) indicates the "old" inspection sticker has expired by less than 12 months, the analyzer shall display prompt five (5).
 - a) If the inspector mechanic enters "yes" to display prompt five (5), the analyzer shall display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~

- ~~b) If the inspector mechanic enters “no” to display prompt five (5), the analyzer shall display prompt seven (7) (MM/YYYY will be 12 months from date of sticker on vehicle). The analyzer will then enter MM/YYYY into the test record and print it on the VIRS.~~
- ~~10. If the date entered at display prompt four (4) indicates the “old” inspection sticker has not expired, the analyzer will display prompt six (6) (MM/YYYY will be 12 months from the current date). The analyzer will then enter MM/YYYY into the test record and print it on the Waiver Receipt/Statement.~~
- ~~11. The analyzer will then present display prompt eight (8). If the inspector mechanic answers no to display prompt eight (8), the analyzer will display prompt nine (9) to identify the disposition of the damaged sticker. Display prompt nine (9) WILL display the number of the damaged sticker. The disposition of any unsuccessfully applied sticker will be written to STICKER.DAT. The analyzer shall also record all other relevant information for this record in STICKER.DAT, including date, station license number, analyzer number, inspector license number, sticker class, sticker number, reason code and VIN. This cycle will be repeated until the inspector mechanic answers “Yes” to the sticker being successfully applied to the vehicle.~~
- ~~12. Once the inspector mechanic indicates the sticker has been successfully applied to the vehicle, the analyzer shall calculate a “Transaction Identification Number” (TIN). The TIN will be calculated and written to the inspection record and will be printed on all copies of the VIRS. [12/01/07 (MCI) Updated TIN algorithm spec v1.01]~~
- ~~13. The analyzer shall write the final NCAS.DAT record at which time the analyzer will initiate a call to the VID. After the analyzer has attempted to initiate a phone call to the VID, successful or not, the analyzer shall display prompt ten (10) to query the inspector about how many copies of the VIRS to print. This field will accept entry of a single numeric digit (1 through 9) and will be selected via the “enter” key. The default value for this field will be one (1), so the inspector may print one VIRS with a single keystroke (via the “enter” key). If the one (1) is deleted and no additional number is entered, error message one (1) above shall be displayed. Once the inspector mechanic selects the number of VIRS to print, the analyzer will begin printing the receipt/statement(s) in the form described in Section 5.~~
- ~~14. While printing the receipt/statement the display shall be, "PRINTING WAIVER RECEIPT/STATEMENT."~~
- ~~15. Throughout this entire process, if the inspector mechanic attempts to proceed past any required display prompts without an entry, the analyzer shall display error message one (1).~~
- ~~16. When printing is complete, the analyzer shall then return to the Main Menu.~~

~~Printer Error Messages:~~

~~During the printing process of the VIRS the following messages will be displayed as necessary:~~

- ~~1. The printer is out of paper. Please correct this problem and press any key to continue.~~

~~2. The printer is not responding. Please correct the problem and press any key to continue. If the problem cannot be resolved, please contact your service vendor.~~

3.18.6 (Effective based on E-Sticker Start Date) Issuing the E-Sticker Authorization and Printing the VIRS due to Waivers

If the overall inspection disposition of a “P”, the following display prompts, error messages and programming criteria will guide the inspector-mechanic through the procedure of printing a receipt/statement at the end of the waiver sequence:

3.18.6.1 Display Prompts

1. Display prompt one (1):

“Please enter number of Vehicle Inspection Receipt/Statements (VIRS) to print_____.”

3.18.6.2 Error Messages

The following error messages will be displayed as indicated in the programming criteria:

1. Error message one (1). “This field requires an entry.”

3.18.6.3 Programming Criteria

1. Waivers are only issued for emissions (IM) e-stickers. No safety-only (SI) e-stickers are issued using waivers through the analyzer.
2. If the analyzer determines that the vehicle has passed all sections of the inspection, (the Record Inspection Disposition in the test record is “P”), the analyzer will then take the next e-sticker authorization for category IM and record the corresponding e-sticker authorization inventory number along with the receipt/statement number and the inspection disposition into the test record.
[11/30/07 (NC) E-sticker authorization number recorded in test record will be three digit (zero padded) number that corresponds to the e-sticker authorization in inventory used for the test.]
3. When the e-sticker authorization has been issued, the analyzer shall calculate a “Transaction Identification Number” (TIN). The TIN will be calculated and written to the inspection record and will be printed on all copies of the VIRS.
[01/28/99 (MCI) Updated TIN algorithm spec – v1.01]
4. The analyzer shall record the “Next Inspection Due Date” as received from the VID. The analyzer will enter MM/YYYY (Next Inspection Due Date) into the test record and print it on the VIRS.
5. The analyzer shall write the final NCAS.DAT record at which time the analyzer will initiate a call to the VID.
6. After the analyzer has attempted to initiate a phone call to the VID, successful or not, the analyzer shall display prompt one (1) to query the inspector about how many copies of the

VIRS to print. This field will accept entry of a single numeric digit (1 through 9) and will be selected via the “enter” key. The default value for this field will be one (1), so the inspector may print one VIRS with a single keystroke (via the “enter” key). If the one (1) is deleted and no additional number is entered, error message one (1) above shall be displayed. Once the inspector-mechanic selects the number of VIRS to print, the analyzer will begin printing the receipt/statement(s) in the form described in Section 5

7. While printing the receipt/statement the display shall be "PRINTING WAIVER RECEIPT/STATEMENT."
8. Throughout this entire process, if the inspector-mechanic attempts to proceed past any required display prompts without an entry, the analyzer shall display error message one (1).
9. When printing is complete, the analyzer shall then return to the Main Menu.

3.18.6.4 Printer Error Messages:

During the printing process of the VIRS the following messages will be displayed as necessary:

1. The printer is out of paper. Please correct this problem and press any key to continue.
2. The printer is not responding. Please correct the problem and press any key to continue. If the problem cannot be resolved, please contact your service vendor.

3.19 Analyzer Maintenance Menu (BAR-90 and BAR-97/OBDII Analyzers)

The analyzer maintenance menu shall be activated by an entry of 5 from the State Inspection Menu. This will present a set of analyzer maintenance functions that may be performed by the inspector-mechanic.

3.19.1 Display Prompts

1. For BAR-90 and BAR-97/OBDII analyzers, display prompt one (1) shall be displayed to the screen. The inspector-mechanic shall select from the options listed, the maintenance function to be performed. Display prompt one (1);
Analyzer Maintenance Menu
 1. Two-point Gas Calibration and Leak Check
 2. Gas Calibration
 3. Leak Check
 4. Status Screen
 5. Change Gas Bottle
 99. Return to Main Menu.
2. When the inspector-mechanic has selected 1 at display prompt one (1), the analyzer shall initiate a two-point gas calibration and leak check sequence.
 - (a) A two-point gas calibration and leak check is required. Selection of this item shall bring up a set of both gas calibration and leak check procedures. The procedures shall be user friendly and shall indicate every step needed to

- properly perform the required gas calibration and leak check (including when it is necessary to turn the gas cylinder valve on and off). The procedures shall include a prompt to scan the calibration gas bottle bar code. If the bar code reader is not available, manual entry of the gas values is allowed. Procedures shall be approved by the State. Results of the leak check and the gas calibration shall be displayed to the screen and recorded on the test calibration record. The system shall preclude State emission inspections (State Inspection Menu options 1 and 3) after seventy-two (72) hours for low-volume stations or after twenty-four (24) hours for high-volume stations if a two-point gas calibration and leak check are not performed and passed. If the analyzer fails the two-point gas calibration and leak check, a message shall be displayed indicating that it failed and instructing the inspector-mechanic to call for repairs. Emissions-related inspection function will be locked out pending service repair(s).
- (b) When the two-point gas calibration and leak check is completed, the analyzer shall return to the Analyzer Maintenance Menu (display prompt 1).
3. When the DMV Inspector has selected two (2) at display prompt one (1), the analyzer shall initiate a gas calibration sequence.
 - (a) Selection of this item shall bring up a set of gas calibration procedures. The procedures shall be user friendly and shall indicate every step needed to properly perform the gas calibration (including when it is necessary to turn the gas cylinder valve on and off). The procedures shall include a prompt to scan the calibration gas bottle bar code. If the bar code reader is not available, manual entry of the gas values is allowed. Procedures shall be approved by the State. Results of the gas calibration shall be displayed to the screen and recorded on the test record. If the analyzer fails the gas calibration, a message shall be displayed indicating that it failed and instructing the inspector-mechanic to call for repairs.
 - (b) When the gas calibration is completed, the analyzer shall return to the Enforcement Analyzer Maintenance Menu (display prompt one (1)).
 4. When the inspector-mechanic has selected 3 at display prompt (1), the analyzer shall initiate a leak check sequence.
 - (a) 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 the leak check (including when it is necessary to turn the gas cylinder valve on and off). Procedures shall be approved by the state. Results of the leak check shall be displayed to the screen and recorded on the test record. If the analyzer fails the leak check, a message shall be displayed indicating that it failed and instructing the inspector-mechanic to call for repairs.
 - (b) When the leak check is completed, the analyzer shall return to the Analyzer Maintenance Menu (display prompt one (1)).

5. When the inspector-mechanic has selected 4 at display prompt one (1), the analyzer shall display the Status Screen. The Status Screen will display the current status of all lockouts, as well as the following information, using information stored in the LOCKOUT.DAT and CAL.DAT files and other sources to generate the Status Screen. The Status Screen may consist of two screens, with page-up/page-down options to move between the screens.
- (a) The general structure of the status screen follows:

Analyzer Status Screen
County Location Code: XXX
Station Number: XXXXXXXX
Analyzer Number: XXXXXXXXX
Status of all relevant lockouts including
 1) lockouts included in LOCKOUT.DAT (such as State analyzer lockout, State analyzer safety lockout, station license suspended, station license revoked, station license expired, failure to pay for stickers/e-stickers authorization, failure to pay for communication services, failure to pay for certification stickers, cabinet tampering, state disk drive tampering, too many off-line tests, virus detected, e-sticker sequence lockout, etc.) as well as;
 2) any additional lockouts of systems or components necessary for proper NCAS functioning, including, but not limited to; warm-up, gas calibrations, leak check, out of various certificates, disk(s) full, disk failures, gas analyzer failure, clock failure, etc..
Propane Equivalency Factor (PEF) number: .XXX
Span Gas Cylinder Values: HC XXXX
 CO XX.XX
 CO2 XX.X
 O2 XX.X
Gas Calibration Limits: HC XXXX
 CO XX.XX
 CO2 XX.X
 O2 XX.X

Date and Time of the last gas calibration and leak check: XX/XX/XX XX:XX
Next Available Sticker Number: XXXXXXXX
Number of Stickers Remaining in Inventory: for Class XX XXXX
 for Class XX XXXX
 for Class XX XXXX
Effective based on E-Sticker start date: Available e-sticker authorizations for each class of e-stickers stored on the analyzer: XXX
Number of E-Stickers Authorizations in Inventory: for Class IM XXX
 for Class SI XXX

Date analyzer was last serviced: XX/XX/XX
Current Date and time: XX/XX/XXXX XX:XX
Software Version Number: XXXX
Date of last VID Communication: MM/DD/YYYY
Number of inspections since last communication: XXX
Press the Enter key when ready to continue.

- (b) After the inspector-mechanic has pressed the Enter key, the analyzer shall return to the Analyzer Maintenance Menu.
6. When the inspector-mechanic has selected five (5) at display prompt one (1), the analyzer shall initiate a change gas bottle sequence.
- (a) Selection of this item shall bring up a set of gas bottle change procedures. The procedures shall be user friendly and shall indicate every step necessary to properly perform the gas bottle change (including when it is necessary to turn the gas cylinder valve on and off). The procedures shall include a prompt to scan the calibration gas bottle bar code. If the bar code reader is not available, manual entry of the gas values is allowed. Procedures shall be approved by the state. The time and date of the gas bottle change shall be displayed to the screen and recorded to the calibration test record.
 - (b) When the gas bottle change procedure is complete, the analyzer shall automatically begin performing a gas calibration and leak check sequence.
 - (c) When the analyzer has completed the gas calibration and leak check, the analyzer shall return to the Analyzer Maintenance Menu.
7. When the inspector-mechanic selects 99 from the Analyzer Maintenance Menu, the analyzer shall return to the Main Menu.

3.20 Analyzer Maintenance Menu (OBDII-only analyzers)

The Analyzer Maintenance Menu shall be activated by an entry of 5 from the State Inspection Menu. For OBDII-only Analyzers, this menu shall display the following prompt:

Display Prompt

“Analyzer Maintenance Menu

1. Status Screen

99. Return to Main Menu”

1. When the inspector-mechanic has selected Item (1) from the Analyzer Maintenance menu, the analyzer shall display the Status Screen. The Status Screen will display the current status of all lockouts, as well as the following information, using information stored in the LOCKOUT.DAT and CAL.DAT files and other sources necessary to generate the Status Screen. The Status Screen may consist of two screens, with page-up/page-down options to move between the screens.

The general structure of the status screen follows:

Analyzer Status Screen
County Location Code: XXX
Station Number: XXXXXXXX
Analyzer Number: XXXXXXXXX

Status of all relevant lockouts including

- 1) lockouts included in LOCKOUT.DAT (such as State analyzer lockout, State analyzer safety lockout, station license suspended, station license revoked, station license expired, failure to pay for stickers/e-stickers, failure to pay for communication services, failure to pay for certification stickers, cabinet tampering, state disk drive tampering, too many off-line tests, virus detected, e-sticker sequence lockout, etc.) as well as;
- 2) any additional lockouts of systems or components necessary for proper NCAS functioning, including, but not limited to; out of various certificates, disk(s) full, disk failures, clock failure, etc.

Next Available Sticker Number: XXXXXXXX

Number of Stickers Remaining in Inventory: for Class XX XXXX
for Class XX XXXX
for Class XX XXXX

Effective based on E-Sticker start date: Available e-sticker authorizations for each class of e-stickers stored on the analyzer: XXX

Number of E-Stickers Authorizations in Inventory: for Class IM XXX
for Class SI XXX

Current Date and time: XX/XX/XXXX XX:XX

Software Version Number: XXXX

Date of last VID Communication: MM/DD/YYYY

Number of inspections since last communication: XXX

Press the Enter key when ready to continue.

After the inspector-mechanic has pressed the Enter key, the analyzer shall return to the Analyzer Maintenance Menu.

2. When the inspector-mechanic selects 99 from the Analyzer Maintenance Menu, the analyzer shall return to the Main Menu.

3.21 Search and Reprint Receipt/Statement

Search and Reprint Receipt/Statement function shall be activated by an entry of 6 from the State Inspection Menu. This function shall permit the inspector-mechanic to search the test records on the analyzer and print duplicate receipt/statements.

3.21.1 Display prompt

1. Display prompt 1 shall be displayed to the screen. The inspector-mechanic shall enter information upon which the search of the test records shall be based. Display prompt one (1), Enter the information for the search:

VIN: _____
Date: ____/____/____
Receipt/Statement Number: _____
Sticker/E-Sticker Class: ____
Sticker Number: _____

(NOTE: Effective on E-Sticker State Date – search by Sticker Number will be replaced by search by Vehicle Plate Number.

Vehicle Plate Number: _____

Press the Enter key when ready to begin the search or press (cancel key) to cancel.

2. The analyzer will not require the completion of all fields, but at least one (1) field must be completed to begin the search.
3. The analyzer shall search for test records, which match the conditions listed. If no matches are found, the analyzer shall give the inspector-mechanic the option of searching the history file (NCAS.HST) as well. When a match is found for the search condition, the inspector-mechanic shall be able to review the previous test records as well as those that follow the target record. The inspector-mechanic shall be given the option of continuing the search for the next matching test record.
4. After the analyzer has located the test record, the inspector-mechanic shall be given the option of printing a duplicate receipt/statement from the test record. When a receipt/statement is duplicated, **it shall be the same as the original (see Section 5) except for two (2) differences.**

1) The title shall be changed to reflect that this is a duplicate. (Ref; Section 5.2)

2) The date of the duplicating shall appear above the receipt/statement date (preferred location).

[5/26/98 (NC) Do not allow printing of VIRS if abort code field is populated.]

[2/3/99 (NC) No need to reprint recall/tsb msgs & match info on reprinted VIRS]

[12/7/09 (NC) Removed referenced to Section 5(1) which referred to the previously removed item "Analyzer Inspection Summary" in August 2000 which was then part of the Station Menu.

5. When the inspector-mechanic has finished printing or searching, the analyzer shall return to the Main Menu.

~~3.22 (Current until such time E-Sticker Start Date takes affect) Add Inspection Stickers to Analyzer Inventory~~

~~Add Inspection Stickers to Analyzer Inventory sequence will be initiated when 7 is selected from the State Inspection Menu.~~

- ~~1. The analyzer shall display, on a single screen, the instructions for adding stickers to the analyzer inventory and record the beginning and ending sticker numbers by class of sticker in a file named as follows:
 - a) ~~CERTIFIM.DAT for Emission Inspection (IM) Stickers;~~
 - b) ~~CERTIFSI.DAT for Safety Inspection (SI) Stickers, and~~
 - c) ~~CERTIFMT.DAT for Trailer and Motorcycle (MT) Stickers.~~
 - d) ~~CERTINV.DAT to record all sticker books entered, for transmission to the VID.~~~~
- ~~2. The operator will also be offered the opportunity to record sticker numbers (by class) that are missing from the book of sticker assigned to the analyzer. The process for recording missing sticker number(s) shall allow for the single entry of individual numbers. The analyzer must account for all stickers. Each sticker number shall be individually written to a record in the STICKER.DAT file, with the "reason code" recorded as an "M". The analyzer shall also record all other relevant information for this record in STICKER.DAT, including date,~~

- ~~station license number, analyzer number, inspector license number, sticker class, and sticker number.~~
- ~~3.—As the analyzer initiates the Receipt/Statement printing procedure, the analyzer will request the confirmation of accuracy of the identified next available sticker number for the class of inspection being performed. The analyzer will query the CERTIFIM.DAT, CERTIFSI.DAT, and CERTIFMT.DAT data files to determine the next available sticker number for the inspection class as identified in the file and the operator will be requested to confirm the number of the actual sticker as available in the sticker inventory drawer of the analyzer.~~
 - ~~4.—If the last physical sticker for a particular class of sticker in the analyzer drawer has been used in the inspection process (that is the number of the last used sticker is equal to the last available number as identified in the CERTIFIM.DAT, CERTIFSI.DAT, or CERTIFMT.DAT data files), then the analyzer shall be locked out of performing the selections 1, 2, 3, and 4 of the State Inspection Menu depending upon the class of sticker inventory depleted.~~
 - ~~5.—To assist the manufacturer(s) in developing a procedure for adding sticker inventory to the analyzer, the following information should be noted:
 - ~~a)—Sticker books for Emission Inspections and Safety Inspections are issued with fifty (50) stickers to the book. Sticker books for Trailer and Motorcycle Inspections are issued with ten (10) stickers to the book.~~
 - ~~b)—Inspection station owner/managers normally purchase several books of a particular class for addition to the station inventory.~~~~
 - ~~6.—While sticker numbers within a book normally run consecutively (possibly with missing numbers), books purchased at one time may not be in sequential order. Therefore, sticker books are to be entered one book at a time. For instance: the analyzer might inquire "How many books are to be entered?" It might then direct the operator to "Enter sticker numbers of the first book," "Enter sticker numbers of the second book," etc.~~
 - ~~7.—The analyzer shall allow scanner or keyboard entry.
{3/3/99 (DMV) Single scan entry okay. Set end sticker number per book size & proceed to missing sticker prompt}~~
 - ~~8.—The screen shall allow the input of the starting numbers of sticker books. The books will be bar coded and will be in code 3 of 9 with the following format:~~
 - ~~9.—Bar Code format for stickers:
 - ~~a)—Leading identifier character "+" for individual stickers.~~
 - ~~b)—Sticker number = 8 characters. First character alpha to designate sticker type (IM, SI, or MT), second character alpha to designate series number, followed by six (6) numeric.~~
 - ~~c)—Allowable letters for the first alpha character of IM stickers shall be "A", "B", "C", "D", "E", "F", "G", "H", or "I". Allowable letters for first alpha character of SI stickers shall be "N", "P", "Q", "R", "S", "T", "U", "V", "W", "X", "Y", or "Z". Allowable letters for the first alpha character of MT stickers shall be "J", "K", "L", or "M".~~
 - ~~d)—Leading identifier character "B" for sticker booklets. Starting booklet number can range from 000001 to 999901.~~
 - ~~e)—Do not save, display or print the leading identifiers "+" or "B" characters.~~~~

3.22 (Effective based on E-Sticker Start Date) Add Inspection E-Sticker Authorizations to Analyzer Inventory

E-sticker authorizations purchased through a system, other than through the analyzer, such as a web-base site, will be downloaded to the analyzer upon the next communications with the VID, through the normal inspection process or by data file refresh and recorded in EAUTHINV.DAT.

E-sticker authorizations inventory will be maintained both on the analyzer, as described below, as well on the VID. For each passed inspection, the analyzer will decrement the inventory of e-sticker authorizations by one for it's respective inspection class. If for some reason e-sticker authorizations were removed from an analyzer through a repair process or other means, the VID will repopulate the analyzer with the proper number of e-sticker authorizations for each class of inspections upon a successful data file refresh.

Adding e-sticker authorizations directly through the analyzer can be accomplished through a **direct purchase**. [12-13-06 (NC) It will be the VID contractor's responsibility to provide communication package to download e-stickers authorizations to analyzers.]

1. The analyzer shall display on a single screen the number of e-sticker authorizations available for each inspection class.
2. As the analyzer initiates VID contact per Section 3.7 (at the start of inspections type 1, 2, 3, or 4 of the State Inspection Menu), the analyzer transmits current authorizations inventory for the e-sticker class (type of inspection) selected to the VID. The VID will set an e-sticker sequence lockout, if any mis-matches occurred (i.e. the number of e-sticker authorizations on VID does not match the number of authorizations available from analyzer.) This lockout will prevent any further inspection processes to take place upon completion of the current inspection.
3. When the last e- sticker authorization for a particular inspection class has been used (zero in inventory), the analyzer shall prevent any further inspections for that class from taking place. Inspections can take place once inventory has been added to that inspection class.
4. To assist the manufacturer(s) in developing a procedure for adding e-sticker authorizations inventory to the analyzer, the following information should be noted:
 - a) E-sticker authorization books for Emission Inspections and Safety Inspections are issued with fifty (50) e-sticker authorizations to a book.
 - b) Inspection station owner/managers/authorized buyers may purchase a book of a particular class for addition to the station inventory.
5. E-sticker authorizations inventory will not exceed three number spaces.
6. Prior to having the ability to purchase e-sticker authorizations from either the analyzer or website, each inspection station must set up an account through DMV. These accounts will allow automated billing to take place for e-sticker authorization purchases.

3.22.1 Prompts

The following displays prompts will be displayed as indicated in the programming criteria:

1. Display Prompt one (1)

“Enter your purchaser ID and password. Press Enter to continue”.

2. Display Prompt two (2)

“Additional e-sticker authorizations cannot be obtained at this time for the inspection Class selected. Press the Enter Key to Continue”.

3. Display Prompt three (3)

“You Do Not Have Rights to Purchase E-Sticker Authorizations. Press the Enter Key to return to the Main Menu”.

4. Display Prompt four (4)

“Select the inspection class of e-sticker authorizations to be purchased. Safety-Emissions (IM) or Safety Only (SI). Press the Enter Key to Continue”

5. Display Prompt five (5)

“Order is ready to process. Press the Enter Key to Continue.”

6. Display Prompt six (6)

“Analyzer has received new e-sticker authorizations. Press the Entry Key to Continue.”

3.22.2 Error messages

The following error message will be displayed as indicated in the programming criteria:

1. Error message one (1). E-sticker authorizations cannot be purchased at this time due to no VID contact. Please check your phone line. Do you wish to retry or abort this purchase?”

3.22.3 Program Criteria for E-Sticker Purchase

1. Under entry 7 of State Inspection Menu an option to purchase and add e-sticker authorizations into inventory is to be provided.
2. Display prompt one (1) to begin purchase process.
3. Purchasers ID and password must match those listed in EBUYER.DAT in order to proceed in buying e-sticker authorizations.
4. The analyzer shall display prompt three (3) on the screen if purchaser does not have the rights to purchase e-sticker authorizations per EBUYER.DAT. The analyzer will abort the process to purchase e-sticker authorizations with the proper keystroke and return to the Main Menu.
5. Upon successful log-in display prompt four (4) to select class of e-stickers to be purchased.
6. Analyzer shall only allow the purchase of one book of e-sticker authorizations if the e-sticker inventory for that class of e-sticker authorizations is less than one full book. (I.E.

- less than 50 e-sticker authorizations in inventory for Safety/Emissions (IM) as well for Safety (SI).
7. If e-sticker inventory is equal to or greater than 50 for Safety/Emissions (IM) as well for Safety (SI), display prompt two (2) will be displayed. Upon the proper keystroke of “Continue”, the analyzer will abort the purchase process and return to the Main Menu.
 8. Upon satisfying the above conditions, prompt five (5) will be displayed. Upon the proper keystroke of “Continue”, the VID will be contacted to process the order.
 9. Station number, analyzer number, e-sticker class and purchasers ID will be transmitted to the VID.
 10. Upon successful communications with the VID, the VID will process the order. While the VID is processing the order the words “PROCESSING ORDER” will appear on the screen. Upon successful e-sticker authorization purchase and download of e-sticker authorizations from the VID (EAUTHINV.DAT), the analyzer shall display prompt six (6). Proper keystroke will continue the e-sticker process.
 11. The analyzer shall then display the E-Sticker Authorization Purchase Receipt per Section 5.12.1 and provide the option to print. [12/11/2007 (NC) Transaction ID will be provided by the VID.]
 12. If the purchase process could not be completed, VID response would indicate reason why the order could not be completed.
 13. If communications to the VID cannot be made, error message one (1) will be displayed. A keystroke of “Retry” will return to menu to purchase e-sticker authorizations where another attempt to contact the VID will be made. This cycle will continue until the keystroke to “Abort” is selected. An “Abort” will return analyzer to the Main Menu.

3.22.4 E-Buyer information

Under entry 7 of State Inspection Menu an option to display and print e-sticker purchaser’s information along with setting the replenishing limit for e-sticker authorizations are to be made available. A log-in will not be required to view/print e-buyer list or to enter replenishing limits.

1. The analyzer shall display the e-sticker purchaser’s information as contained in EBUYER.DAT. The analyzer shall not permit the editing of this information.
2. Passwords shall not be displayed.
3. County Location: ___ (location of analyzer)
Station Number: _____
Analyzer Number: ___

E-Sticker Authorization Purchasers

Last Name	First Name	ID	Type
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

4. The analyzer will have a print feature to allow viewer to print all ebuyer names of individual approved to purchase e-sticker authorizations. (These e-buyer individuals could include the owner, accounting staff, non- technicians as well as licensed technician-mechanics. It is whoever the owner has designated as a buyer). The station name and date will be printed in the upper right hand corner. It is intended that this list be printed in a "fast" text mode rather than a "slow" graphics mode.
5. The analyzer will display replenishing limits for both safety and emission e-sticker authorization. While values for each will be set by station personnel the defaults values for each will be set to 15.

3.23 Training Mode

Training Mode function shall be activated by an entry of 8 from the State Inspection Menu. The Training Mode function shall allow the inspector-mechanic to conduct training and to generate a "training" that is a voided, receipt/statement. The choice of inspections shall be the same as for regular State inspections. The NCAS test record will indicate a Record Inspection Disposition of "T", an "8" in the Record Inspection Type, and the VIRS shall have the words "Training Mode" instead of inspection results at the top of the form. The word "VOID" shall be printed in large letters on the face of the receipt/statement. In addition, the receipt/statement number and sticker/e-sticker authorization number fields of the receipt/statement shall be printed with the word "VOID". The inspector-mechanic may select any inspection listed in the State Inspection Menu, but the inspection type shall be recorded as "T". The training application shall not require the use of a valid inspector-mechanic's access code or allow access to secured areas of hardware or software.

1. The analyzer shall record the VIN and the date and time to the test record. The analyzer shall print a TEST receipt/statement.
2. No lockouts, excluding a virus lockout, or modem/phone line conditions shall affect the use of the training mode.
3. No calls shall be placed to the VID during the training inspection.
4. Training records are not to be sent to the VID.
5. When the Training Mode inspection is complete, the analyzer shall return to the Main Menu.

3.24 Feedback Report

Feedback Report function shall be activated by an entry of 9 from the State Inspection Menu. The Feedback Report function allows the inspector-mechanic to propose changes to the analyzer software or hardware.

1. Selection of this function will display a screen with the following information:
"You have selected the Feedback Report function. This lets you propose emissions testing program changes to the State. Changes can be related to the analyzer software or hardware, or to the emissions program itself. Each Feedback Report will be considered

for inclusion in a future software or hardware change. Please type in your suggestion, print the form, and then mail it to the address on the form.

NOTE: For immediate problems, you must contact your local DMV representative. The Feedback Report is only intended to identify future changes -- it cannot fix immediate problems."

2. The screen(s) will be designed to include an area to enter text. Options will be available to print the form or to exit.
3. The printed Feedback Report will include:
 - A heading identifying it as an I/M Feedback Report,
 - The inspection station name and number,
 - The inspector-mechanic name,
 - The date,
 - The software version,
 - The text entered by the inspector-mechanic, and
 - Instructions to mail the form to:

North Carolina Division of Air Quality
Mobile Source Compliance Branch
1641 Mail Service Center
Raleigh, NC 27699-1641
4. The Feedback Report does not produce a file recorded to either the floppy or hard drive. It only prints a text report to the printer.
5. When the Feedback Report is complete, the analyzer will return to the State Inspection Menu.

3.25 DLC Location Reference Information

DLC location reference information shall be displayed upon selection of "10" from the State Inspection Menu. The analyzer will be designed to provide assistance to the inspector with references for OBDII connector locations using the DLCREF.DAT file. After selection of this menu item, the text message from DLCREF.DAT will be displayed on the analyzer screen. After the DLCREF text message is displayed, the analyzer shall allow the inspector to press "enter" to return to the previous test screen.

3.26 Print Inspection Fee Pie Chart

Selection of option 11 of the State Inspection Menu will print a stand-alone safety/emissions inspection fee pie chart as described in Section 5.8. The pie-chart will be printed full-strength, not as a watermark. All legends and notes as shown in Section 5.8 will be printed, and the page will have a header that reads:

STATE OF NORTH CAROLINA
SAFETY/EMISSIONS TEST FEE ALLOCATION

3.27 Return to the Main Menu

Return to the Main Menu as described in section (2) when 99 is selected from the menu.

3.28 Enforcement State Audit Menu

3.28.1 Initiation

When the Enforcement State Audit Menu is selected from the Main Menu, the DMV Inspector will be prompted to enter a State identification number electronically, manually or scanned. The bar code format will be 3 of 9 with no check digit [12/16/98 (NC) Leading identifier is present. See 9.3] . The identification number will be a ten (10) to twelve (12) numeric character string. The access code will be a five (5) numeric character string entered manually and stored in the ENFACC.DAT file. However, leading characters of the access code may be zero, so this field should be designated as an “alpha” field to allow the analyzer to recognize leading zeros. For example, the analyzer should recognize the difference between access code “380” and access code “00380”. The analyzer shall search the file ENFACC.DAT, containing the authorized State representatives, for a license number and access code. After the second failed attempt of entering the identification number or access number by use of an electronic means, manual means or by the use of a scanner,) the analyzer shall request that only the keyboard be used. After the third failed attempt to enter a valid identification number or a valid access code from the keyboard, the analyzer will return to the Main Menu.

[1/8/99; 12/9/98 (NC) If no auditors in file, analyzer must always accept default license number of “111111111” (ten 1’s) and access code of “11111” (five 1’s)]

[12/16/98 (NC) The license number bar code will contain up to 12 characters. Compare as left justified, trailing spaces.]

[12/16/98 (NC) Both the DMV Inspector and QA Auditor have access to the same state menu items.]

[12/1/98 (NC) Change audit.dat file field #5 (offset 28) to spare, length 4 and leave blank.]

1. When the analyzer has accepted a valid access code, a record will be written to the State Audit File containing field 1, 2, 3, 4, 5, 6, 7, 8, and 13. Any menu item selected which will require the output of a State Audit record will update the record created upon the entry into the Enforcement State Audit Menu. If a menu item is selected which does not require the output of a record to the State Audit File, no update to the record written upon entry to the menu will be performed. After the record is written to the file, the Enforcement State Audit Menu prompt will be displayed. For BAR-90 and BAR-97/OBDII analyzers, the following prompt will be displayed:

“Enforcement State Audit Menu

- 1 Station Performance Report
- 2 Enforcement Analyzer Maintenance
- 3 Gas Audit
- 4 Update Station and Inspector Mechanic Information
- 5 Install New Data Disk
- 6 Set Calibration Gas Limits
- 7 Lockout Analyzer
- 8 Perform Emergency Software Update
- 9 Test Record Search and Retrieval
- 10 Copy Analyzer Files
- 11 Sticker Inventory Maintenance
- 12 Network Initialization/Update Communications Data
- 13 Communications Log
- 14 Data File/Lockout Status Refresh
- 99 Return to Main Menu.

Select Option Desired; Enter Number _____”

OBDII-only analyzers shall display the following prompt:

“Enforcement State Audit Menu

- 1 Station Performance Report
- 2 Enforcement Analyzer Maintenance
- 3 Update Station and Inspector Mechanic Information
- 4 Install New Data Disk
- 5 Lockout Analyzer
- 6 Perform Emergency Software Update
- 7 Test Record Search and Retrieval
- 8 Copy Analyzer Files
- 9 Sticker Inventory Maintenance
- 10 Network Initialization/Update Communications Data
- 11 Communications Log
- 12 Data File/Lockout Status Refresh
- 99 Return to Main Menu.

Select Option Desired; Enter Number _____”

When the DMV inspector has entered a valid menu option number, the analyzer shall initiate the associated procedure. If the value entered is not a valid number, an error message shall be displayed to the screen. After four (4) successive invalid entries are made, the analyzer shall automatically return to the Main Menu.

2. From any screen under the Enforcement State Audit Menu, “hot keys” shall be provided. The number of “hot keys” shall be equal to the number of printers. For example, if there is a VIRS printer and a utility printer, one “hot key” shall route the contents of the screen display to the VIRS printer. The other “hot key” shall route the

contents of the screen display to the utility printer. (Note: It is intended that this function cause printing in a “fast” text mode rather than a “slow” graphics mode.)
[5/1/98 (NC) In regards to printing all output to one printer, plain paper replacement obviates need for secure printer. Can enable toggle between printers if mfrs desire.]

3.28.2 Station Performance Report (BAR-90 and BAR-97/OBDII Analyzers)

Station Performance Report sequence shall be initiated when one (1) is selected from the Enforcement State Audit Menu. The analyzer shall display the Station Performance Report to the screen. For BAR-90 and BAR-97/OBDII analyzers, the analyzer shall complete the following fields automatically:

County Location code

Station Number

Analyzer Number

Today's Date

Time Started (time the Enforcement State Audit Menu was Activated)

Time Departed (time the Station Performance Report was printed)

Date of the Last Station Performance Report

Date of Last Calibration Gas Change

Date of the Last two-point Gas Calibration and Leak Check

DMV Inspector Name – Last gas Audit (per access code/license number)
[1/29/99 (DM) should be struck out.]

Readings for HC, CO₂, CO, O₂ (O₂ is optional)

DMV Inspector Name – This Access (per access code/license number).
[1/29/99 (DM) should be struck out.]

The remaining fields shall be suitable for manual entry by the DMV Inspector.

STATION PERFORMANCE REPORT (BAR-90 and BAR-97/OBDII analyzers)

County Location: XXX Time Arrived:-__:____
Time Started:XX:XX
Station Name:XXXXXXXXXXXXXXXXXXXX Time Departed:XX:XX
Station Number: XXXXX Name of person contacted:
Analyzer Number: XXXXXXXX Last name: _____
First name: _____

Date of last Station Performance Report :XX/XX/XXXX
Today's Date:XX/XX/XXXX
Date of Last Calibration Gas Change :XX/XX/XXXX
Date of Last two-point Gas Cal/Leak-Check:XX/XX/XXXX

EVALUATION CHECKLIST: Please enter a P (pass), F (fail), or N (not applicable for each item):

<u>Signs</u>	<u>Miscellaneous</u>	<u>Tools</u>
<input type="checkbox"/> Official Sign	<input type="checkbox"/> Sticker Supply	<input type="checkbox"/> Heavy Duty Jack Lift
<input type="checkbox"/> Station License	<input type="checkbox"/> Inspector Available	<input type="checkbox"/> Scraper
<input type="checkbox"/> Posters	<input type="checkbox"/> Inspection Area Clean	<input type="checkbox"/> Tire Depth Gauge
<input type="checkbox"/> Inspector License	<input type="checkbox"/> Inspection Observed	<input type="checkbox"/> Approved Headlight Tester or Aiming Kit
	<input type="checkbox"/> Sticker Security	<input type="checkbox"/> Creeper
	<input type="checkbox"/> Authorization for Repairs	<input type="checkbox"/> Current Emission Application Manual
	<input type="checkbox"/> Signatures on Forms	<input type="checkbox"/> Photometer
	<input type="checkbox"/> Signatures on Forms	
	<input type="checkbox"/> Telephone as per State regulations	
	<input type="checkbox"/> Hole Puncher	

Remarks: _____

Corrective action taken: Inspector-Mechanic warned
(mark with X) Owner/manager warned?
 Lockout Issued

DMV Inspector's Signature Owner/Manager's Signature
DMV Inspector Number: XXXXXXXXXXXX

1. The entries made by the DMV Enforcement inspector shall be written to the State audit record.
2. The Station Performance Report shall include an option to print multiple copies on all printers.
3. The NCAS analyzer shall return to the Enforcement State Audit Menu.
4. The audit record shall be transmitted to the VID during the next communications session. No call is initiated from this procedure.

3.28.3 Station Performance Report (OBDII-only analyzers)

Station Performance Report sequence shall be initiated when one (1) is selected from the Enforcement State Audit Menu of OBDII-only analyzers. The analyzer shall display the Station Performance Report to the screen and shall complete the following fields automatically:

County Location code

[8/24/00 (ERG): Shouldn't this satisfy our requirement for automatic county retrieval? MCI reports DMV county of registration is not sent to the analyzer upon initial VID phone call.]

Station Number

Analyzer Number

Today's Date

Time Started (time the Enforcement State Audit Menu was Activated)

Time Departed (time the Station Performance Report was printed)

Date of the Last Station Performance Report

DMV Inspector Name – Last Audit (per access code/license number)

[1/29/99 (DM) should be struck out.]

DMV Inspector Name – This Access (per access code/license number).

[1/29/99 (DM) should be struck out.]

The remaining fields shall be suitable for manual entry by the DMV Inspector.

STATION PERFORMANCE REPORT (OBDII-only analyzers)

County Location: XXX Time Arrived:- __: __
Time Started:XX:XX
Station Name:XXXXXXXXXXXXXXXXX Time Departed:XX:XX
Station Number: XXXXX Name of person contacted:
Analyzer Number: XXXXXXXX Last name: _____
First name: _____

Date of last Station Performance Report :XX/XX/XXXX
Today's Date:XX/XX/XXXX

EVALUATION CHECKLIST: Please enter a P (pass), F (fail), or N (not applicable for each item):

- | <u>Signs</u> | <u>Miscellaneous</u> | <u>Tools</u> |
|--|--|---|
| <input type="checkbox"/> Official Sign | <input type="checkbox"/> Sticker Supply | <input type="checkbox"/> Heavy Duty Jack Lift |
| <input type="checkbox"/> Station License | <input type="checkbox"/> Inspector Available | <input type="checkbox"/> Scraper |
| <input type="checkbox"/> Posters | <input type="checkbox"/> Inspection Area Clean | <input type="checkbox"/> Tire Depth Gauge |
| <input type="checkbox"/> Inspector License | <input type="checkbox"/> Inspection Observed | <input type="checkbox"/> Approved Headlight
Tester or Aiming Kit |
| | <input type="checkbox"/> Sticker Security | <input type="checkbox"/> Creeper |
| | <input type="checkbox"/> Authorization for Repairs | <input type="checkbox"/> Current Emission
Application Manual |
| | <input type="checkbox"/> Signatures on Forms | <input type="checkbox"/> Photometer |
| | <input type="checkbox"/> Signatures on Forms | |
| | <input type="checkbox"/> Telephone as per
State regulations | |
| | <input type="checkbox"/> Hole puncher | |

Remarks: _____

Corrective action taken: Inspector-Mechanic warned
(mark with X) Owner/manager warned?
 Lockout Issued

DMV Inspector's Signature Owner/Manager's Signature
DMV Inspector Number: XXXXXXXXXXXX

1. The entries made by the DMV Enforcement inspector shall be written to the State audit record.
2. The Station Performance Report shall include an option to print multiple copies on all printers.
3. The NCAS analyzer shall return to the Enforcement State Audit Menu.
4. The audit record shall be transmitted to the VID during the next communications session. No call is initiated from this procedure.

3.28.4 Enforcement Analyzer Maintenance (BAR-90 and BAR-97/OBDII Analyzers)

Enforcement Analyzer Maintenance Menu shall be activated by an entry of two (2) from the State Enforcement Audit Menu. This will present a set of maintenance functions that may be performed by the operator.

3.28.4.1 Display prompt one

For BAR-90 and BAR-97/OBDII analyzers, display prompt one (1) shall be displayed to the screen. The DMV Inspector shall select from the options listed the maintenance function to be performed. Display prompt one (1),

1. "Enforcement Analyzer Maintenance Menu
 1. Two-point Gas Calibration and Leak Check
 2. Gas Calibration
 3. Leak Check
 4. Status Screen
 5. Change Gas Bottle
 6. Test Bar Code Scanner
 99. Return to Enforcement State Audit Menu"
2. When the DMV Inspector has selected (1) at display prompt 1, the analyzer shall initiate a two-point gas calibration and leak check sequence.
 - (a) A two-point gas calibration and leak check is required. Selection of this item shall bring up a set of both gas calibration and leak check procedures. The procedures shall be user friendly and shall indicate every step needed to properly perform the required gas calibration and leak check (including when it is necessary to turn the gas cylinder valve on and off). The procedures shall include a prompt to scan the calibration gas bottle bar code. If the bar code reader is not available, manual entry of the gas values is allowed. Procedures shall be approved by the State. Results of the leak check and the gas calibration shall be displayed to the screen and recorded on the test record. The system shall preclude State emission inspections (State Inspection Menu options 1, 3, and 4, and Enforcement State Audit Menu option 14) after seventy-two (72) hours for a low-volume station or after twenty-four (24) hours for a high-volume station if a gas calibration and leak check are not performed and passed, although OBDII testing will still be allowed (for BAR-97/OBDII analyzers). If the analyzer fails the two-point gas calibration and leak check, a message shall

- be displayed indicating that it failed, State Inspection Menu option 1, 3, and 4 shall be precluded, and instructions shall be provided to the inspector-mechanic to call for repairs, although OBDII testing will still be allowed (for BAR-97/OBDII analyzers).
- (b) When the two-point gas calibration and leak check is completed, the analyzer shall return to the Enforcement Analyzer Maintenance Menu (display prompt one (1)).
3. When the DMV Inspector has selected two (2) at display prompt one (1), the analyzer shall initiate a gas calibration sequence.
 - (a) Selection of this item shall bring up a set of gas calibration procedures. The procedures shall be user friendly and shall indicate every step needed to properly perform the gas calibration (including when it is necessary to turn the gas cylinder valve on and off). The procedures shall include a prompt to scan the calibration gas bottle bar code. If the bar code reader is not available, manual entry of the gas values is allowed. Procedures shall be approved by the State. Results of the gas calibration shall be displayed to the screen and recorded on the test record. If the analyzer fails the gas calibration, a message shall be displayed indicating that it failed and instructing the inspector-mechanic to call for repairs.
 - (b) When the gas calibration is completed, the analyzer shall return to the Enforcement Analyzer Maintenance Menu (display prompt one (1)).
 4. When the DMV Inspector has selected three (3) at display prompt one (1), the analyzer shall initiate a leak check sequence.
 - (a) 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 the leak check (including when it is necessary to turn the gas cylinder valve on and off). Procedures shall be approved by the state. Results of the leak check shall be displayed to the screen. If the analyzer fails the leak check, a message shall be displayed indicating that it failed and instructing the inspector-mechanic to call for repairs.
 - (b) When the leak check is completed, the analyzer shall return to the Enforcement Analyzer Maintenance Menu (display prompt one (1)).
 5. When the DMV Inspector has selected (4) at display prompt one (1), the analyzer shall display the Status Screen. The Status Screen will display the current status of all lockouts, as well as the following information, using information stored in the LOCKOUT.DAT and CAL.DAT files and other sources to generate the Status Screen. The Status Screen may consist of two screens, with page-up/page-down options to move between the screens.

The general structure of the status screen follows:

Analyzer Status Screen

County Location: XXX

Station Number: XXXXXXXX

Analyzer Number: XXXXXXXXX

Status of all relevant lockouts including

1) lockouts included in LOCKOUT.DAT (such as State analyzer lockout, State analyzer safety lockout, station license suspended, station license revoked, station license expired, failure to pay for stickers/e-sticker authorizations, failure to pay for communication services, failure to pay for certification stickers, cabinet tampering, state disk drive tampering, too many off-line tests, virus detected, etc..) as well as;

2) any additional lockouts of systems or components necessary for proper NCAS functioning, including, but not limited to; warm-up, gas calibrations, leak check, out of various certificates, disk(s) full, disk failures, gas analyzer failure, clock failure, etc..

Effective based on E-Sticker start date) Available e-sticker authorizations for each class of e-stickers stored on the analyzer: XXX

Number of E-Stickers Authorizations in Inventory: for Class IM XXX
 for Class SI XXX

Propane Equivalency Factor (PEF) number: _____

Span Gas Cylinder Values: _____

GAS CALIBRATION LIMITS: _____

Date and Time of the last gas calibration and leak check: XX/XX/XXXX XX:XX

Date analyzer was last serviced: XX/XX/XXXX

Current Date and Time: XX/XX/XXXX XX:XX

Software Version Number: XXXX

Press the Enter key when ready to continue.

- (a) After the DMV Inspector has pressed the Enter key, the analyzer shall return to the Enforcement Analyzer Maintenance Menu.
6. When the DMV inspector has selected (5) at display prompt one (1), the analyzer shall initiate a change gas bottle sequence.
- (a) Selection of this item shall bring up a set of gas bottle change procedures. The procedures shall be user friendly and shall indicate every step necessary to properly perform the gas bottle change (including when it is necessary to turn

the gas cylinder valve on and off). The procedures shall include a prompt to scan the calibration gas bottle bar code. If the bar code reader is not available, manual entry of the gas values is allowed. Procedures shall be approved by the State. The time and date of the gas bottle change shall be displayed to the screen and recorded to the calibration test record.

- (b) When the gas bottle change procedure is complete, the analyzer shall automatically begin performing a gas calibration and leak check.
- (c) When the analyzer has completed the gas calibration and leak check, the analyzer shall return to the Enforcement Analyzer Maintenance Menu.

7. When the DMV inspector has selected six (6) at display prompt (1), the analyzer shall display a screen allowing the inspector to verify the functionality of the bar code scanner. The analyzer shall display the following scan prompt:

“PLEASE SCAN BAR CODE (VEHICLE REGISTRATION CARD, VIN, STICKER, ETC.). THE SCANNED BAR CODE WILL BE DISPLAYED IN TEXT BELOW.

PRESS THE ENTER KEY TO CONTINUE”

On the same screen, below the scan prompt, the analyzer shall display the decoded bar code. The analyzer shall allow any value to be scanned (vehicle registration cards, stickers, vehicle VINs, etc.). When a new bar code is scanned, the original decoded bar code shall be overwritten and the new decoded value will be displayed. This process will be continued until the DMV inspector presses the enter key, returning the analyzer to the Enforcement Analyzer Maintenance Menu”.

8. When the DMV Inspector selects ninety-nine (99) from the Enforcement Analyzer Maintenance Menu, the analyzer shall return to the Enforcement State Audit Menu.

3.28.5 Enforcement Analyzer Maintenance (OBDII-only analyzers)

The Analyzer Maintenance Menu shall be activated by an entry of two (2) from the State Enforcement Audit Menu on OBDII-only analyzers (BAR-90 and BAR-97/OBDII analyzers are required to display the Enforcement Analyzer Maintenance Menu described above). For OBDII-only analyzers, this menu shall display the following prompt:

3.28.5.1 Display Prompt one

“Enforcement Analyzer Maintenance Menu

- 1. Status Screen
- 2. Test Bar Code Scanner
- 99. Return to Enforcement State Audit Menu”

1. When the DMV inspector has selected the Item one (1) from the Enforcement Analyzer Maintenance menu, the analyzer shall display the Status Screen. The Status Screen shall display the current status of all lockouts, as well as the following information, using

information stored in the LOCKOUT.DAT and CAL.DAT files and other sources necessary to generate the Status Screen. The Status Screen may consist of two screens, with page-up/page-down options to move between the screens.

The general structure of the status screen follows:-

Analyzer Status Screen
County Location: XXX
Station Number: XXXXXXXX
Analyzer Number:XXXXXXXX
Status of all relevant lockouts including
1) lockouts included in LOCKOUT.DAT (such as State analyzer lockout, State analyzer safety lockout, station license suspended, station license revoked, station license expired, failure to pay for stickers/e-sticker authorizations, failure to pay for communication services, failure to pay for certification stickers, too many off-line tests, virus detected, etc.,) as well as;
2) any additional lockouts of systems or components necessary for proper NCAS functioning, including, but not limited to; out of various certificates, disk(s) full, disk failures, clock failure, etc.
Effective based on E-Sticker start date: Available e-sticker authorizations for each class of e-stickers stored on the analyzer: XXX
Number of E-Stickers Authorizations in Inventory: for Class IM XXX
for Class SI XXX
Current Date and Time: XX/XX/XXXX XX:XX
Software Version Number: XXXX

Press the Enter key when ready to continue.

After the DMV Inspector has pressed the Enter key, the analyzer shall return to the Enforcement Analyzer Maintenance Menu.

2. When the DMV inspector has selected two (2) at display prompt (1), the analyzer shall display a screen allowing the inspector to verify the functionality of the bar code scanner. The analyzer shall display the following scan prompt:

“PLEASE SCAN BAR CODE (VEHICLE REGISTRATION CARD, VIN, STICKER, ETC.). THE SCANNED BAR CODE WILL BE DISPLAYED IN TEXT BELOW.

PRESS THE ENTER KEY TO CONTINUE”

On the same screen, below the scan prompt, the analyzer shall display the decoded bar code. The analyzer shall allow any value to be scanned (vehicle registration cards, stickers, vehicle VINs, etc.). When a new bar code is scanned, the original decoded bar code shall be overwritten and the new decoded value will be displayed. This process will be continued until the DMV inspector presses the enter key, returning the analyzer to the Enforcement Analyzer Maintenance Menu”.

3. When the DMV inspector selects 99 from Enforcement Analyzer Maintenance Menu, the analyzer shall return to the Enforcement State Audit Menu.

3.28.6 Gas Audit (BAR-90 and BAR-97/OBDII Analyzers)

Gas Audit sequence shall be initiated when three (3) is selected from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers. The analyzer shall allow the Gas Audit to be performed prior to any other regular gas calibrations or leak checks that may be due.

1. The analyzer shall prompt the DMV Inspector to press the Enter key when ready to begin the Gas Audit.
2. The analyzer shall conduct an automated electronic zero and span and then begin taking emission readings. The procedures shall be user friendly and shall indicate every step necessary to properly perform the gas audit through the probe with the sampling system pump(s) turned on (including when it is necessary to turn the gas cylinder valve on and off). Procedures shall be approved by the state. The emission readings shall be displayed in large, easily read characters by a person with twenty-twenty (20/20) vision from a distance of eight feet (8').
3. The display of the emission readings. Enforcement gas audits will always be performed using propane. Therefore, HC readings shall always be displayed as PPM propane.

“Sampling

<u>Emission</u>	<u>Reading</u>
HC (propane)	XXXX
CO	X.XX
CO ₂	XX.X
O ₂ (optional)	XX.X”

“Press the Enter key when you are finished with the gas audit.”

4. When the gas audit is complete, the analyzer shall return to the Enforcement State Audit Menu.

3.28.7 Update Station and Inspector-Mechanic Information

Update Station and Inspector-Mechanic Information sequences shall be initiated when four (4) is selected from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item three (3) on OBDII-only analyzers).

1. The analyzer shall display the contents of the inspector-mechanic file (TECH.DAT). The analyzer shall not permit the editing of the information. All inspector-mechanics shall be displayed to the screen.

[12/09/98 (NC) Do not display state inspector information (enfact.dat file)]

[5/26/98 (NC) Do not display emission & safety lockout flags.]

2. Access codes shall not be displayed.
3. Average Annual Volume will be blank when the analyzer is initially installed at a station. DMV inspectors will set the volume to "High" or "Low" during quarterly audits. A high

volume station performs 4,000 or more emissions inspections per year; a low volume less than 4,000.

County Location: __ (location of analyzer)
 Station Number: _____
 Analyzer Number: __
 Average Annual Volume (High or Low): ____
 [5/24/02 – Volume information not required on stand-alone OBD units.]

Last Name	First Name	License Number	Emissions Expire Date (MO/YR)	Safety Expire Date (MO/ YR)	OBDII Expire Date (MO/ YR)
Inspector Mechanics					
_____	_____	_____	____/____	____/____	____/____
_____	_____	_____	____/____	____/____	____/____
_____	_____	_____	____/____	____/____	____/____
_____	_____	_____	____/____	____/____	____/____

- The analyzer will have a print feature to allow DMV inspectors to print inspector-mechanic information to either printer. The station name, station number, date, and DMV inspector name will be printed in the upper right hand corner. It is intended that this list be printed in a "fast" text mode rather than a "slow" graphics mode.
- The analyzer will then display the current inspection and sticker/e-sticker authorization fees, from file FEES.DAT. Analyzer computes totals by adding inspection and sticker/e-sticker authorization fees. The following format will be displayed to assist the DMV inspector

<u>Type of inspection:</u>	<u>Inspection Fee</u>	<u>Sticker/ E-Sticker Authorization Fee</u>	<u>Window Tinting Fee</u>	<u>Total Fee</u>
Light Duty & Heavy Duty Vehicle				
Safety Only	\$XX.XX	\$XX.XX	\$XX.XX	\$XX.XX
Safety & Emissions	\$XX.XX	\$XX.XX	\$XX.XX	\$XX.XX
Motorcycle/Trailer				
Safety Only	\$XX.XX	\$XX.XX		\$XX.XX

3.28.8 Install New Data Disk

Install New Data Disk sequence shall be initiated when five (5) is selected from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item four (4) on OBDII-only analyzers).

1. The analyzer shall display instructions, on a single screen, for changing the floppy diskette. This procedure shall properly format the new diskette, and the files will be updated so the data removed on the old diskette will not be sent on the next modem transfer. The instructions must be approved by the state.
2. When the change is complete and the analyzer security devices (doors, etc.) are secure (for BAR-90 and BAR-97/OBDII analyzers), the analyzer shall return to the Enforcement State Audit Menu.

3.28.9 Set Calibration Gas Limits (BAR-90 and BAR-97/OBDII Analyzers)

Set Calibration Gas Limits sequence shall be initiated when six (6) is selected from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers.

The analyzer shall display the calibration gas limits used to pass/fail gas calibrations. The current and new settings shall be displayed on the update screen. Actual numerical values shall be displayed, not percentages. The calibration gas limits display will be for view only. The limits may not be edited by accessing this screen.

The calibration gas tolerance screen, Calibration Gas Tolerance.

“At the bottom of the screen type Y to save changes.

Press (abort key) to abort changes.

Low Range Values

	Present	New
Emissions	Allowable Range	Allowable Range
HC		
CO		
CO ₂		
O ₂ (optional)		

Mid Range Values

HC	
CO	
CO ₂	
O ₂ (optional)	
_____ Save?”	

The analyzer shall update the calibration gas limits file. The analyzer shall return to the Enforcement State Audit Menu.

3.28.10 Lockout Analyzer

Lockout NCAS sequence shall be initiated when seven (7) is selected from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item five (5) on OBDII-only analyzers).

1. The analyzer manufacturer shall devise a method to allow the inspection operations (State Inspection Menu options 1, 2, 3, and 4) to be disabled and still allow all other options to work normally. The analyzer shall display a message if it is locked out.
2. The analyzer software shall allow the Division of Motor Vehicles to set or clear the two (2) State lockouts, NCAS Safety-emissions and NCAS Safety lockouts, from the analyzer keyboard. If a State lockout is cleared from the analyzer keyboard following transmission of the lockout status to the VID, a possibility of restoring the lockout during the next VID communications will exist.

The status of all relevant lockouts will be displayed, including;

1) lockouts included in LOCKOUT.DAT (such as State analyzer lockout, State analyzer safety lockout, station license suspended, station license revoked, station license expired, failure to pay for stickers/e-sticker authorizations, failure to pay for communication services, failure to pay for certification stickers, cabinet tampering, state disk drive tampering, too many off-line tests, virus detected, etc.,) as well as;

2) any additional lockouts of systems or components necessary for proper NCAS functioning, including, but not limited to; warm-up, gas calibrations, leak check, out of various certificates, disk(s) full, disk failures, gas analyzer failure, clock failure, etc..

[5/1/98 (NC) No need to transfer lockout status from "lockout" file during update]

3. The analyzer shall return to the Enforcement State Audit Menu.

3.28.11 Perform Emergency Software Update

Emergency Software Update shall be performed when eight (8) is selected from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item six (6) on OBDII-only analyzers).

1. When emergency software updates are required between annual software updates, the manufacturer is responsible to develop the update and provide the update to the State on a three and one-half inch (3 1/2") floppy diskette. The State may have DMV install the update, but reserves the right to have it done by the manufacturer. If the State performs the update, multiple copies may be required.
2. The update shall be made as simple as possible for the DMV Inspector by using display driven instructions, batch files, etc.
3. Emergency Software Updates will cause the software version number to change.
4. When the update is complete, the analyzer shall return to the Enforcement State Audit Menu.

3.28.12 Test Record Search and Retrieval

Test Record Search and Retrieval function shall be activated by an entry of nine (9) from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item seven (7) on OBDII-only analyzers).

This function shall permit the DMV Inspector to search the test records on the analyzer.

1. Display prompt one (1) shall be displayed to the screen. The DMV Inspector shall be asked to enter information upon which the search of the test records shall be based.

Display prompt one (1):

“Enter the information for the search:

VIN: _____

Date: ___/___/_____

Receipt/Statement Number: _____

Sticker Class: _____

Sticker Number: _____

(NOTE: Effective on E-Sticker State Date – search by Sticker Number will be replaced by search by Vehicle Plate Number.)

Vehicle Plate Number: _____

Press the Enter key when ready to begin the search or press (*abort key*) to abort.”

2. The analyzer will not require the completion of all fields, but at least one (1) field must be completed to begin the search.
3. The analyzer shall search the NCAS.DAT file for test records which match the conditions listed. If no matches are found, the analyzer shall give the DMV Inspector the option of searching the history file (NCAS.HST) as well. When a match is found for the search condition, the DMV Inspector shall be able to review the previous test records as well as those that follow the target record. The DMV Inspector shall be given the option of continuing the search for the next matching test record.
4. After the analyzer has located the test record, the DMV Inspector shall be given the option of printing the test record on the receipt/statement printer. The printout shall include the following **two items which shall be printed at the top of the test record printout.**
 - 1) The date and;
 - 2) the time, of the reprinting.
5. When the DMV Inspector has finished printing or searching, the analyzer shall return to the Enforcement State Audit Menu.

3.28.13 Copy Analyzer Files

Copy Analyzer Files function shall be activated by an entry of ten (10) from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item eight (8) on OBDII-only analyzers).

This function will allow the DMV Enforcement Officer to copy one (1) to four (4) files from the analyzer hard drive to a floppy disk in the A: drive.

1. Display prompt one (1) shall be displayed on the screen. The DMV Inspector shall be asked to enter information to identify the file or files to be placed on the A: drive.

Display prompt one (1):

“Insert a formatted diskette in the A: Drive.

Select the files to be copied to the A: Drive by entering an "X" to indicate the files to be copied and press "Enter".

- Current Test Record File (NCAS.DAT)
- Test Record History File (NCAS.HST)
- Calibration Data File (CAL.DAT)**
- The Audit File (AUDIT.DAT)
- All of the above files"

**Note: The Calibration Data File (CAL.DAT) option will not be presented for OBDII-only analyzers

A second screen will then offer the opportunity to select only records within certain dates to be copied:

"Select the dates of the files to be copied by entering an "X" and the requested dates, or select "Copy all records" to copy all records within the selected files. Then press "Enter" to begin copying.

- Begin Date: (Month, Day, Year)
- End Date: (Month, Day, Year)
- Copy All Records"

2. The DMV Inspector will be allowed to abort the process without selecting one of the above options if desired. The analyzer shall perform a disk copy of the files from the C: drive to the A: drive.

3.28.14 Sticker Inventory Maintenance

Sticker Inventory Maintenance function shall be activated by an entry of eleven (11) from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item nine (9) on OBDII-only analyzers).

This function will allow the DMV Enforcement Officer to delete, add, or clear stickers (individually or in groups) that are entered erroneously by stations.

Under the e-sticker program DMV Enforcement Officer will have no ability to clear e-sticker authorization inventory from analyzers.

[12/18/98 (NC) Not required to convert existing inventory. If converted, do not record to certinv.dat file. It's okay to allow service tech to enter partial booklets. This capability needs to be added to Service menu]
[02/10/99 (NC) For sticker.dat file, record ID of inspector who accessed the state menu]

3.28.15 Network Initialization/Update Communications Data

A "Network Initialization/Update Communications Data" menu item shall be activated by an entry of twelve (12) from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item ten (10) on OBDII-only analyzers).

When selected, the following shall be displayed, in order to enter data required for communications with the VID:

- Primary network phone number up to 15 numeric and commas

The data will be stored on both hard and floppy disks. The file is defined as follows:

Directory/File Name C:\NCASDATA\VIDCOMM.DAT (hard disk)

The State representative shall establish first time network communications between the analyzer and the VID after the analyzer has been initialized.

3.28.16 Communications Log

Communications Log shall be viewed by an entry of thirteen (13) from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item eleven (11) on OBDII-only analyzers).

Selection of this menu item will enable the DMV Inspector to view, with an option to print to the VIRS printer, a text listing of all communications session logs recorded by the analyzer for the past 14 calendar days.

3.28.17 Data File/Lockout Status Refresh

This option shall be initiated by an entry of fourteen (14) from the Enforcement State Audit Menu on BAR-90 and BAR-97/OBDII analyzers (or menu item twelve (12) on OBDII-only analyzers).

1. This feature shall allow the DMV Enforcement Officer to place a request to the VID to update key analyzer data files, such as reference tables, inspector-mechanic information, lockout status, program data and the public token.
2. The analyzer shall overwrite the existing tables with the refreshed data received from the VID.
3. Programming Criteria
 - (a) The analyzer shall use the communications software to contact the VID with a data file refresh request.
 - (b) All data file refresh requests placed under the Enforcement State Audit Menu shall be uniquely flagged by the NCAS to allow the VID to differentiate between requests made from the Station Menu and requests made from the Enforcement State Audit Menu.
 - (c) Upon completion of the "Data File Refresh" procedure the analyzer shall display the following message:
"THE INSPECTOR-MECHANIC LICENSE NUMBERS AND ACCESS CODES HAVE BEEN UPDATED BY THE VID."
 - 1) The analyzer shall display the updated list of inspector-mechanic names.
 - 2) The analyzer shall allow the printing of an updated official Station License, as shown in Section 5.12.
 - 3) During screen display or printing of the inspector-mechanic information the analyzer shall never display the inspector-mechanic license numbers or access codes.
 - (d) If network access to the VID is not achieved display the following message:
"CANNOT ACCESS NETWORK"

3.29 Return to the Main Menu

Return to the Main Menu shall be activated when ninety-nine (99) is selected from the Enforcement State Audit Menu.

3.30 Data Entry Conditions

Vehicle information entered by the inspector-mechanic shall be subject to the conditions described below. These conditions are in addition to those described under the State Inspection Menu.

3.30.1 Vehicle Model Year

Model year entries greater than the current calendar year plus one (1), shall not be allowed.

3.30.2 Vehicle Make

The following display will appear whenever the vehicle make entered is not displayed:

"If the vehicle make being inspected is not displayed, type the first four characters of the vehicle make name as it appears on the vehicle registration".

3.31 Display Features

3.31.1 Print screen capability

In addition to the "hot key" function, the NCAS shall have a print screen feature which prints any current text screen by depressing no more than three (3) keys. Print screen output will be directed to the utility printer, if two printers are provided.

3.31.2 Display during emission inspection (BAR-90 and BAR-97/OBDII Analyzers)

During the exhaust sampling sequence of the emission inspection, the word TESTING shall be displayed.

3.31.3 Messages permitted during the emission inspection (BAR-90 and BAR-97/OBDII Analyzers)

BAR-90 and BAR-97/OBDII analyzers shall display messages indicating if excessive exhaust dilution or out of range engine speed conditions occur during the idle exhaust emission inspection. Restart capabilities will be allowed if the conditions causing the excessive exhaust dilution or out of range engine speed are corrected.

3.31.4 Information not permitted during the emission inspection (BAR-90 and BAR-97/OBDII Analyzers)

BAR-90 and BAR-97/OBDII analyzers shall not display the emission readings during the exhaust sampling sequence.

3.31.5 Readability of display (BAR-90 and BAR-97/OBDII Analyzers)

The display of BAR-90 and BAR-97/OBDII analyzers, when in the preconditioning and exhaust sampling sequences of the emission inspection, shall be readable at a distance of

eight feet (8') in a building which meets OSHA lighting standards for a garage environment. Contrast shall be adjustable.

3.31.6 Engine RPM (BAR-90 and BAR-97/OBDII Analyzers)

The display of BAR-90 and BAR-97/OBDII analyzers shall have the capability to display the engine speed up to four (4) significant digits during the exhaust emission inspection and any other information necessary for the inspector-mechanic to properly conduct an emissions inspection.

3.31.7 Emission inspection results (BAR-90 and BAR-97/OBDII Analyzers)

At the end of an exhaust emission inspection, the display shall show, as a minimum, the following emission results. The emission standards shall also be displayed to the screen. The words PASS or FAIL shall be displayed beside each result except for CO₂ (and O₂ if purchased):

HC:	XXXX	ppm
CO:	XX.XX	%
CO ₂ :	XX.X	%
O ₂ :	XX.X	% (optional).

This information shall not be displayed until the test record is written and the printer has begun to print out the receipt/statement. Do not display O₂ readings for vehicles passing the inspection for emissions.

3.31.8 Hard disk (device) warning message

When data is being stored or accessed, a message shall be displayed indicating that the disk is in operation and the analyzer shall not be moved or otherwise disturbed. Following each disk read/write operation, the hard disk read/write head shall be moved to a safe parked position. If a device is employed where unit disturbance will not impact the recording of such data, a warning message will not be required.

3.32 Inspection Receipt/Statement Number

3.32.1 When an inspection is complete

When an inspection is complete and the logic/program indicate conditions for issuance of receipt/statement have been met, but before the analyzer requests a sticker/e-sticker authorization number (if applicable), then the following prompt shall be displayed:

“Are receipt/statements in the printer ready to print? Y=Yes, N=No.”

3.32.2 Ready to Print

When the inspector-mechanic indicates that the printer is ready to print the receipt/statement, the analyzer shall prompt the inspector-mechanic to confirm the sticker number. After the number is confirmed, the analyzer shall immediately begin printing the receipt/statement. With the use of e-sticker authorizations when the inspector-mechanic indicates that the printer is ready to print the receipt/statement, the analyzer shall begin printing the receipt/statement.

3.32.3 Multiple Copies

The analyzer shall be programmed to allow multiple copies of receipt/statements

3.32.4 Not Ready to Print

If the inspector-mechanic enters an N indicating that the printer is not ready to print, the software shall display a prompt instructing the inspector-mechanic to correct the problem and press Continue when the printer is ready. At this point, the inspector-mechanic must be able to enter the receipt/statement loading sequence to correct the misfeed or other printer problems without aborting the inspection.

3.33 Abort Codes

3.33.1 Aborted inspections

Aborted inspections shall not be saved as test records unless it was an OBDII readiness-induced abort as described in Section 3.10.6.2(o)(3).

3.33.2 Reasons for Aborts

Aborts shall occur automatically for the reasons listed in the inspection and test procedures in Section 2 and Section 3. If a vehicle undergoing an exhaust emissions inspection has excessive dilution or is unable to maintain RPM, the emission inspection shall be aborted. If the inspector-mechanic fails to enter satisfactory vehicle information when prompted, an error message "Invalid Entry" or its equivalent will be displayed warning the inspector-mechanic that the sequence will abort unless correct information is entered.

3.33.3 Emission Test Sequence Completion

During the North Carolina emission test sequence, the inspector-mechanic may^{-[1/12/99 This conflicts with 2.14]} interrupt or abort the exhaust emission sampling sequence by pressing the abort key. The inspection result shall be recorded as an "F", and the abort code as an "M".

3.34 Station Menu

The analyzer will display the following prompt:

1. Network Communications Diagnostics
2. Data File/Lockout Status Refresh
3. Print a Communications log
4. Print a Station License

3.34.1 Network Communications Diagnostics

"Network Communications Diagnostics" shall be used to diagnose communication-related problems. The following diagnostic tests shall be provided:

1. MODEM SERIAL PORT DIAGNOSTICS
 - (a) Modem serial port diagnostics shall be manufacturer provided pursuant to manufacturer-specific hardware configurations.

- (b) Following completion of the diagnostics the analyzer will report the results on-screen.
 - 1) Messages:
 - a. "MODEM DIAGNOSTICS PASSED"
 - b. "MODEM DIAGNOSTICS FAILED. CALL SERVICE."
2. DIAL TONE CHECK
- (a) The analyzer shall attempt to determine if the modem detects dial tone.
 - (b) Following completion of the dial tone check the analyzer will report the results on-screen.
 - 1) Messages:
 - a. "DIAL TONE DETECTED – PASSED"
 - b. "NO DIAL TONE DETECTED - FAILED. CHECK TO SEE THAT PHONE CORD IS CONNECTED. POSSIBLE FAULTS CAN BE CHECKED USING A STANDARD PHONE AT BOTH ANALYZER END OF PHONE CABLE OR AT WALL PLUG FOR PHONE. IF NO DIAL TONE ON PHONE CABLE - CONTACT PHONE COMPANY. IF DIAL TONE DETECTED USING PHONE THE FAULT IS IN ANALYZER - CALL SERVICE."
3. NETWORK DIAGNOSTICS
- (a) It is the responsibility of each NCAS manufacturer to work with the electronic transmission vendor to ensure that the modem strings are set up automatically and correctly.
 - (b) The modem strings will be set up in a data file (refer to the communications Protocol) for the electronic transmission vendor's software.
 - (c) The analyzer shall provide the data needed to conduct network diagnostics (from C:\NCASDATA\DIAGNOSE.DAT). This data is created with the size and characters as determined by each individual analyzer manufacturer. During the network diagnostics routine, the analyzer shall transmit the data to the VID and subsequently the same data shall be transmitted back from the VID to the analyzer. The sent and received files should be identical upon completion of the network diagnostics routine for this test to pass. The analyzer shall display the following message:
 - "TRANSMITTING DATA, PLEASE WAIT"
 - (d) Programming Criteria:
 - 1) If, upon completion of network access, the data transmitted by the analyzer to the VID is the same as the data received by the analyzer from the VID, then display the following message:
 - "NETWORK COMMUNICATIONS PASSED."
 - 2) If, upon completion of network access, the data transmitted by the analyzer to the VID is not the same as the data received by the analyzer from the VID, then display the following message:
 - "NETWORK COMMUNICATIONS FAILED."
 - 3) If network communications access is not achieved display the following message:
 - "CANNOT ACCESS NETWORK. CALL TECHNICALSUPPORT."

3.34.2 Data File/Lockout Status Refresh

1. This feature shall allow station personnel to place a request to the VID to, update key analyzer data files, such as reference tables, inspector-mechanic information, lockout status, program data and the public token.
2. The analyzer shall overwrite the existing tables with the refreshed data received from the VID.
3. Programming Criteria
 - (a) The analyzer shall use the communications software to contact the VID with a data file refresh request.
 - (b) Upon completion of the "Data File Refresh" procedure the analyzer shall display the following message:
"THE INSPECTOR-MECHANIC LICENSE NUMBERS AND ACCESS CODES HAVE BEEN UPDATED BY THE VID. IN CASE THERE ARE PROBLEMS CONTACT DMV OR TECHNICAL SUPPORT."
 - 1) The analyzer shall display the updated list of inspector-mechanic names.
 - 2) The analyzer shall allow the printing of an updated official Station License, as shown in Section 5.12.
 - 3) During screen display or printing of the inspector-mechanic information the analyzer shall never display the inspector-mechanic license numbers or access codes.
 - (c) If network access to the VID is not achieved, display the following message:
"CANNOT ACCESS NETWORK"

3.34.3 Print a Communications Log

Selection of this menu item will allow station personnel to view, with an option to print to the VIRS printer, a text listing of all communications session logs recorded by the analyzer for the past 14 calendar days.

3.34.4 Print a Station License

Selection of this menu item will allow station personnel to print a Station License Report. This report will use data from the LICENSE.DAT file and the TECH.DAT file in the creation of the report. The purpose of the license report is to produce a document that must be posted in a public place at the station. The report displays station information and lists all inspector-mechanics employed at the station.

The report will be printed on either printer; the format is found in Section 5.

4 NCAS Test Record Specifications

PURPOSE: This section describes the data file formats for the North Carolina Analyzer System. Information on data field number, data description, offset, record length, data type, and format notes for files: AUDIT.DAT, CAL.DAT, CERTINV.DAT, COUNTY.DAT, DLCREG.DAT, EAUTHINV.DAT, EBUYER.DAT, ENFACC.DAT, EXCPTION.DAT, FEES.DAT, LICENSE.DAT, LOCKOUT.DAT, NCAS.DAT, NETWORK.DAT, STICKER.DAT, TECH.DAT, and VIDCOMM.DAT is detailed on the following pages.

Note 1: In regard to Field 5 "Inspection Type" within NCAS.DAT, OBD vendors must be aware that while they would never record a "3" to this field, they may receive a "3" from the VID. This would indicate that the record being received is a reinspection (idle or safety) performed on an either a BAR90 or a BAR97 that does not support OBD.

Field #	Description	Offset	Length	Data Type	Format
1	County Code of Location	0	3	N	
2	Station Number	3	5	N	if less than length 5, left pad with 0
3	NCAS Analyzer Number	8	8	AN	
4	Enforcement Inspector Number	16	12	AN	
5	Spare	28	4	AN	
6	Time Arrived	32	8	N	HH:MM:SS
7	Time Enforcement Started	40	8	N	HH:MM:SS
8	Time Enforcement Ended	48	8	N	HH:MM:SS
9	Name Contacted - Last	56	17	AN	
10	Name Contacted - First	73	10	AN	
11	Date of Last Report	83	10	N	MM/DD/YYYY
12	Today's Date	93	10	N	MM/DD/YYYY
13	Last Date Gas Calibration	103	10	N	MM/DD/YYYY
14	Spare	113	2	AN	
15	Spare	115	2	AN	
16	Official Sign	117	1	A	P=Pass,F=Fail,N=N/A
17	Station License	118	1	A	P=Pass,F=Fail,N=N/A
18	Inspector Mechanic License	119	1	A	P=Pass,F=Fail,N=N/A
19	Enforcement Poster	120	1	A	P=Pass,F=Fail,N=N/A
20	Heavy Duty Jack Lift	121	1	A	P=Pass,F=Fail,N=N/A
21	Photometer	122	1	A	P=Pass,F=Fail,N=N/A
22	Scraper	123	1	A	P=Pass,F=Fail,N=N/A
23	Tire Depth Gauge	124	1	A	P=Pass,F=Fail,N=N/A
24	Headlight Tester/Aim Kit	125	1	A	P=Pass,F=Fail,N=N/A
25	Creeper	126	1	A	P=Pass,F=Fail,N=N/A
26	Emission Application Manual	127	1	A	P=Pass,F=Fail,N=N/A
27	Sticker/Decal Supply	128	1	A	P=Pass,F=Fail,N=N/A
28	Inspector Available	129	1	A	P=Pass,F=Fail,N=N/A
29	Inspection Area Clean	130	1	A	P=Pass,F=Fail,N=N/A
30	Inspection Observed	131	1	A	P=Pass,F=Fail,N=N/A
31	Security (Stickers)	132	1	A	P=Pass,F=Fail,N=N/A
32	Authorization for Repairs	133	1	A	P=Pass,F=Fail,N=N/A
33	Signatures on Forms	134	1	A	P=Pass,F=Fail,N=N/A
34	Telephone as per Regulation	135	1	A	P=Pass,F=Fail,N=N/A
35	Hole Pncher	136	1	A	P=Pass,F=Fail,N=N/A

AUDIT.DAT

36 Spare	137	4	AN	
37 Spare	141	4	AN	
38 Spare	145	4	AN	
39 Spare	149	4	AN	
40 Spare	153	4	AN	
41 Spare	157	4	AN	
42 Spare	161	4	AN	
43 Spare	165	4	AN	
44 Date of Last Gas Audit	169	8	N	MMDDYYYY
45 HC Reading Last Gas Audit	177	4	N	nnnn
46 CO Reading Last Gas Audit	181	4	N	n.nn
47 CO ₂ Reading Last Gas Audit	185	4	N	nn.n
48 O ₂ Reading Last Gas Audit	189	4	N	nn.n
49 Remarks	193	250	AN	
50 Inspector Warned	443	1	AN	X or blank
51 Owner/Manager Warned	444	1	AN	X or blank
52 Lockout Issued	445	1	AN	X or blank
53 Spare	446	21	AN	
54 Inspect Mechanic Number	467	12	AN	
55 Inspector Mechanic Name	479	30	AN	
56 Enforcement Inspector No.	509	12	AN	
57 Score	521	3	N	
58 Pass Fail Indicator	524	1	A	P=Pass, F=Fail or blank
59 Spare	525	6	AN	
60 <CR><LF>	531	2		
Total Length		533		

Field #	Description	Offset	Length	Data Type	Format
1	County Code of Location	0	3	N	
2	Station Number	3	5	N	if less than length 5, left pad with 0
3	NCAS Analyzer Number	8	8	AN	AANNNNNN
4	Date	16	8	N	MMDDYYYY
5	Start Time (24 hour time)	24	6	N	HHMMSS
6	Hexane/Propane Ratio (PEF)	30	4	N	.nnn
7	HC Calib Upper Limit	34	4	N	nnnn
8	HC Calib Lower Limit	38	4	N	nnnn
9	CO Calib Upper Limit	42	5	N	nn.nn
10	CO Calib Lower Limit	47	5	N	nn.nn
11	CO2 Calib Upper Limit	52	4	N	nn.n
12	CO2 Calib Lower Limit	56	4	N	nn.n
13	O2 Upper Calib Limit	60	4	N	nn.n
14	O2 Lower Calib Limit	64	4	N	nn.n
15	HC Span Gas	68	4	N	nnnn
16	HC Zero Reading	72	5	N	nnnnn
17	HC Span Reading	77	5	N	nnnnn
18	CO Span Gas	82	5	N	nn.nn
19	CO Zero Reading	87	6	N	nnn.nn
20	CO Span Reading	93	5	N	nn.nn
21	CO2 Span Gas	98	4	N	nn.n
22	CO2 Zero Reading	102	5	N	nnn.n
23	CO2 Span Reading	107	5	N	nnn.n
24	O2 Span Gas (Air)	112	4	N	nn.n
25	O2 Zero Reading	116	4	N	nn.n
26	O2 Span Reading	120	4	N	nn.n
27	HC Mid Span Gas	124	4	N	nnnn
28	HC Mid Span Reading	128	5	N	nnnnn
29	CO Mid Span Gas	133	5	N	nn.nn
30	CO Mid Span Reading	138	6	N	nnn.nn
31	CO2 Mid Span Gas	144	5	N	nnn.n
32	CO2 Mid Span Reading	149	5	N	nnn.n
33	End Time	154	6	N	HHMMSS
34	Leak Check Start Time	160	6	N	HHMMSS
35	Leak Check Pass/Fail	166	1	A	P =Pass, F=Fail

36 Inspection Volume	167	1	A	H=High Volume, L=Low Volume
37 Calibration Record Type	168	1	A	A,B,C,D,E*
38 Spare	169	9		
39 <CR><LF>	178	2		
Total Length		180		

* Calibration Types

A-Periodic (72 or 24 hours) two-point calibration

B-Four-hour two-point calibration check

C-Periodic (1 or 6 months) four-point calibration check, readings for 60% and 80% of scale

D-Periodic (1 or 6 months) four-point calibration check, readings for 20% and 40% of scale

E-Leak check only

Field #	Description	Offset	Length	Data Type	Format
1	Date	0	8	N	MMDDYYYY
2	Station License Number	8	5	AN	
3	Analyzer Number	13	8	AN	
4	Booklet Starting Sticker Number	21	8	AN	
5	<CR><LF>	29	2		
	Total Length		31		

Note: CERTIFIM.DAT is a working file for the tracking of the sticker numbers. Therefore, manufacturers may take liberties in the construction of the files and the specific method of performing the number tracking function. Please see description in Section 1.8, File Location and Backup.

Note: CERTIFSI.DAT is a working file for the tracking of the sticker numbers.

Note: CERTIFMT.DAT is a working file for the tracking of the sticker numbers. Therefore, manufacturers may take liberties in the construction of the files and the specific method of performing the number tracking function. Please see description in Section 1.8, File Location and Backup.

COUNTY.DAT

Field #	Description	Offset	Length	Data Type	Format
1	County Code	0	3	N	999
2	County Name	3	25	A	
3	Test Required	28	1	A	E = Emissions, B =Emissions and OBDII, O = OBDII, S = Safety-Only
4	Test Start Date	29	8	N	MMDDYYYY
5	<CR><LF>	37	2		
	Total Length		39		

Field #	Description	Offset	Length	Data Type	Format
1	This data file provides text to be displayed on analyzer screen when "H" is pressed after the OBDII connector prompt and also as a separate menu item under the Station Menu.	0	1000	AN	

Field #	Description	Offset	Length	Data Type	Format
1	E-Sticker Authorization Type	0	2	A	
2	E-Sticker Authorization Inventory Count	2	3	N	
3	Spares	5	3		
4	<CR><LF>	8	2		
	Total Length		10		

EBUYER.DAT

Field #	Description	Offset	Length	Data Type	Format
1	Purchasers ID	0	30	AN	
2	Purchaser Last Name	30	30	A	
3	Purchaser First Name	60	15	A	
4	Purchaser Middle Initial	75	1	A	
5	Purchasers Type	76	1	A	(T=Technician, N-Non-Technician)
6	Encrypted Password/Access Code	77	40	AN	
7	Password/Access Code Salt	117	40	AN	
8	Spares	157	10		
9	<CR><LF>	167	2		
	Total Length		169		

Field #	Description	Offset	Length	Data Type	Format
1	Enforcement Inspector Number	0	12	AN	
2	Inspector Last Name	12	30	A	
3	Inspector First Name	42	15	A	
4	Inspector Middle Initial	57	1	A	
5	Access Code	58	5	N	99999
6	<CR><LF>	63	2		
	Total Length		65		

EXCPTION.DAT

Field #	Description	Offset	Length	Data Type	Format
1	Spare	0	5	AN	
2	Spare	5	8	AN	
3	Vehicle Model Year	13	4	N	YYYY
4	Vehicle Make	17	5	AN	
5	Vehicle Model	22	33	AN	
6	Spare	55	1	AN	
7	Fuel Type	56	1	A	Blank or G = Gasoline, D, B, P, N, E, H, I, O, F
8	Misfire Ready Code	57	1	A	F, N, P, or blank
9	Fuel System Ready Code	58	1	A	F, N, P, or blank
10	Comprehensive Ready Code	59	1	A	F, N, P, or blank
11	Catalyst Ready Code	60	1	A	F, N, P, or blank
12	Heated Catalyst Ready Code	61	1	A	F, N, P, or blank
13	Evaporative System Ready Code	62	1	A	F, N, P, or blank
14	Secondary Air System Ready Code	63	1	A	F, N, P, or blank
15	A/C System Refrigerant Ready Code	64	1	A	F, N, P, or blank
16	O2 Sensor Ready Code	65	1	A	F, N, P, or blank
17	O2 Sensor Heater Ready Code	66	1	A	F, N, P, or blank
18	EGR System Ready Code	67	1	A	F, N, P, or blank
19	Num. of "N" Ready Codes Allowed	68	2	N	0-11 or blank
20	Brief KOEO MIL	70	1	A	Y = Yes or blank
21	Advisory Screen	71	120	AN	Text advising inspector how to proceed with inspection at appropriate point.
22	Spare	191	8	AN	
23	Spare	199	20	AN	
24	Spare	219	20	AN	
25	Spare	239	20	AN	
26	Spare	259	20	AN	
27	Spare	279	20	AN	
28	<CR><LF>	299	2		
	Total Length		301		

NOTES:

OBDII Readiness information presented in this table will take precedence over that presented in NETWORK.DAT.

If a Ready Code has been defined as "F", then the vehicle will be rejected from testing if the status for this code is "NOT COMPLETE", even if the number of number of "not-ready allowable" codes has not been exceeded. This code will also be included in the overall readiness determination count. If a Ready Code has been defined as "P", then this monitor will not be included in the overall readiness determination count, even if the status is "NOT COMPLETE". If a Ready Code has been defined as "N", then this code will be used in the overall readiness determination count. If more than the

defined number of "N" Ready Codes have a status of "NOT COMPLETE", then the vehicle will be rejected from testing. Readiness codes with a status of "NOT ENABLED" shall not be counted or be included in any readiness determination.

DATA ENTRY field: "A" = Alpha, "N" = Numeric, "A/N" = Alpha-Numeric.

FEES.DAT

Field #	Description	Offset	Length	Data Type	Format	
1	Safety-Emissions Initial Inspection Fee	0	5	N	99.99	default is 23.50
2	Safety-only Initial Inspection Fee	5	5	N	99.99	default is 8.25
3	Motorcycle/Trailer Initial Inspection Fee	10	5	N	99.99	default is 8.25
4	Safety-Emissions Reinspection Fee	15	5	N	99.99	default is 0
5	Safety-only Reinspection Fee	20	5	N	99.99	default is 0
6	Motorcycle/Trailer Reinspection Fee	25	5	N	99.99	default is 0
7	Safety-Emissions Sticker or E-Sticker	30	5	N	99.99	default is 6.50
8	Safety-Only Sticker or E-Sticker	35	5	N	99.99	default is 0.85
9	Motorcycle/Trailer Sticker	40	5	N	99.99	default is 0.85
10	Window Tinting Inspection Fee	45	5	N	99.99	default is 10.00
11	Open Market Safety-Emissions Inspection Fee	50	1	A	Y=Yes, N=No	
12	<CR><LF>	51	2			
	Total Length		53			

LICENSE.DAT

Field #	Description	Offset	Length	Data Type	Format
1	County Location Code	0	3	N	
2	Station Number	3	5	N	if less than length 5, left pad with 0
3	Station Name	8	35	AN	
4	Address	43	35	AN	
5	City	78	35	AN	
6	Zip Code	113	5	N	99999
7	Station Phone Number	118	12	AN	999,999,9999
8	Issue Date	130	8	N	MMDDYYYY
9	<CR><LF>	138	2		
	Total Length		140		

LOCKOUT.DAT

Field #	Description	Offset	Length	Format		Set From	Cleared From
1	DMV/State NCAS lockout	0	1	A	Y=Yes, N=No	VID or NCAS	VID or NCAS*
2	NCAS State Safety lockout	1	1	A	Y=Yes, N=No	VID or NCAS	VID or NCAS*
3	Station license has been suspended	2	1	A	Y=Yes, N=No	VID	VID
4	Station license has been revoked	3	1	A	Y=Yes, N=No	VID	VID
5	Station license has expired	4	1	A	Y=Yes, N=No	VID	VID
6	Failure to Pay for Stickers or E-Sticker	5	1	A	Y=Yes, N=No	VID	VID
7	Failure to pay for communications services	6	1	A	Y=Yes, N=No	VID	VID
8	Failure to pay for certification stickers or e-stickers	7	1	A	Y=Yes, N=No	VID	VID
9	Cabinet tampering	8	1	A	Y=Yes, N=No	NCAS	NCAS
10	State disk drive tampering	9	1	A	Y=Yes, N=No	NCAS	NCAS
11	nnn (TBD) Emission tests performed without communications within XXX day period	10	1	A	Y=Yes, N=No	VID or NCAS**	VID or NCAS**
12	E-Sticker Sequence Lockout	11	1	A	Y=Yes, N=No	VID	VID
13	Virus detected	12	1	A	Y=Yes, N=No	NCAS	NCAS
14	<CR><LF>	13	2	Control Chars.			
	TOTAL		15				

* VID has priority over NCAS. If the State lockout is not cleared at VID the NCAS lockout clear will be overwritten and reversed.

** If the "DMV/State NCAS no communication" field in VIDCOMM.DAT is set to 000, number of test and number of day "no

Field #	Description	Offset	Length	Data Type	Format
1	County Location Code	0	3	N	
2	Station Number	3	5	N	if less than length 5, left pad with 0
3	Analyzer Number	8	8	AN	Examples: AT = Allen, BA = Bear, ES = ESP, SE = Sun, etc.
4	NCAS Test Record Number	16	8	N	
5	Inspection Type	24	1	N	1=Emissions/Safety, 2=Safety Only, 5=OBDII/Safety, 8=Training
6	Reinspection	25	1	A	Y=Yes, N=No
7	Record Inspection Disposition	26	1	A	P=Pass on initial inspection, F=Fail, R=Pass on reinspection, T=Training
8	Inspector License Number	27	12	AN	
9	Inspector License Number Source	39	1	A	B=Scanned off badge, M=Manually entered via keyboard
10	Inspector Last Name	40	30	A	
11	Inspector First Name	70	15	A	
12	Inspector Middle Initial	85	1	A	
13	Test Date	86	8	N	MMDDYYYY
14	Test Start Time (24 hour time)	94	6	N	HHMMSS
15	Test End Time (24 hour time)	100	6	N	HHMMSS
16	Inspection Class	106	2	A	IM = Safety/Emission, SI = Safety
17	Sticker Number	108	8	AN	
18	Inspection Fee (either safety-only or safety-emissions)	116	5	N	99.99
19	Sticker or E-Sticker Fee	121	5	N	99.99
20	Window Tinting Fee	126	5	N	99.99
21	Total Fees	131	5	N	99.99
22	TIN	136	12	AN	calculated only when sticker or e-sticker issued, else blank
23	Number of Receipt/Statements Printed	148	2	N	
24	Waiver Authorization Number	150	11	AN	
25	Current Registration Indicator	161	1	A	N = North Carolina, O = Out of state, U = Unknown
26	Registration County	162	3	N	
27	Vehicle Type	165	1	A	A = Light Duty, B = Heavy Duty, T = Trailer, M = Motorcycle
28	GVWR	166	5	N	99999, blank if Vehicle type = A, T, or M.
29	Vehicle Body Style	171	2	N	1-11
30	Spare	173	1	AN	
31	VIN	174	17	AN	
32	VIN Source	191	1	A	B=Scanned off barcode, M=Manually entered via keyboard
33	VIN Match	192	1	A	M=VIN match from VID, C=no communication with VID, R= no record match with VID after successful communication
34	Vehicle Model Year	193	4	N	YYYY
35	Vehicle Make	197	5	AN	
36	Spare	202	23	AN	
37	Vehicle Plate Number	225	8	AN	Left justified, blank filled
38	Number of Cylinders	233	2	AN	For rotary engines, entry will be "R".

39 Engine Size	235	5	N	Engine size stated in cubic centimeters displacement, right justified, zero filled
40 Current Odometer	240	6	N	
41 Previous Odometer	246	6	N	
42 Sticker Expiration Month	252	2	N	MM
43 Sticker Expiration Year	254	4	N	YYYY
44 Vehicle Fuel Type	258	1	A	G, B, P, N, D, E, H, I, O and F
45 E-Sticker Authorization Number	259	3	N	
46 Next Inspection Due Date Month	262	2	N	MM
47 Next Inspection Due Date Year	264	4	N	YYYY
48 Current Registration Due Date	268	8	N	MMDDYYYY
49 Abort Code	276	1	A	A = by analyzer, M = by inspector-mechanic, I = by invalid entry/retries, E = initiated in emissions sampling sequence, Z = related to ZF transmission, R=Forced abort for readiness codes check
50 Software Version	277	4	AN	YYVV
51 Spare	281	1	AN	
52 Parts Exemption Number	282	11	AN	"PEN" plus 8 numbers
53 Safety Inspection Disposition	293	1	A	P = Pass, F = Fail
54 Headlights	294	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
55 Parking Lights	295	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
56 Tail Lights	296	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
57 Clearance Lights	297	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
58 Foot Brake or Vehicle/Trailer/Motorcycle Brake	298	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
59 Steering Mechanism	299	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
60 Horn	300	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
61 Rear View Mirrors	301	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
62 Beam Indicator/Light Switch	302	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
63 License Plate Light	303	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
64 Stop Light	304	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
65 Directional Signals	305	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
66 Emergency Brake	306	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
67 Windshield Wiper	307	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
68 Tires	308	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
69 Exhaust System	309	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
70 Window Tinting	310	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
71 Reflectors	311	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable
72 Spare	312	2	AN	
73 Tampering Inspection Disposition	314	1	A	P = Pass, F = Fail
74 Catalytic Converter	315	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
75 Air Injection System	316	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
76 PCV Valve	317	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption

77 Unleaded Gas Restrictor	318	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
78 EGR Valve	319	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
79 Thermostatic Air Control (TAC)	320	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
80 Fuel Evaporation Control	321	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
81 O2 Sensor	322	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
82 Gasoline Tank Cap	323	1	A	P=Pass, F=Fail, C=Corrected, N=Not Applicable, E=Exemption
83 Spare	324	2	AN	
84 Emission Inspection Disposition	326	1	A	P = Pass, F = Fail
85 Preconditioning Sequence	327	1	N	1,2,3,4,9 default is 9
86 Idle RPM	328	4	N	nnnn
87 Hydrocarbons	332	4	N	nnnn
88 CO Gas	336	5	N	nn.nn
89 CO2 Gas	341	4	N	nn.n
90 HC Results	345	1	A	P = Pass, F = Fail
91 CO Results	346	1	A	P = Pass, F = Fail
92 CO2 Results	347	1	A	P = Pass, F = Fail
93 OBDII Inspection Disposition	348	1	A	P=Pass, F=Fail, C=Inoperable connector, N=No response to Mode \$01, PID \$01, R=Forced abort for readiness codes check
94 PID Count	349	8	AN	
95 PCM Module ID	357	8	AN	
96 PCM VIN	365	17	AN	
97 OBDII Ready Misfire	382	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
98 OBDII Ready Fuel	383	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
99 OBDII Ready Component	384	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
100 OBDII Ready Cat	385	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
101 OBDII Ready Cat Heated	386	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
102 OBDII Ready Evap	387	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
103 OBDII Ready Secondary Air	388	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
104 OBDII Ready Air Conditioning	389	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
105 OBDII Ready O2 Sensor	390	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
106 OBDII Ready O2 Heater	391	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
107 OBDII Ready EGR	392	1	N	0=Not supported/enabled; 1=Completed; 2=Not completed
108 OBDII Ready Result	393	1	A	P=Pass, F=Fail
109 OBDII Fault Codes	394	50	AN	Variable length list of fault codes, comma delimited
110 OBDII Fault Result	444	1	A	P=Pass, F=Fail
111 OBDII MIL Bulb Check	445	1	A	P=Pass, F=Fail
112 OBDII MIL Commanded Status	446	1	N	P=Pass, F=Fail
113 Engine RPM during OBDII Scan	447	5	N	99999
114 Engine Running	452	1	A	Y=Yes, N=No
115 Spare	453	1	AN	
116 Owner First Name	454	20	AN	default is blank
117 Owner Last Name	474	20	AN	default is blank

118 Owner Address	494	35	AN	default is blank
119 Owner City	529	35	AN	default is blank
120 Owner Zip Code	564	5	AN	default is blank
121 Motor Vehicle Dealer Number	569	6	AN	nnnnnA (alpha D,M,B,F or W), default = blank
122 VID Vehicle Sys ID	575	11	AN	blank is default or VID assigned
123 Spares	586	20		
124 Protocol	606	1	A	V=VPW, P=PWM, I=ISO, K=KWP, C=CAN(11 bit), D=CAN (29 bit), U=Unknown
125 CAL ID	607	16	AN	
126 CVN	623	8	AN	
127 Number of warm ups (trips) since DTCs cleared	631	3	N	
128 Distance traveled since DTCs cleared (miles)	634	5	N	
129 Time since DTCs cleared (minutes)	639	5	N	
130 Spares	644	17	AN	
131 <CR><LF>	661	2		
Total Length		663		

Note: This data file has been added to accommodate OBDII inspections

Field #	Name (Description)	Offset	Length	Data Type	Format
1	OBDII Enabled (Is OBDII implemented in NC?)	0	1	A	T, F
2	LD OBDII Model Year (Earliest model year LD vehicle subject to OBDII test)	1	4	N	YYYY
3	Misfire Ready Code (Is "misfire" to be used for "readiness" count?)	5	1	A	F, N, P
4	Fuel System Ready Code (Is "fuel system" to be used for "readiness" count?)	6	1	A	F, N, P
5	Comprehensive Ready Code (Is "comprehensive component" to be used for "readiness" count?)	7	1	A	F, N, P
6	Catalyst Ready Code (Is "catalyst" to be used for "readiness" count?)	8	1	A	F, N, P
7	Heated Catalyst Ready Code (Is "heated catalyst" to be used for "readiness" count?)	9	1	A	F, N, P
8	Evaporative System Ready Code (Is "evaporative system" to be used for "readiness" count?)	10	1	A	F, N, P
9	Secondary Air System Ready Code (Is "secondary air system" to be used for "readiness" count?)	11	1	A	F, N, P
10	A/C System Refrigerant Ready Code (Is "air conditioning sys" to be used for "readiness" count?)	12	1	A	F, N, P
11	O2 Sensor Ready Code (Is "oxygen sensor" to be used for "readiness" count?)	13	1	A	F, N, P
12	O2 Sensor Heater Ready Code (Is "oxygen sensor heater" to be used for "readiness" count?)	14	1	A	F, N, P
13	EGR System Ready Code (Is "EGR system" to be used for "readiness" count?)	15	1	A	F, N, P
14	Phase 1 Not Ready Allowed (Number of allowable "N" "not ready" monitors allowed for Phase 1 vehicles)	16	2	N	0-11
15	Phase 2 Start Year	18	4	N	YYYY
16	Phase 2 Not Ready Allowed (Number of allowable "N" "not ready" monitors allowed for Phase 2 vehicles)	22	2	N	0-11
17	HD OBDII Model Year (Earliest model year HD vehicle subject to OBDII test)	24	4	N	YYYY
18	LD Diesel OBDII Model Year (Earliest model year light duty diesel vehicle subject to OBDII test)	28	4	N	YYYY
19	HD Diesel OBDII Model Year (Earliest model year heavy duty diesel vehicle subject to OBDII test)	32	4	N	YYYY
20	E-Sticker Program Start Date	36	10	N	MM/DD/YYYY
21	Days Allotated for Re-Inspection	46	2	N	
22	Check for CVN	48	1	A	Y,N
23	Spares	49	31		
24	<CR><LF>	80	2		
	TOTAL_LENGTH		82		

Values in NETWORK.DAT shall be superceded by any information presented in EXCEPTION.DAT if a match is made for the current vehicle being tested.

If a Ready Code has been defined as "F", then the vehicle will be rejected from testing if the status for this code is "NOT COMPLETE", even if the number of "not-ready allowable" codes has not been exceeded. This code will also be included in the overall readiness determination count. If a Ready Code has been defined as "P", then this monitor will not be included in the overall readiness determination count, even if the status is "NOT COMPLETE". If a Ready Code has been defined as "N", then this code will be used in the overall readiness determination count. If more than the allowable number of "N" Ready Codes have a status of "NOT COMPLETE" as described in Section 3.10.6.2 of this specification, then the vehicle will be rejected from testing. Readiness codes with a status of "NOT ENABLED" shall not be counted or be included in any readiness determination

Phase 1 refers to vehicles of model years greater than or equal to the year listed in the "LD (or HD) OBDII Model Year Field" but less than the year listed in the "Phase 2 Start Year" field in this table.

Phase 2 refers to vehicles of model years greater than or equal to the year listed in the "Phase 2 Start Year" in this table.

DATA ENTRY field: "A" = Alpha, "N" = Numeric, "A/N" = Alpha-Numeric.

STICKER.DAT

Field #	Description	Offset	Length	Data Type	Format
1	Date	0	8	N	MMDDYYYY
2	Station License Number	8	5	AN	
3	Analyzer Number	13	8	AN	
4	Inspector License Number	21	12	AN	
5	Sticker Class	33	2	A	IM = Safety/Emission, SI = Safety, MT = Motorcycle/Trailer Inspection
6	Sticker Number	35	8	AN	
7	Reason Code	43	1	A	V = Voided/Damaged M = Missing S = Stolen W = Waiver
8	Waiver Authorization Number	44	11	AN	Waiver only - from VID
9	VIN	55	17	AN	Waiver only - from VID
10	Sticker Expiration Month	72	2	N	MM
11	Sticker Expiration Year	74	4	N	YYYY
13	Spare	78	13	AN	Spaces
14	<CR><LF>	91	2		
	Total Length		93		

TECH.DAT

Field #	Description	Offset	Length	Data Type	Format
1	Inspector License	0	12	AN	
2	Inspector Last Name	12	30	A	
3	Inspector First Name	42	15	A	
4	Inspector Middle Initial	57	1	A	
5	Access Code	58	5	A	99999
6	Emissions Suspended Flag	63	1	A	Y=Yes, N=No
7	Emissions Revoked Flag	64	1	A	Y=Yes, N=No
8	Emission License Expiration Date	65	8	N	MMDDYYYY
9	OBDII Suspended Flag	73	1	A	Y=Yes, N=No
10	OBDII Revoked Flag	74	1	A	Y=Yes, N=No
11	OBDII License Expiration Date	75	8	N	MMDDYYYY
12	Safety Suspended Flag	83	1	A	Y=Yes, N=No
13	Safety Revoked Flag	84	1	A	Y=Yes, N=No
14	Safety License Expiration Date	85	8	N	MMDDYYYY
15	Authorized to Purchase E-Stickers	93	1	A	Y=Yes, N=No
16	Spare	94	9	AN	
17	<CR><LF>	103	2		
	Total Length		105		

Field #	Description	Offset	Field Length	Data Type	Format
1	Network phone no	0	15	AN	---
2	Station License Number	15	5	N	if less than length 5, left pad with 0
3	Analyzer Number	20	8	AN	---
4	Analyzer Type	28	1	A	E = Safety/Emissions, B = Safety/Emissions and Safety/OBDII, O = Safety/OBDII S=Safety Only
5	Spare	29	1	AN	
6	Spare	30	30	AN	
7	Spare	60	30	AN	
8	Spare	90	20	AN	
9	Spare	110	15	AN	---
10	Spare	125	15	AN	---
11	Spare	140	15	AN	---
12	Spare	155	15	AN	---
13	Spare	170	15	AN	---
14	Spare	185	12	AN	---
15	Spare	197	12	AN	---
16	Spare	209	12	AN	---
17	Spare	221	11		
18	DMV/State no communication *	232	3	N	000=not set 999=set
19	Com. port base address	235	3	Hex	---
20	Com. port interrupt	238	2	Hex	---
21	Spare	240	3	AN	
22	Max # of tests in # of day with no modem contact	243	3	N	999 default = 50
23	Max # of days for # of tests with no modem contact	246	3	N	999 default = 30
24	<CR/LF>	249	2		---
	Total Length		251		

NOTES:

* If the "DMV/State NCAS no communication" field in VIDCOMM.DAT is set to 000, a "no communication" lockout (field 11 in LOCKOUT.DAT) will be automatically cleared via a data file refresh. If the "DMV/State NCAS no communication" field in VIDCOMM.DAT is set to 999, a "no communication" lockout (field 11 in LOCKOUT.DAT) must be manually cleared at the analyzer through the "Enforcement Menu" (before or after a data file refresh). A data file refresh will not be sufficient to clear this lockout. All character data shall be upper case.

FIELD LENGTH includes position for prescribed points, commas and colons.

DATA ENTRY field: "A" = Alpha, "N" = Numeric, "A/N" = Alpha-Numeric.

ENTRY METHOD field: "A" = Automatic, "M" = Manual

When a field will not be completely filled with data, the remaining characters shall be filled with spaces or as specified in the fill column.

[1/27/99 (NC) Abort Code field (#33) description contains aborts codes A, I, E, & Z but no criteria in spec. Field is to be blank or "M" (tbd)]

5 Section 5 – NCAS Vehicle Inspection Receipt/Statement and Printer Function Specifications

PURPOSE: This section describes the vehicle inspection receipt/statements, vehicle inspection reports and printer functions for the various North Carolina Analyzer Systems. The systems shall use one dedicated printer for printing inspection receipt/statements and one optional utility printer for general printing. NOTE: Current VIRS 5.3; 5.3.1; 5.4; 5.5; 5.5.1; 5.7 as established in the NCAS Specification dated March 5, 2004 will remain in affect (except for the following changes below identified with a “*”) until e-sticker start date begins. All other changes to the VIRS listed in this section will not take affect until e-sticker start date becomes effective.

* The following word changes need to be made to the following inspection VIRS: 5.3 from “Approval” to “Passed”; 5.3.1 from “Approval” to “Passed”; 5.4 from “Rejection” to “Failed” (two places); 5.5 from “Rejection” to “Failed” (two places); 5.5.1 from “Rejection” to “Failed”; and 5.7 from “Approval” to “Passed”;

5.1 Vehicle Inspection Receipt/Statement (VIRS)

The completed vehicle inspection receipt/statement must be identical to the format described in this section.

1. The size of the completed receipt/statement shall be eight and one-half by eleven inches (8 1/2" x 11"). Final layout is subject to approval by the State. The appropriate receipt/statement shall be automatically printed by the analyzer at the conclusion of each State inspection, regardless of the inspection disposition.
2. The words "State of North Carolina Vehicle Inspection Receipt/Statement" shall be centered at the top of each VIRS. Centered directly below the words "Vehicle Inspection Receipt/Statement", the NCAS shall print in bold letters the type of inspection and whether the disposition of the inspection is a "Passed", "Failed", or "Not-Ready Rejection". The word "Passed", "Failed", or "Not-Ready Rejection" shall be enclosed in a rectangle construction with the asterisk character of the printer. This function shall apply to selection number one (1) through four (4) of the NCAS Main Menu, which are: 1. Safety and Emission Inspection; 2. Safety Inspection Only; 3. Reinspection; 4. Reinspection using Waivers/Waiver.
3. Beginning immediately below the first full line of asterisks on the receipt/statement the NCAS shall generate a list of each safety item and tampering item (if applicable) with an indication of the item disposition.
4. When an emission inspection is included in a receipt/statement disposition "Exhaust Emission Test Results" or "OBDII Test Results" will be presented in a box of asterisks on the right portion of the Receipt/Statement below the "Tampering Inspection" information. For idle exhaust emissions tests, this information shall include a description, exhaust gas reading, exhaust gas standard, and engine RPM reading recorded in the test. For OBDII inspections, this information shall include MIL bulb working status, connector

status, communication status, MIL commanded status, RPM reading, and OBDII Test Results.

5. For OBDII test failures, a second page will be printed with the VIRS that will include the receipt/statement number, date, vehicle information, a failure notice, OBDII test result explanations, and a list of the stored diagnostic trouble codes and their descriptions. The failure notice shall be a hard-coded text block.

5.2 Receipt/Statement Field Format

1. The date ~~and time~~ recorded on the VIRS shall be the test date ~~and time~~ as recorded in NCAS.DAT.
[12/7/09 (NC) The requirement to print the time of the inspection was removed in 2002 but failed to get removed from this section until now.]
2. The title of the VIRS format shall use the same inspection names as selections one (1) through four (4) of the NCAS Main Menu. ~~and five (5) of the Station Menu.~~ The disposition (PASSED, FAILED, or NOT-READY REJECTION) shall be printed in capital letters.
3. If NCAS Main Menu Item six (6), Reprint Receipt/Statement, is selected, the title of the receipt/statement shall include the word DUPLICATE in all capital letters. The word DUPLICATE shall be prominently displayed, to the State's satisfaction, on the front of each reprinted VIRS in the upper left corner.
4. The station number and vehicle information shall be retrieved from the test record. The county name, vehicle type, and fuel type shall also be spelled out completely up to the maximum number of characters available.
5. The safety inspection summary shall list all safety inspection items.
6. The idle exhaust emission inspection summary (if applicable) shall list all emission inspection results and emission inspection standards.
7. The OBDII emission inspection summary (if applicable) shall list all OBDII inspection results. If the vehicle fails the OBDII inspection, a second page will be printed showing vehicle information, OBDII test result explanations, and all downloaded diagnostic trouble codes and their descriptions.
8. Each receipt/statement page shall include a line for the inspector-mechanic's signature and the vehicle owner's repair authorization signature. The NCAS shall also print the inspector mechanic's full name.
9. Each VIRS shall include, in addition to the information specified above, the information as shown on the relevant sample Receipt/Statement forms contained in this specification. The software version number of the software that generated the Receipt/Statement shall also be presented on the form.
10. The VIRS will consist of one (1) original copy. Additional copies may be printed as needed. Inspector-mechanic signatures will be required on all printed copies. Inspector-mechanic signatures will not be required on the second page of a VIRS from a failure OBDII scan (the error code description page). The original copy will be given to the vehicle operator, and any additional copies will be retained in the receipt/statement repository of the analyzer or other State approved location.

11. The "Receipt/Statement Number" as presented on the bottom of the Receipt/Statement form is the NCAS Record Number from the NCAS test record.
12. The sentence "Retain this copy for your records" shall be printed on the VIRS.
13. Print the inspector-mechanic's name under the signature line.
14. If the vehicle failed the emissions portion of an initial inspection, then
 - (a) The "EMISSIONS FAILURE INFORMATION" shall be printed prior to the printing of the VIRS, and
 - (b) The analyzer screen shall prompt "Do you need to print a copy of the DMV 'Uh-Oh' brochure to give the owner of this vehicle? (Yes/No)"
 - (i) If the answer is "Yes", then the sample "Uh-Oh!" brochure is to be printed. This sample may be printed on either printer.
 - (ii) If the answer is "No", then proceed without printing the "Uh-Oh!" brochure.
15. If the vehicle failed the OBDII scan portion of an initial inspection, then
 - (a) The "EMISSIONS FAILURE INFORMATION" shall be printed prior to the printing of the VIRS, and
 - (b) The analyzer screen shall prompt "Do you need to print a copy of the DMV 'OBDII Failure' brochure to give the owner of this vehicle? (Yes/No)"
 - (i) If the answer is "Yes", then the sample "OBDII Failure" brochure is to be printed. This sample may be printed on either printer.
 - (ii) If the answer is "No", then proceed without printing the "OBDII Failure" brochure.
16. If the vehicle is rejected from the OBDII scan due to too many unset readiness codes, then
 - (a) The "NOT-READY REJECTION" VIRS shall be printed, and
 - (b) The analyzer screen shall prompt "Do you need to print a copy of the DMV 'OBDII Failure' brochure to give the owner of this vehicle? (Yes/No)"
 - (i) If the answer is "Yes", then the sample "OBDII Failure" brochure is to be printed. This sample may be printed on either printer.
 - (ii) If the answer is "No", then proceed without printing the "OBDII Failure" brochure.
17. Additional copies of either the "Uh-Oh!" brochure or the "OBDII Failure" brochure must be printable from a menu item listed under the **State Inspection Menu (preferred)**.

5.2.1 Alignment of the Receipt

Alignment of the receipt/statement shall provide a one-half inch (1/2") margin from the top edge of the receipt/statement paper down to the midline of the first printed line. The vendor is to indicate appropriate vertical alignment. The NCAS shall be designed so that proper tension is maintained on the receipt/statement paper as it is fed through the printer. For Printers using fan-fold paper, the printer shall be designed such that removal of the VIRS which has completed printing will not require more than one single fan fold of paper from the printer.

5.2.2 Fees

The fees printed on the receipt/statement are computed from the information provided in Section 3. A pie chart, representing the emissions inspection fees in accordance with Table 5.2.2.1, shall appear as a watermark on the VIRS. This watermark, appearing in lighter tone than the VIRS itself, shall be present only on only safety-emissions inspection VIRS and when inspection fees are posted. (Sections 5.3, 5.4 and 5.5.) A sample of a pie chart, with its legend, is available within this Section 5. The sticker fee will be collected only if the inspection is approved and a sticker/e-sticker is issued.

**Table 5.2.2.1
 Fee Breakout for Safety-Emissions Inspections**

Fee Title	July 1, 2002	July 1, 2007
Highway Fund	\$0.55	\$0.55
Emissions Program	\$3.00	\$3.00
Telecommunication	\$1.75	\$1.75
Volunteer Rescue/EMS	\$0.18	\$0.18
Rescue Squad Relief	\$0.12	\$0.12
Division of Air Quality	\$0.65	\$0.65
Highway Trust Fund	\$0.25	\$0.00
Inspection Station	\$23.50	23.75
Total Inspection Fee	\$30.00	\$30.00

5.2.3 The Receipt/Statement Number

The Receipt/Statement Number as printed on the Receipt/Statement is the NCAS Test Record Number as identified in these specifications.

The information specified herein shall be recorded to the test record and recorded on the VIRS to the satisfaction of the State.

5.3 Sample Idle or Safety-only Vehicle Inspection Receipt/Statement

STATE OF NORTH CAROLINA
VEHICLE INSPECTION RECEIPT/STATEMENT

SAFETY AND EMISSIONS

Sticker Class: _____	*****	Inspection Fee \$XX.XX
Sticker Number: XXXXXXXXX	* PASSED *	Sticker Fee \$XX.XX
Date: MM/DD/YYYY	*****	Window Tinting Fee XX.XX
		Total Fees \$XX.XX
Make: _____		Vehicle Type: _____
Year: _____		Plate Number: _____
Body Style: _____		Odometer Reading: _____
VIN: _____		Number of Cylinders: _____
County: _____		Type of Fuel: _____
Sticker Expiration Month/Year: __/___		Previous Odometer: _____
TIN: XXXXXXXXXXXXX		Motor Vehicle Dealer Number: _____

Safety Equipment

Headlights PASS
 Parking LightsFAIL
 Tail LightsREINSP
 Beam Indicator Light/Switch ..CORR
 License Plate Light.....N/A
 Stop Lightetc.
 Directional Signals
 Horn
 Windshield Wipers
 Rear View Mirrors
 Foot Brake
 Emergency Brake
 Steering Mechanism.....
 Tires
 Exhaust System
 Clearance Lights
 Reflectors
 Window Tinting

Tampering Inspection

Catalytic Converter..... PASS
 Air Injection System..... FAIL
 PCV Valve..... REINSP
 Unleaded Gas Restrictor..... PASS
 Exhaust Gas Recirculation.... CORR
 Thermostatic Air Control..... N/A
 Fuel Evaporation Control..... Etc.
 Oxygen Sensor.....
 Gasoline Tank Cap

* Exhaust Emission Test Results *
* PASS, FAIL, WAIVER, - *
* <u>Gas Reading</u> <u>Standard</u> *
* HC (ppm) XXXX XXXX *
* CO (%) XXXX XXXX *
* CO2 (%) XXXX XXXX *
* * * * *
* Engine RPM at Reading XXXXX *
* * * * *

Station Number: _____	Analyzer Number: _____ Ver. XXXX
Inspection Class: _____	Receipt/Statement Number: _____
	Waiver Number: _____

Inspector-Mechanic: _____	Owner's Repair Authorization _____
Inspector-Mechanic's Name	

RETAIN THIS COPY FOR YOUR RECORDS

[1/27/99 (NC) See 3.7.3 on printing TSBs & recall msgs. EDTR (Comm) spec - up to 20 TSBs and 3 recall msgs in each file. Print first line of each and carry-over to second page if necessary. Placement not critical]

[2/10/99 (NC) Received updated sample from state]

5.3.1 Sample Safety-only Vehicle Inspection Receipt/Statement

STATE OF NORTH CAROLINA
VEHICLE INSPECTION RECEIPT/STATEMENT

SAFETY INSPECTION

Classification: _____ *****
Electronic Authorization No.: XXX * PASSED * Inspection Fee \$XX.XX
Date: MM/DD/YYYY * * * * * E-Auth. Fee \$XX.XX
Window Tinting Fee XX.XX
Total Fees \$XX.XX

Make: _____ Vehicle Type: _____
Year: _____ Plate Number: _____
Engine Size: _____ Odometer Reading: _____
Body Style: _____ Number of Cylinders: _____
VIN: _____ Type of Fuel: _____
County: _____ Previous Odometer: _____
TIN Number: XXXXXXXXXXXXX Motor Vehicle Dealer Number: _____

See your vehicle's registration card for your next Inspection Due Date.

Safety Equipment
HeadlightsPASS
Parking LightsFAIL
Tail LightsREINSP
Beam Indicator Light/Switch ..CORR
License Plate Light.....N/A
Stop Lightetc.
Directional Signals
Horn
Windshield Wipers
Rear View Mirrors
Foot Brake
Emergency Brake
Steering Mechanism.....
Tires
Exhaust System
Clearance Lights
Reflectors
Window Tinting

Tampering Inspection
Catalytic Converter..... PASS
Air Injection System..... FAIL
PCV Valve..... REINSP
Unleaded Gas Restrictor..... PASS
Exhaust Gas Recirculation..... CORR
Thermostatic Air Control..... EXEMPT
Fuel Evaporation Control..... N/A
Oxygen Sensor..... etc.
Gasoline Tank Cap

Station Number: _____ Analyzer Number: _____ Ver. XXXX
Inspection Class: _____ Receipt/Statement Number: _____
Parts Exemption Number: _____

Inspector-Mechanic: _____ Owner's Repair Authorization _____
Inspector-Mechanic's Name

RETAIN THIS COPY FOR YOUR RECORDS

5.4 Sample OBDII Vehicle Inspection Receipt/Statement (Passed)

STATE OF NORTH CAROLINA
VEHICLE INSPECTION RECEIPT/STATEMENT

SAFETY AND EMISSIONS (OBDII)

Classification: _____ *****
Electronic Authorization No.: XXX * PASSED * Inspection Fee \$XX.XX
Date: MM/DD/YYYY * * * * * E-Auth. Fee \$XX.XX
Window Tinting Fee XX.XX
Total Fees \$XX.XX

Make: _____ Vehicle Type: _____
Year: _____ Plate Number: _____
Engine Size: _____ Odometer Reading: _____
Body Style: _____ Number of Cylinders: _____
VIN: _____ Type of Fuel: _____
County: _____ Previous Odometer: _____
TIN Number: XXXXXXXXXXXXX Motor Vehicle Dealer Number: _____

See your vehicle's registration card for your next Inspection Due Date.

Safety Equipment

HeadlightsPASS
Parking Lights PASS
Tail Lights REINSP
Beam Indicator Light/Switch .. CORR
License Plate Light..... N/A
Stop Light etc.
Directional Signals
Horn
Windshield Wipers
Rear View Mirrors
Foot Brake
Emergency Brake
Steering Mechanism.....
Tires
Exhaust System
Clearance Lights
Reflectors
Window Tinting

Tampering Inspection

Catalytic Converter..... PASS
Air Injection System..... FAIL
PCV Valve..... REINSP
Unleaded Gas Restrictor..... PASS
Exhaust Gas Recirculation.... CORR
Thermostatic Air Control..... EXEMPT
Fuel Evaporation Control..... N/A
Oxygen Sensor..... Etc.
Gasoline Tank Cap

OBDII Test Results

PASS *
* MIL Bulb Working Pass *
* Connector Damage Pass *
* Communications Established ... Pass *
* MIL Commanded-On Pass *
* Engine RPM at Reading ... XXXXX *

Station Number: _____ Analyzer Number: _____ Ver. XXXX
Inspection Class: _____ Receipt/Statement Number: _____
Parts Exemption Number: _____ Waiver Number: _____

Inspector-Mechanic: _____ Owner's Repair Authorization _____
Inspector-Mechanic's Name

RETAIN THIS COPY FOR YOUR RECORDS

5.5 Sample OBDII Vehicle Inspection Receipt/Statement (Failed)

STATE OF NORTH CAROLINA
VEHICLE INSPECTION RECEIPT/STATEMENT

SAFETY AND EMISSIONS (OBDII)

Classification: _____ *****
Electronic Authorization No. XXX * FAILED *
Date: MM/DD/YYYY * * * * * * * * * *

Inspection Fee \$XX.XX
E-Auth. Fee \$XX.XX
Window Tinting Fee XX.XX
Total Fees \$XX.XX

Make: _____
Year: _____
Engine Size: _____
Body Style: _____
VIN: _____
County: _____
TIN Number: XXXXXXXXXXXXX

Vehicle Type: _____
Plate Number: _____
Odometer Reading: _____
Number of Cylinders: _____
Type of Fuel: _____
Previous Odometer: _____
Motor Vehicle Dealer Number: _____

Safety Equipment
HeadlightsPASS
Parking Lights FAIL
Tail Lights REINSP
Beam Indicator Light/Switch .. CORR
License Plate Light..... N/A
Stop Light etc.
Directional Signals
Horn
Windshield Wipers
Rear View Mirrors
Foot Brake
Emergency Brake
Steering Mechanism.....
Tires
Exhaust System
Clearance Lights
Reflectors
Window Tinting

Tampering Inspection
Catalytic Converter..... PASS
Air Injection System..... FAIL
PCV Valve..... REINSP
Unleaded Gas Restrictor..... PASS
Exhaust Gas Recirculation..... CORR
Thermostatic Air Control..... EXEMPT
Fuel Evaporation Control... N/A
Oxygen Sensor..... etc.
Gasoline Tank Cap

* OBDII Test Results *
* PASS, FAIL *
* MIL Bulb WorkingPass *
* Connector Damage.....Pass *
* Communications Established.. Fail *
* MIL Commanded-On N/A *
* Engine RPM at Reading ... XXXXX *

Your vehicle has failed the OBDII test. See page 2 of this report for repair instructions.
(programming note: print the above text only when OBDII Test Results are FAIL)

Station Number: _____
Inspection Class: _____
Parts Exemption Number: _____
Inspector-Mechanic: _____
Inspector-Mechanic's Name

Analyzer Number: _____ Ver. XXXX
Receipt/Statement Number: _____
Waiver Number: _____
Owner's Repair Authorization _____

RETAIN THIS COPY FOR YOUR RECORDS
REINSPECTION MUST BE PERFORMED AT THIS STATION WITHIN 60* DAYS TO AVOID
PAYING ANOTHER INSPECTION FEE [See 5/24/02 - (NC) note under Section 5.5.1]
*[10/19/07 (NC) Days Allocated for Re-Inspection obtained from Network.DAT]

5.5.1 Sample OBDII Vehicle Inspection Receipt/Statement (Failed, pg. 2)

STATE OF NORTH CAROLINA
VEHICLE INSPECTION RECEIPT/STATEMENT

SAFETY AND EMISSIONS
OBDII FAILURE REPORT - PAGE 2

Make: _____ Year: _____ Plate Number: _____
VIN: _____ County: _____ Odometer: _____
Receipt/Statement Number: _____ Date: MM/DD/YYYY

NOTICE: Your vehicle has failed the On-Board Diagnostic (OBDII) test.

Repair of your vehicle's emission system should be performed by a qualified repair facility. You may wish to check with your automobile dealership to determine if the repairs are covered under any warranties.

You may request additional brochures on the on-board diagnostic system from your inspector.

OBDII Test Results Explanations: (See sheet 1 for test results)

- MIL Bulb Working A "Fail" indicates your bulb and/or bulb circuitry is not working.
- Connector Damage A "Fail" indicates your OBDII Diagnostic Link Connector is damaged, tampered, or inoperable
- Communications Established A "Fail" indicates your OBDII Diagnostic Link Connector is not communicating with the test equipment at the inspection facility.
- MIL Commanded-On A "Fail" indicates your vehicle's computer has detected a malfunction in one or more of your vehicle's emission control components. A MIL Commanded-On signal indicates your vehicle's computer has stored Diagnostic Trouble Codes (DTC). These codes (see list below) will assist your repair technician in identifying the cause of your failure.

Stored Diagnostic Trouble Codes:

<u>Code Number:</u>	<u>Description of the DTC</u>
PNNNN	AAAAAA
PNNNN	AAAAAA
PNNNN	AAAAAA
.....

RETAIN THIS COPY FOR YOUR RECORDS
REINSPECTION MUST BE PERFORMED AT THIS STATION WITHIN 60* DAYS TO AVOID
PAYING ANOTHER INSPECTION FEE

[5/24/02 - (NC) – Print "REINSPECTION MUST. . . INSPECTION FEE" only when the vehicle fails an initial inspection. It is not to be printed on reinspections.] *[10/19/07 (NC) Days Allocated for Re-Inspection obtained from Network.DAT]

5.6 Sample OBDII Vehicle Inspection Receipt/Statement (“Monitors Not-Ready” Rejection)

STATE OF NORTH CAROLINA
VEHICLE INSPECTION RECEIPT/STATEMENT

SAFETY AND EMISSIONS (OBDII)

* NOT-READY REJECTION *

Make _____ Year _____ Vehicle Type _____
Body Style _____ Plate Number _____ Number of Cylinders _____
Type of Fuel _____ Odometer _____ VIN _____
Previous Odometer _____ County _____ Date: MM/DD/YYYY

NOTICE: Your vehicle has too many unset (not ready) readiness codes.

Your vehicle’s diagnostic monitors are not ready for testing at this time. Please return to this facility at a later date for an inspection, or contact your service dealer for additional information regarding on-board diagnostic readiness status.

You may request additional brochures on the on-board diagnostic system from your inspector.

Summary of Readiness Monitors:

<u>Misfire</u> (if available)	<u>Fuel System</u> (if available)	<u>Comprehensive Component</u> (if available)
Ready	Not Ready	Not Available
<u>Catalyst</u>	<u>Heated Catalyst</u>	<u>Evaporative System</u>
Ready	Not Ready	Not Available
<u>Secondary Air System</u>	<u>A/C System</u>	<u>O2 Sensor</u>
Ready	Not Ready	Not Available
<u>O2 Sensor Heater</u>	<u>EGR System</u>	<u>Other</u>
Ready	Not Ready	Not Available

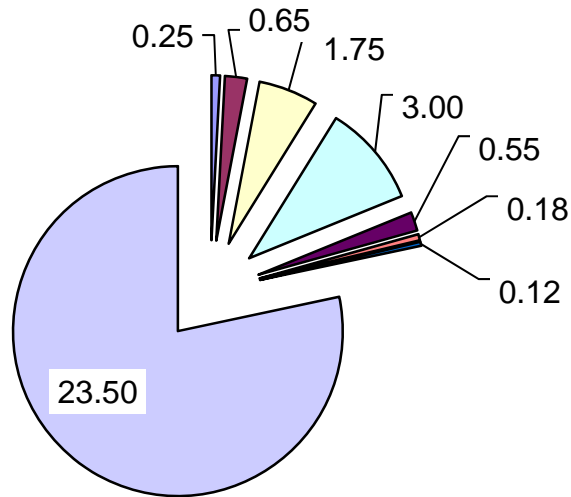
Station Number: _____ Analyzer Number: _____ Ver. XXXX
Inspection Class: _____ Receipt/Statement Number: _____

Inspector-Mechanic: _____
Inspector-Mechanic's Name

RETAIN THIS COPY FOR YOUR RECORDS

5.7 LEFT BLANK INTENTIONALLY

5.8 Safety-Emissions Pie Chart



■ Highway Trust Fund = \$0.25*	■ Division of Air Quality = \$0.65
□ Telecommunication = \$1.75	□ Emissions Program = \$3.00
■ Highway Fund = \$0.55	■ Volunteer Rescue/EMS = \$0.18
■ Rescue Squad Relief = \$0.12	□ Inspection Station = \$0.00(min) - \$23.50(max)*

Total Inspection Fee \$6.50 (min) - \$30.00 (max)

Notes:

1. Appearance of this pie chart is representative of State requirements.
2. If printed on a VIRS, the pie chart and legend must appear as a watermark on the VIRS. If printed as a stand-alone, the pie chart will be printed full-strength on a single page with a header as described in Section 3.26.
3. If printed on a VIRS, the pie chart should be centered between the columns labeled "Safety Equipment" and "Tampering Inspections". Otherwise, the pie chart should be centered on the page.
4. Font should be no smaller than 12 point type
5. If printed on a VIRS, the legend should be placed just below the text that reads "Retain this record for your records". If printed as a stand-alone, the legend should be placed directly below the pie chart.
6. "Total Inspection Fee \$6.50 (min) - \$30.00 (max)" should appear underneath the legend.
7. * On July 1, 2007 the Highway Trust Fund will be reduced to \$0.00 and the maximum fee for the inspection station will go up to \$23.75.

5.9 Emissions Failure Information

YOUR VEHICLE HAS FAILED THE OBD II INSPECTION

Q. What should I do next?

A. Before leaving the inspection station, you can request the inspector mechanic print a copy of the “Sample OBDII Failure Brochure”, which provides valuable OBD II system information. Take your vehicle and the “Vehicle Inspection Receipt/Statement” to a service center and have your emission failure repaired.



Q. What repairs costs will I be responsible for?

A. There should not be a charge for repairs if your vehicle is still within the manufacturer’s mileage and/or time warranty period. Additionally, there is an 8 year / 80,000 mile federally mandated warranty which covers the catalytic converter and the OBD II diagnostic devices/control unit. Repairs that are made outside the warranty periods will be the responsibility of the vehicle owner.

Q. What do I do after my vehicle has been repaired?

A. **Return within 60 days to the station that did your original inspection to be reinspected.**

Q. What do I do if my vehicle fails the re-inspection? Can I receive a WAIVER?

A. If you have spent at least \$200 trying to fix the original emission problem, take both (2) failed inspection receipts and your repair statements to your local DMV Office within 60 days of initial failure and request a (1) year inspection “Waiver”. NOTE: See the “Sample OBDII Failure Brochure” for additional waiver information.

Q. How can I locate the local DMV Office in my area?

A. You can call the DMV Hot Line at 1-888-999-3044 and they will direct you to the closest DMV Office. (www.ncdot.org/dmv)

For additional information, you may write the Division of Motor Vehicles or the Division of Air Quality:

For enforcement Issues
State of North Carolina
Division of Motor Vehicles
License and Theft Bureau
3125 Mail Service Center
Raleigh, North Carolina 27699-3125

For Air Quality Issues
State of North Carolina
Division of Air Quality
Mobile Sources Compliance Branch
1641 Mail Service Center
Raleigh, North Carolina 27699-1641

5.10 Sample "Uh-Oh" Brochure

"Uh-Oh!"

How to Meet the Clean Air Standards

North Carolina's Vehicle Emissions Control Inspection/Maintenance Program

Whether or not you received this publication as a result of failing an emissions inspection, you are encouraged to read on, in order to learn more about vehicles and emissions.

About five percent of all vehicles subject to the North Carolina's Vehicle Emissions Inspection/Maintenance (I/M) Program do not meet clean air standards created to protect the public. Your vehicle, like most others, can still pass inspection, often with minor, inexpensive repairs. This guide explains steps you should take to meet the clean air standards.

Because exhaust emissions usually cannot be seen, you probably did not know that your vehicle pollutes excessively. That is why a yearly inspection of your exhaust emissions control system is necessary.

There are several steps you should take to meet the clean air standards. First, find out why your vehicle failed and try to correct the problem. Then have your vehicle re-inspected. It's a good idea to keep detailed records of what you did to correct the problem, who did the work, and how much it cost. Do not wait until the last minute to have your vehicle repaired and re-inspected. It is illegal to operate a motor vehicle on North Carolina roads and highways with an expired inspection. Here is some information to help you:

1. Learn Why It Failed

Save the computer analyzer report and discuss it with the inspector-mechanic who did the inspection. The report tells you if carbon monoxide (CO) or hydrocarbon (HC) emissions are too high for your vehicle. High levels of CO and HC also mean that your vehicle is running inefficiently. Correcting these problems should enable your vehicle to pass inspection and also make it more fuel efficient.

-Diagnose Your Vehicle's Problems:

The causes of inspection failure, high CO or high HC, relate to the vehicle systems listed below. Use this information to aid in the diagnosis and repair of your vehicle. If your vehicle failed both CO and HC standards, you should perform CO repairs first.

HIGH CARBON MONOXIDE (CO):

When hydrocarbons (HC) are low or normal and the carbon monoxide (CO) reading is high, the most likely causes are:

- Rich fuel mixture

- Plugged PCV valve or fuel in the crankcase ventilation system
- Dirty air filter
- Malfunctioning closed-loop fuel metering system
- Saturated fuel evaporation canister or malfunctioning vapor purge system

More Details on the Probable Causes of High Carbon Monoxide (CO):

-Rich Fuel Mixture - Carburetor Adjustment:

Idle air/fuel mixture screws at the base of the carburetor housing control the idle air/fuel mixture. These screws often have tamper-resistant devices to limit the amount of adjustment that can be done. A single-barrel carburetor has one screw. A multiple-barrel carburetor has two. A very rich fuel mixture caused by improper adjustment produces high CO and poor fuel economy.

-Rich Fuel Mixture - Carburetor Malfunction:

Typical carburetor malfunctions that contribute to high CO include a sunk or heavy float, plugged or dirty air bleeds, oversized or worn metering jets, a power valve stuck in the open position, or an improperly adjusted choke valve.

-Rich Fuel Mixture - Choke Malfunction:

A properly operating carburetor choke mechanism reduces the air flow for a short period of time to produce a rich fuel mixture that helps start the engine. When the engine warms up, the choke mechanism must re-open. If it doesn't, the air flow is not increased, causing a rich fuel mixture, which leads to high CO, poor combustion and poor fuel economy. On carburetors with choke valves, the choke valve will be in the wide open position when the engine is warm and should move freely with light finger pressure.

Adjustments, cleaning, rebuild, or replacement can fix these carburetors and choke problems.

-Positive Crankcase Ventilation (PCV) Valve:

The PCV valve reduces air pollution from crankcase vapors by drawing them, along with filtered air, into the intake manifold, in order to be burned as fuel. Some of these vapors are unburned fuel that has entered the crankcase through leakage. An incorrect or plugged PCV valve or system may cause excessive CO emissions, poor combustion and poor fuel economy. (Excessive hydrocarbon emissions may be caused by a PCV valve that is too large or by a leak in the PCV system.) PCV problems are most often corrected by replacing the PCV valve and PCV filter, and by cleaning the system.

-Dirty Air filter:

The air filter cleans the air entering the engine. If the filter is dirty, enough air may not be available to mix with the fuel. This rich fuel mixture produces high CO, poor combustion and poor fuel economy. Most air filters are designed to be replaced when they are dirty; cleaning

them may reduce their effectiveness in protecting your engine from dirt. Some air filters are designed to be cleaned and then coated with a substance that dirt sticks to.

-Fuel Evaporation Canister:

This system helps prevent gasoline from evaporating into the air. If the canister is clogged or saturated, the gasoline vapors released into the air contribute to ground-level ozone. If the vapor purge system malfunctions, high CO emissions can result.

-Closed-Loop Fuel Metering System Malfunction:

Closed-loop fuel metering systems control fuel delivery by sensing the O₂ (oxygen) in the exhaust, and making rapid adjustments to the air/fuel ratio. These systems also supply additional fuel when the engine is cold. Vehicles that have these systems usually have a MIL (malfunction indicator light) or a "Check Engine" light. If this light comes on during normal driving, your vehicle may be polluting excessively or not operating efficiently. Determining whether the system is working properly is often very difficult without the use of diagnostic equipment.

HIGH HYDROCARBONS (HC):

When carbon monoxide (CO) is low or normal and the hydrocarbon (HC) reading is high, the most likely causes of the high HC are:

- Electrical misfire
- Too much spark advance (or initial timing)
- Air-fuel mixture too lean
- Vacuum leak
- Leaking exhaust gas recirculation (EGR) valve
- Malfunctioning closed-loop fuel metering system
- Engine wear

More Detail on the Probable Cause of High Hydrocarbons (HC):

-Ignition System Condition:

The ignition system generates a high voltage spark across the spark plugs in order to ignite the air/fuel mixture properly. The spark plugs, ignition wires, distributor cap, rotor, points, condenser, and ignition module must be in good condition for proper ignition of the air/fuel mixture. Ignition system problems are fixed by replacing the defective part. Since ignition system problems usually are not readily observable, it is wise to do regular ignition system "tune-ups," in which parts that are known to deteriorate are replaced and adjustments are checked. This not only reduces pollution, but also improves fuel economy and engine performance, and reduces the likelihood of breakdowns.

-Spark Timing:

The spark must be properly timed to ignite the air/fuel mixture in each cylinder at the right time in order to have emissions control devices work as intended, provide good fuel economy, and prevent costly engine damage. Timing checks and adjustments should be done as part of an ignition system tune-up.

-Lean Air/Fuel Ratios:

Lean (not enough fuel) air/fuel ratios may be caused by improper carburetor adjustments, such as an idle mixture that is too lean, idle speed that is too low, or a float that is adjusted too low. These carburetor problems can be fixed by appropriate adjustments. Other causes of a lean air/fuel ratio include vacuum leaks caused by disconnected or cracked vacuum hoses, air leaks in vacuum-operated equipment, gasket leaks, a warped carburetor base, warped intake manifold, etc. Careful visual inspection or the use of leak-detection equipment will generally find the cause of a vacuum leak.

-Exhaust Gas Recirculation (EGR) Valve:

The EGR valve is usually located on the intake manifold. It is supposed to be closed when the engine is idling. Deposits can cause the valve to remain open at all times, resulting in lean misfire, high HC, poor combustion, and poor fuel economy. If the EGR valve is sticking, it can be cleaned or replaced.

-Closed-Loop Fuel Metering System Malfunction:

Closed-loop fuel metering systems control fuel delivery by sensing the O₂ (oxygen) in the exhaust, and making rapid adjustments to the air/fuel ratio. These systems also supply additional fuel when the engine is cold. Vehicles that have these systems usually have a MIL (malfunction indicator light) or a "Check Engine" light. If this light comes on during normal driving, your vehicle may be polluting excessively or not operating efficiently. Determining whether the system is working properly is often very difficult without the use of diagnostic equipment.

-Engine Wear:

Timing belts and chains, intake and exhaust valves, and camshafts are examples of engine parts that control air/fuel and exhaust flow through an engine. Piston rings, gaskets, and seals are examples of parts that prevent different engine fluids or air from mixing with each other. Wear or failure of these parts may reduce engine performance and economy, and increase exhaust emissions. Regular maintenance and proper operation in accordance with the manufacturer's recommendations will help to minimize engine wear.

OTHER PARTS THAT CAN AFFECT EMISSIONS:

-Gasoline Tank Cap:

Along with preventing the spilling of liquid gasoline, the gasoline tank cap has the additional important purpose of sealing-in gasoline vapors. If allowed to escape into the air, gasoline vapors can cause an increase ground-level ozone, which has been linked to breathing problems in

people. In addition, if the gasoline vapors are held-in, they can be burned by your engine as fuel, increasing fuel economy. The simple act of properly replacing your gasoline tank cap after refueling can help yourself and others.

-Thermostatic Air Cleaner (TAC):

The TAC allows heated air to flow into the carburetor or throttle body to aid in warm-up. Air is drawn over the exhaust manifold through a heat pipe to the air cleaner inlet. Heating is controlled by a flap in the snorkel that allows heated air to enter when the cold air inlet is closed. If the cold air inlet remains closed after warm-up, hot air continues to flow into the engine, which can affect the air/fuel ratio.

-Catalytic Converter:

A basic catalytic converter combines CO and HC into water and carbon dioxide. Many late model vehicles are equipped with a three-way catalytic converter that also reduces nitrogen oxides (NOx) emissions. The catalytic converter is located between the exhaust manifold and muffler. A rich fuel mixture or engine misfire can cause overheating of the catalytic converter that may melt the catalyst bed, causing increased exhaust back pressure, poor fuel economy, and increased emissions. Having ever used leaded fuel may “poison” the catalytic converter, preventing it from doing its job.

-Heat Riser/Early Fuel Evaporation (EFE)

The heat riser/early fuel evaporation controls circulate engine exhaust through special passages of the intake manifold to assist engine warm-up. A mechanism located between the exhaust manifold and exhaust pipe is used for this purpose. Sticking, broken, or disconnected parts can cause extended warm-up time or excessively hot air/fuel mixtures, resulting in reduced fuel economy, engine fouling, and increased emissions.

-Air Pump/Air Injection Systems:

This equipment pumps air to the exhaust manifold or catalytic converter for more complete burning of CO and HC. Malfunctions can cause high CO/HC emissions and may contribute to catalytic converter damage..

2. Try to Correct the Problem

If your vehicle is under warranty, determine if needed repairs are covered by the manufacturer.

If your vehicle is not under warranty, decide what repairs need to be made so that your vehicle may be re-inspected. Be sure to save your invoices for parts and/or service in order to document expenditures.

If any emissions control system or component failed because it was missing, modified or disconnected, the system or component must be installed and made functional to pass inspection.

3. Have Your Vehicle Re-Inspected

4. Make a Choice

If your vehicle fails the emissions inspection again, you may choose to have it further repaired, or you may see if your vehicle qualifies for a waiver.

Waiver Information

If Your Vehicle Has Failed The Emissions Inspection

This handout explains the North Carolina Emissions Waiver Procedure or Process. This information is effective January 1, 1994 and supersedes any waiver information previously published.

Emission Waivers are issued to vehicles that have failed the tailpipe portion of the emissions test. Waivers cannot be issued to vehicles with safety related failures.

Waivers will be issued after the owner-operator has spent the required amount in parts and/or labor in order to bring the vehicle within compliance standards, yet the vehicle still fails the emissions portion of the test.

1980 and Older Model Year Vehicles

The minimum expenditure requirement is \$75.00. Repairs may be performed by the owner/operator. If owner/operator performs repairs, only cost of parts may be counted toward the waiver.

1981 And Newer Model Year Vehicles

The minimum repair expenditure is \$200.00. Repairs must be performed by a recognized repair inspector-mechanic. A recognized repair inspector-mechanic is considered to be someone who is professionally engaged in vehicle repairs or someone employed by a business whose purpose is vehicle repair or possessing nationally recognized certification for emission-related diagnosis and repair.

If The Vehicle Fails, It Must Have:

- . Passed the safety portion of the inspection
- . All exhaust emissions components appropriate to make, model, year, series, and engine size in place and visually operating
- . Failed first emissions test
- . Appropriate repairs made
- . Repair receipts itemized, dated and include the name of each part
- . Repairs performed after vehicle fails first emissions test and completed within sixty (60) days of initial inspection. [02/5/08 (DAQ) NC DMV to evaluate time period for waiver issuance.]
- . Only repairs made to correct emissions problems can be counted for a waiver and bring vehicle

- to emission compliance standards
- . The catalytic converter replaced if unleaded fuel restrictor has been removed
- . A written Denial of Coverage from the manufacturer or dealer, if the vehicle is still within the statutory age and mileage requirements as set forth in the Federal Clean Air Act.
- . Failed only the idle-emissions portion of re-inspection after repairs have been made.

What Is Not Accepted For Waivers

- . Cost of replacement, reconnection, or repair of emission control components or devices
- . Diagnostics – without repairs
- . Repair or replacement of safety items

After Repairs and Retest Failure

Present vehicle with current registration, both the initial and final inspection receipts, repair receipts, and written Denial of Dealer Warranty Coverage (if appropriate) to local DMV Enforcement Office.

DMV Enforcement Officer will inspect the vehicle for required emissions parts and verify receipts. Waiver will be issued once criteria is met. The waiver is valid for one test cycle.

Most DMV Enforcement Offices are usually staffed Monday through Friday (except holidays) from 8:00 am - 10:00 am. Before you go to get a waiver, call your local office to insure someone will be there to assist you.

Tips For Obtaining Good Emission System Repairs

Before any repair is performed, DMV recommends that you find a mechanic or repair shop which you feel is competent to make the proper diagnosis and perform the correct repairs. Ask the mechanic to provide you with a written cost estimate. Make sure you receive a written repair receipt with repairs itemized. Don't attempt to make complex repairs yourself. Emission control devices are often electronically controlled and require special test and adjustment procedures which can be performed only by technically qualified professionals. ASE (Automotive Service Excellence) certification is an accepted industry wide certification that recognizes individuals with competency in certain automotive fields. ASE certification in tune up and emissions repair usually signify a qualified professional.

For further waiver information contact your DMV Inspector at:

CABARRUS COUNTY
2192 Kannapolis Hwy.
Concord, NC 28025
704-786-8922

DURHAM COUNTY
101 S. Miami Blvd.
Durham, NC 27705
919-560-3280

FORSYTH COUNTY
3637 Patterson Ave.
Winston Salem, NC 27105
336-761-2286

GASTON COUNTY
2560 W. Franklin Ave.
Gastonia, NC 28052
704-853-5370

GUILFORD COUNTY
2391 Coliseum Blvd.
Greensboro, NC 27403
336-256-2024

MECKLENBURG COUNTY
8446 US Hwy. 29
Charlotte, NC 28256
704-547-5782

ORANGE COUNTY
1201 W. Hwy. 70
Hillsborough, NC 27278
336-732-7826

UNION COUNTY
3122 Highway 74 West
Monroe, NC 28110
704-283-1317

WAKE COUNTY
3231 Avent Ferry Road
Raleigh, NC 27607
919-816-9197

OR WRITE:
DMV License and Theft Bureau
3125 Mail Service Center
Raleigh, NC 27699-3125

MANUFACTURER WARRANTY COMPLAINT
Warranty Complaint
Field Operations and
Support Division (EN-397F)
U.S. Environmental Protection Agency
Washington, DC 20460

[8/24/00 (NC): This referral section will either be updated with the additional counties, or this information will be replaced with a toll-free information number]

5.11 Sample OBDII Failure Brochure

Frequently Asked Questions About On-Board Diagnostics

The Environmental Protection Agency has regulations in place establishing requirements for on-board diagnostic (OBD) systems on light-duty vehicles and light-duty trucks beginning with the 1994 model year. The purpose of the OBD system is to assure proper emission control system operation for the vehicle's lifetime by monitoring emission-related components and systems for deterioration and malfunction.

What is OBD And How Does It Work?

By the early 1980's, numerous vehicles were using electronics and on-board computers to control many of the engine's control systems, such as fuel and ignition. Vehicle manufacturers had to develop ways to diagnose problems generated by the new electronic hardware found under the hood. Thus, the first OBD systems were developed by auto manufacturers in the early 1980's as electronic systems replaced mechanical systems.

The engines in today's vehicles are largely electronically controlled. Sensors and actuators sense the operation of specific components (e.g., the oxygen sensor) and actuate others (e.g., the fuel injectors) to maintain optimal engine control. An on-board computer, known sometimes as a "powertrain control module" or an "engine control unit," controls all of these systems. With proper software, the on-board computer is capable of monitoring all of the sensors and actuators to determine whether they are working as intended. It can detect a malfunction or deterioration of the various sensors and actuators, usually well before the driver becomes aware of the problem through a loss in vehicle performance or drivability. The sensors and actuators, along with the diagnostic software in the on-board computer, make up what is called "the OBD system."

What Is The Connection Between OBD And Vehicle Emissions?

There are circumstances under which the vehicle computer will detect a system problem before the driver notices a drivability problem. Furthermore, OBD can detect problems that may not be noticeable upon visual inspection because many component failures that impact emissions can be electrical or even chemical in nature. By detecting these emission-related failures and alerting the driver to the need for potential repair, EPA hopes that vehicles will be properly repaired before emissions become a problem.

How Does OBD Inform Drivers Of Problems?

When the OBD system determines that a problem exists, a corresponding "Diagnostic Trouble Code" is stored in the computer's memory. The computer also illuminates a dashboard light indicating "Service Engine Soon" or "Check Engine" or displays an engine symbol. This light, usually yellow in color, serves to inform the driver that a problem has been detected and vehicle service is needed. When the car is delivered to the repair shop, a service technician can quickly retrieve the stored diagnostic trouble codes from the computer memory of the vehicle using

newly developed diagnostic tools. Since the diagnostic trouble codes will specifically identify the problem, the service technician can more quickly and accurately make the proper repair.

It is important to note that an illuminated dashboard light, as described here, is intended to inform the driver of the need for service, NOT of the need to stop the vehicle. However, service should be sought as soon as possible. Drivers also may wish to consult a repair shop or their vehicle owner's manual for further guidance.

Why Does The Dashboard Light Blink Or Flash?

Under certain conditions, the dashboard light will blink or flash. This indicates a rather severe level of engine misfire. When this occurs, the driver should reduce speed and seek service as soon as possible. Severe engine misfire over only a short period of time can seriously damage emission control system components, especially the catalytic converter, which is typically the most expensive to replace. Drivers should also consult their vehicle owner's manual for manufacturer specific information.

How Can The Dashboard Light Be Turned Off?

After fixing the problem, the service technician will the turn off the dashboard light. There are also situations under which the vehicle's OBD system can turn off the dashboard light automatically if the conditions that caused a problem are no longer present. If the OBD system evaluates a component or system three consecutive times and no longer detects the initial problem, the dashboard light will turn off automatically. As a result, drivers may see the dashboard light turn on and then turn off. For example, if the gas cap is not properly tightened after refueling, the OBD system can detect the vapor leak that exists from the cap not being completely tightened. If the gas cap is subsequently tightened, the dashboard light should be extinguished within a few days. This is not an indication of a faulty OBD system. In this example, the OBD system has properly diagnosed the problem and accordingly alerted the driver by illuminating of the dashboard light.

How Does OBD Help The Environment?

The intent of OBD systems is to assure proper emission system operation of each and every vehicle and light truck for its lifetime by monitoring emission-related components and systems for malfunction and/or deterioration. An important aspect of OBD is its ability to notify the driver of a problem before the vehicle's emissions have increased significantly. If the vehicle is taken to a repair shop in a timely fashion, it can be properly repaired before any significant emission increase occurs. OBD systems will also provide automobile manufacturers with valuable feedback from their customers' vehicles that can be used to improve vehicle and emission control system designs.

How Does OBD Help Consumers?

OBD systems are designed to alert drivers when something in the emission control system begins to deteriorate or fails. Early diagnosis followed by timely repair can often prevent more costly repairs on both emission control systems and other vehicle systems that may affect vehicle performance such as fuel economy. For example, a poorly performing spark plug can cause the engine to misfire, a condition sometimes unnoticed by the driver. This engine misfire can, in turn, quickly degrade the performance of the catalytic converter. With OBD detection of the engine misfire, the driver would be faced with a relatively inexpensive spark plug repair. However, without OBD detection, the driver could be faced with an expensive catalytic converter repair in addition to the spark plug repair. In addition, manufacturers have increased incentive to build a higher quality vehicle with better performance, reduced emissions, and more efficient powertrains to prevent problems that can lead to OBD detection. OBD systems will also provide far more information than ever before to help auto technicians diagnose and properly repair vehicles during their first visit to the repair shop, saving time and money for consumers.

Are OBD-Related Repairs Covered By Warranty?

Federal law requires that the emission control systems on 1995 and later model year vehicles be warranted for 2 years or 24,000 miles. Many auto makers provide extended warranty coverage beyond what is currently required by federal law. Federal law also requires that the on-board computer and the catalytic converter on 1995 and later model year vehicles be warranted for 8 years or 80,000 miles.

Can Anyone Service An OBD-Related Problem?

Only qualified, trained technicians equipped with the newest diagnostic and repair equipment should conduct OBD related service. All dealerships and independent repair shops should have qualified personnel for conducting OBD related repairs. Vehicle owners should ask their dealer and independent repair shops if their technicians have received proper training and have access to the necessary equipment to properly service OBD equipped vehicles.

Will Aftermarket Parts Work With OBD?

Most aftermarket parts should work with OBD systems, but there is no guarantee. It is the responsibility of aftermarket parts manufacturers to ensure that their parts work properly with the vehicle for which they are designed. This is even more true for OBD. The OBD regulations have required manufacturers to devise technologies and monitoring strategies that didn't previously exist. However, EPA is confident that aftermarket part manufacturers who do a thorough job of replicating original equipment manufacturer parts and those who carefully develop specialty parts will be able to produce parts that work with the OBD system.

What Should I Now Do?

If your vehicle is under warranty, determine if needed repairs are covered by the manufacturer.

If your vehicle is not under warranty, decide what repairs need to be made so that your vehicle may be re-inspected. Be sure to save your invoices for parts and/or service in order to document expenditures.

If any emissions control system or component failed because it was missing, modified or disconnected, the system or component must be installed and made functional to pass inspection.

Have your vehicle re-inspected.

If your vehicle fails the OBDII emissions inspection again, you may choose to have it further repaired, or you may see if your vehicle qualifies for a waiver.

Waiver Information

If Your Vehicle Has Failed the OBDII Inspection

This handout explains the North Carolina Emissions Waiver Procedure or Process. This information is effective January 1, 1994 and supersedes any waiver information previously published.

Emission Waivers are issued to vehicles that have failed the OBDII portion of the emissions test. Waivers cannot be issued to vehicles with safety related failures.

Waivers will be issued after the owner-operator has spent the required amount in parts and/or labor in order to bring the vehicle within compliance standards, yet the vehicle still fails the OBDII portion of the test. The minimum repair expenditure for 1996 and later model year vehicles is \$200.00.

Repairs must be performed by a recognized repair inspector-mechanic. A recognized repair inspector-mechanic is considered to be someone who is professionally engaged in vehicle repairs or someone employed by a business whose purpose is vehicle repair or possessing nationally recognized certification for emission-related diagnosis and repair.

If The Vehicle Fails, It Must Have:

- Passed the safety portion of the inspection;
- All emissions components appropriate to make, model, year, series, and engine size in place and visually operating;
- Failed first emissions (OBDII) test;
- Appropriate repairs made;
- Repair receipts itemized, dated and include the name of each part;
- Repairs performed after vehicle fails first emissions (OBDII) test and completed within sixty (60) days of initial inspection.;
- Only repairs made to correct emissions problems can be counted for a waiver and bring vehicle to emission compliance standards;
- The catalytic converter replaced if unleaded fuel restrictor had been removed;
- A written Denial of Coverage from the manufacturer or dealer, if the vehicle is still within the statutory age and mileage requirements as set forth in the Federal Clean Air Act;

- Failed only the OBDII portion of re-inspection after repairs have been made.

What Is Not Accepted For Waivers

- Cost of replacement, reconnection, or repair of emission control components or devices;
- Diagnostics – without repairs;
- Repair or replacement of safety items.

After Repairs and Retest Failure

Present vehicle with current registration, both the initial and final inspection receipts, repair receipts, and written Denial of Dealer Warranty Coverage (if appropriate) to local DMV Enforcement Office.

DMV Enforcement Officer will inspect the vehicle for required emissions parts and verify receipts. Waiver will be issued once criteria are met. The waiver is valid for one test cycle.

Most DMV Enforcement Offices are usually staffed Monday through Friday (except holidays) from 8:00 am - 10:00 am. Before you go to get a waiver, call your local office to insure someone will be there to assist you.

Tips For Obtaining Good Emission System Repairs

Before any repair is performed, DMV recommends that you find a mechanic or repair shop which you feel is competent to make the proper diagnosis and perform the correct repairs. Ask the mechanic to provide you with a written cost estimate. Make sure you receive a written repair receipt with repairs itemized. Don't attempt to make complex repairs yourself. Emission control devices are often electronically controlled and require special test and adjustment procedures which can be performed only by technically qualified professionals. ASE (Automotive Service Excellence) certification is an accepted industry wide certification which recognizes individuals with competency in certain automotive fields. ASE certification in tune up and emissions repair usually signify a qualified professional.

For further waiver information contact your DMV Inspector at:

ALAMANCE COUNTY
1045 Cedar Crest Drive
Graham, NC 27253
336-570-6807

BUNCOMBE COUNTY
1624 Patton Avenue
Asheville, NC 28806
828-251-6081

CABARRUS COUNTY
2192 Kannapolis Hwy.
Concord, NC 28025
704-786-8922

CATAWBA COUNTY
1033 Smyre Farm Road
Newton, NC 28655
828-466-5511

CLEVELAND COUNTY
1914 East Dixon Blvd.
Shelby, NC 28150
704-480-5484

CUMBERLAND CO.
831-A Elm Street.
Fayetteville, NC 28303
910-486-1331

DAVIDSON COUNTY
2314 South Main Street
Lexington, NC 27292
336-249-4530

DURHAM COUNTY
101 South Miami Blvd.
Durham, NC 27703
919-560-3280

FORSYTH COUNTY
3637 North Patterson Ave.
Winston Salem, NC 27105
336-761-2286

FRANKLIN/GRANVILLE COs.
86 Tanglewood Lane
Louisburg, NC 27549
919-496-3409

GASTON COUNTY
2560 West Franklin Blvd.
Gastonia, NC 28052
704-853-5370

GUILFORD COUNTY (1)
2391 Coliseum Blvd.
Greensboro, NC 27403
336-256-2024

GUILFORD COUNTY (2)
650 Francis Street
High Point, NC 27263
336-884-1742

HARNETT COUNTY
110 North Orange Avenue
Dunn, NC 28334
910-892-8916

IREDELL COUNTY
905 Carolina Avenue North
Statesville, NC 28677
704-878-4257

JOHNSTON COUNTY
3783 Hwy. 301 South
Four Oaks, NC 27524
919-934-3188

LEE/CHATHAM COUNTIES
2210 Carthage Street
Sanford, NC 27330
919-774-6715

LINCOLN COUNTY
1450 North Aspen Street
Lincolnton, NC 28092
704-735-8549

MECKLENBURG COUNTY
8446 North Tryon Street
Charlotte, NC 28213
704-547-5782

MOORE COUNTY
521 South Sandhills Blvd.
Aberdeen, NC 28315
910-944-3624

ORANGE COUNTY
1201 Highway US 70 West
Hillsborough, NC 27278
919-732-7826

RANDOLPH COUNTY
2754 us Hwy. 220 Business South.
Asheboro, NC 27203
336-629-4407

ROCKINGHAM COUNTY
1226 North Scales Street
Reidsville, NC 27320
336-634-5618

ROWAN COUNTY
5780 South Main Street
Salisbury, NC 28147
704-857-2498

STANLY COUNTY
611 Concord Road
Albemarle, NC 28001
704-982-4427

UNION COUNTY
3122 Hwy. 74 West
Monroe, NC 28110
704-283-1317

WAKE COUNTY
3231 Avent Ferry Road
Raleigh, NC 27606
919-816-9197

WAYNE COUNTY
701 West Grantham Street
Goldsboro, NC 27530
919-731-2054

WILSON COUNTY
1822 Goldsboro Street SW
Wilson, NC 27893
252-234-1521

BY DISTRICTS

DISTRICT # 1
2815 East Tenth Street Suite C
Greenville, N.C. 27858
252-752-4435
Carteret County
Craven County
Lenoir County
Onslow County
Pitt County

DISTRICT # 2
831-A Elm Street
Fayetteville, N. C. 28303
910-486-1331
Brunswick County
Cumberland County
New Hanover County
Robeson County

DISTRICT # 3
3231 Avent Ferry Road
Raleigh, N. C. 27606
919-816-9197
Edgecombe County
Franklin County
Granville County
Harnett County
Johnston County
Nash County
Wake County
Wayne County
Wilson County

DISTRICT # 4
2391 Coliseum Blvd.
Greensboro, N. C. 27403
336-256-2024
Alamance County
Chatham County
Durham County
Guilford County
Lee County
Orange County
Rockingham County

DISTRICT # 5
3637 Patterson Ave.
Winston-Salem, N. C.
336-761-2286
Davidson County
Forsyth County
Randolph County
Rowan County
Stokes County
Surry County

DISTRICT #6
8446 US Hwy 29
Charlotte, N. C. 28256
704-547-5782
Cabarrus County
Mecklenburg County
Moore County
Stanly County
Union County

DISTRICT # 7
1033 Smyre Farm Road
Newton, N. C. 28658
828-466-5511
Burke County
Caldwell County
Catawba County
Cleveland County
Gaston County
Iredell County
Lincoln County
Wilkes County

DISTRICT # 8
1624 Patton Ave.
Ashville, N. C. 28806
828-251-6081
Buncombe County
Haywood County
Henderson County
Rutherford County

OR WRITE:
DMV License and Theft Bureau
3125 Mail Service Center
Raleigh, NC 27699-3125

MANUFACTURER WARRANTY COMPLAINT
Warranty Complaint
Field Operations and
Support Division (EN-397F)
U.S. Environmental Protection Agency
Washington, DC 20460

For More Information:

For more information on federal on-board diagnostic regulations please contact:

U.S. EPA
Office of Transportation and Air Quality
2000 Traverwood
Ann Arbor, MI 48105
Telephone: (734) 214-4405

For more information on state on-board diagnostic regulations please contact:

North Carolina Division of Air Quality
Mobile Source Compliance Branch
1641 Mail Service Center
Raleigh, NC 27699-1641
Telephone: (919) 733-3340
URL: <http://daq.state.nc.us>

5.12. Station License Report Layout

**North Carolina Division of Motor Vehicle
License and Theft Bureau**

OFFICIAL INSPECTION STATION CERTIFICATE

The Commissioner of Motor Vehicles hereby certifies that:

Business	Station Number	Date Issued
NC Division of Air Quality 2728 Capital Blvd. Raleigh, NC 27626-0580 (919) 733-1728	29999	03/01/1998

has been designated as an Official Inspection Station to remain in effect until cancelled, suspended, or revoked.

Commissioner of Motor Vehicles

Licensed Inspectors Working At This Facility

NAME	.	LICENSE EXPIRATION DATE			AUTHORIZED TO PURCHASE E-STICKERS
		.SAFETY	EMISSIONS	OBD	
Able B. Inspector	.	04/05/2002	09/18/1999	09/18/1999	Y
Judy M. Mech	.	.06/13/2001	06/13/1999	06/13/1999	N
Under C. Auditor	.	.10/11/1999	02/15/1998	02/15/1998	N

A change in name, location or ownership will automatically cancel this certificate.
SL-8 (Rev 2/1998)

5.12.1 E-Sticker Authorization Purchase Report Layout

North Carolina Inspection Program

OFFICIAL E-STICKER AUTHORIZATION PURCHASE RECEIPT

Date of Transaction: _____

Transaction ID: _____

Station Number: _____

Analyzer ID: _____

Purchaser's First Name: _____

Purchaser's Last Name: _____

Type of Inspection E-Sticker Authorizations Purchased

E-Sticker Class	Number E-sticker Authorizations Purchased
-----------------	---

IM or SI	50
-----------------	-----------

Amount of Transaction: \$ _____

5.13 Printer Functions and Specifications

5.13.1 Required Printer

The NCAS shall be equipped with a printer for printing vehicle inspection receipt/statements (VIRS). This printer shall accept plain white eight and one-half by eleven inch (8 1/2" x 11") continuous fanfold pin-fed paper, and/or single-sheet paper. The printer shall print information on the VIRS using IBM-8 characters (ASCII), twelve (12) characters per inch, and eighty (80) characters per line. This is intended to ensure uniformity between manufacturers for style, size, and number of characters per inch.

5.13.2 Alternate Printer

The NCAS may be equipped with a second printer for use in printing information other than the vehicle inspection receipt/statement (VIRS).

5.13.3 Alignment of the Receipts/Statements

When continuous fan-fold paper is used, there shall be a one-inch (1") margin between vehicle inspection receipt/statements (VIRS). The vendor is to indicate the appropriate vertical alignment.

5.13.4 Vehicle Information

The analyzer software shall cause the required vehicle information to be printed on the vehicle inspection receipt/statement (VIRS). This shall be written in a character format.

5.13.5 Test Result with FAIL for Conditions

An inspection disposition with a FAIL result shall have the following message printed at the bottom of the VIRS: "Retain this copy for use on reinspection. Reinspection should be performed at this station."

6 Section 6 – NCAS Technical Specifications

PURPOSE: This section describes the technical specifications for the North Carolina Analyzer System (NCAS). Subsection 6.1 lists requirements for BAR-90 and BAR-97/OBDII analyzers, and Subsection 6.2 lists requirements for OBDII-only analyzers. These technical specifications include the maintenance functions to be performed by the analyzers, the operating conditions, hardware, and demonstration of conformity.

6.1 BAR-90 and BAR-97/OBDII Analyzers

6.1.1 General

The BAR-90 and BAR-97/OBDII NCAS shall be compatible with all types of automotive service operating environments. The analyzer shall operate under the conditions and performance requirements listed here, and Appendix D to Subpart S of 40CFR51 – Short Test Equipment, Section (I) – Steady-State Test Exhaust Analysis System. Appendix F to this Specification contains the text of this portion of the Code of Federal Regulations.

6.1.2 Automatic Zero and Span

The analyzer shall conduct an automatic zero and span check (or equivalent, with State approval) prior to each test. The span check shall include the HC, CO and CO₂ channels (and optional O₂).

6.1.3 Zero Drift Lockout Threshold

If zero and/or span drift cause the infrared signal levels to move beyond the adjustment range of the analyzer, the inspector-mechanic shall be automatically locked out from performing emission inspections and instructed to call for service. The analyzer manufacturer shall indicate, in writing, at what point the drift lockout will occur.

6.1.4 Gas Calibration and Leak Check

6.1.4.1 The Analyzer

The analyzer, to the maximum extent possible, shall maintain accuracy between gas calibrations taking into account all errors (including noise, repeatability, drift, linearity, temperature and barometric pressure.) The analyzer shall automatically require and successfully pass a gas calibration for HC, CO and CO₂ (and on the optional O₂ if purchased) by a method that is approved by the State at least every one (1) day for high-volume stations or every three (3) days for low-volume stations or the analyzer shall automatically lock itself out from further State emission inspections. The gas calibration shall ensure that accuracy specifications are satisfied and that linearity is correct at both of the required span points or the analyzer shall be automatically prohibited from performing any portion of the State emission inspections. The gas calibration procedure shall correct the readings to the center of the allowable tolerance range. Manufacturers shall include an evaluation of this capability, consisting of at least five (5) analyzers, with

their certification application materials and shall demonstrate this feature during certification/test process.

6.1.4.2 Two Point Calibrations

In high-volume stations (those performing 4,000 or more tests per year), analyzers shall require two-point calibrations each operating day and shall continually compensate for changes in barometric pressure. Calibration shall be checked at least every four hours and the analyzer adjusted if the reading is more than 2% different from the span gas value. Each time the analyzer electronic or optical systems are repaired or replaced, a gas calibration shall be required to be performed prior to returning the unit to service.

6.1.4.3 Multi-Point Calibrations

For analyzers in high-volume stations, monthly multi-point calibrations shall be required to be performed. For low-volume stations multi-point calibrations shall be required every six months. The calibration curve shall be checked at 20%, 40%, 60%, and 80% of full scale and adjusted or repaired if the specifications in 40 CFR Part 51, Appendix D(I)(b)(1) are not met. The necessary additional calibration gas bottles need not be a permanent part of the analyzer, but the analyzer software must require the periodic multi-point calibration and the analyzer hardware must accept the calibration gas from an external source.

During the process of conducting a multi-point calibration, results from the previous multi-point calibration shall be available for display to the screen and printing.

In order to expedite multi-point calibrations, once standard gas values have been entered into the analyzer, they shall be retained and displayed during a multi-point calibration.

6.1.4.4 Gas Calibration

Gas calibration shall be accomplished by introducing National Bureau of Standards traceable gases into the analyzer either through the calibration port or through the probe. Span gases utilized for calibration shall be within two percent (2%) of the required span points.

6.1.4.5 Length of Procedures

The gas calibration and leak check procedures shall require no more than five (5) minutes. The analyzer shall provide adequate prompts on the display to guide the inspector-mechanic through the calibration procedure in a manner that minimizes the amount of gas used. The analyzer shall be designed to keep the loss of calibration gas to an absolute minimum (less than 0.5 liters in twenty-four (24) hours) if the valve is not shut off in a timely manner.

6.1.4.6 Alternate Gas Calibration Systems

Alternate gas calibration systems, used in lieu of introducing gas at the specified span points, will be considered by the State, but will be required to meet additional requirements that will be specified in the NCAS certification test procedures. At the least, alternate gas calibration systems or procedures shall compensate for the following items:

1. Optical bench temperature and ambient barometric pressure shifts;
2. The effects of ambient air contamination on span and linearity;
3. The effects of the buildup of organic matter on optical windows on span and linearity;
4. The effects of changes in the sample cell wall reflections on linearity;
5. The effects of the angle of incidence on the optical filter on center frequency and the bandwidth;
6. Optical settling effects resulting from benches passing through thermal transients; and
7. Aging of the source. The State has taken a position that the only prudent way to compensate for the effects of aging of the source is to perform frequent gas calibrations using gases in the spectral range of at least the two (2) required span points.

6.1.4.7 Proposals for Less Frequent Gas Calibrations

Proposals for less frequent gas calibrations will be subjected to lengthy accuracy and drift tests. Proposals of this type shall be thoroughly evaluated (for example, lab as well as field testing in the range of the required span points for accuracy and drift for extended periods of time) and characterized prior to submission to the State.

6.1.5 Propane Equivalency Factor (PEF)

The PEF shall be conveniently displayed on the NCAS in a manner that is acceptable to the State and that enables it to be viewed conveniently, while permitting it to be altered only by personnel specifically authorized to do so. All emission analyzers which have the PEF changed must have the proper PEF information displayed in the same manner as the original PEF before inspections are resumed.

6.1.6 Non-Dispersive Infra-Red Beam Strength

The beam strength from the source to the detector for all channels shall be monitored so that when the beam degrades beyond the adjustment range of the analyzer, the analyzer shall be locked out from operation. The manufacturer shall specify at what point degradation occurs whereby the signal cannot be corrected.

6.1.7 Date of Last Gas Calibration

The date of the last gas span shall be kept in nonvolatile memory (or on the hard disk) and shall be displayed on the Status Screen in the Enforcement State Audit Menu.

6.1.8 Lockout Criteria

If the NCAS has not successfully passed a gas calibration and a leak check for a period of three (3) days or more for low-volume stations, or one (1) day or more for high-volume stations, it shall lock itself out from performing an official State idle exhaust emissions inspection and display a message to the inspector-mechanic upon start up. However, for BAR-97/OBDII analyzers, official State OBDII inspections may still be performed.

6.1.9 Audit Gas Pressure

During a gas audit, analyzer readings shall not change by more than one percent (1%) if the audit gas pressure is modified by plus or minus 1.5 pounds square inch (psi) from one (1) atmosphere of pressure at the probe.

6.1.10 Calibration and Leak Check Gas Usage

For HC, CO and CO₂ analyzer manufacturers shall limit gas usage during the gas calibration procedure to two (2) liters per span point or demonstrate to the satisfaction of the State that a greater amount must be utilized to properly calibrate their analyzer and that it would be cost prohibitive to reduce it to acceptable levels. An additional two (2) liters may be used to perform the leak check.

6.1.11 Span Points

A two (2)-point gas calibration procedure shall be followed by all manufacturers. The span shall be accomplished at the following points:

1. 300ppm propane;
 1.0% carbon monoxide;
 6.0% carbon dioxide;
 20.9% oxygen (if equipped with O₂); and
2. 1200ppm propane;
 4.0% carbon monoxide; and
 12.0% carbon dioxide

Ambient air may be used to calibrate the O₂ sensor.

6.1.12 Accuracy Tolerances

The analyzer shall meet the following accuracy requirements.

Channel	Range	Accuracy	Noise	Repeatability
HC ppm	0-400	+/- 12	6	8
	401-1000	+/- 30	10	15
	1001-2000	+/- 80	20	30
CO %	0-2.00	+/- 0.06	0.02	0.03
	2.01-5.00	+/- 0.15	0.06	0.08
	5.01-9.99	+/- 0.40	0.10	0.15
CO ₂ %	0-4.0	+/- 0.6	0.2	0.3
	4.1-14.0	+/- 0.5	0.2	0.3
	14.1-16.0	+/- 0.6	0.2	0.3
O ₂ %	0-10.0	+/- 0.5	0.3	0.4
	10.1-25.0	+/- 1.3	0.6	1.0

Rounding beyond the decimal places shown in the table shall follow the standard mathematical practice of going to next higher number for any numerical value of five (5) or more. Only numerical values more than three (3) places behind the decimal may be truncated.

6.1.13 Analyzer Display

The analyzer electronics shall have sufficient resolution and accuracy to achieve the following:

HC 1 ppm HC
CO 0.01 % CO
CO₂ 0.1 % CO₂
O₂ 1 % O₂ (OPTIONAL)
RPM 10 RPM

Dynamic information being displayed shall be refreshed at a minimum of twice per second.

6.1.14 System Response Time Requirements For Analyzer Channels

The response time from the probe to the display shall not exceed eight (8) seconds to ninety percent (90%) of a step change in input nor shall it exceed twelve (12) seconds of a ninety-five percent (95%) step change in input. If an analyzer is equipped with a optional O₂ sensor, the response time for the O₂ sensor may be long as fifteen (15) seconds to ninety percent (90%) of full scale.

6.1.15 Environmental Operating Range

6.1.15.1 Temperature

The analyzer, including all of the software/hardware enclosed in the cabinet, shall operate within the performance specifications described here in ambient air temperatures ranging from forty-one to one hundred ten degrees Fahrenheit (41-110 °F). The State will attempt to simulate, as closely as possible, actual diurnal and seasonal temperature changes that might be experienced by the stations to evaluate this performance requirement. Analyzers must be designed so that adequate air flow is provided around critical components to prevent overheating (and automatic shutdown) and to prevent the condensation of water vapor that could reduce the reliability and durability of the analyzer.

6.1.15.2 Humidity

The analyzer, including all of the software/hardware enclosed in the cabinet, shall operate within the performance specifications described here at up to eighty percent (80%) relative humidity throughout the required temperature range.

6.1.15.3 Interference Effects

The interference effects from non-interest gases shall not exceed +/- ten (10) ppm for hydrocarbons, +/- 0.05 percent for carbon monoxide and +/- 0.20 percent for carbon dioxide.

6.1.16 Power/Telephone Cord

The telephone line, separated from the power cord, shall be provided for the modem. The telephone line shall be enclosed in a protective cable meeting State and Underwriters Lab (UL) approval. Alternative methods to protect the telephone line may be submitted to the State for approval. The manufacturer shall include provisions to ensure that the power necessary to activate the modem at the appropriate time is available.

The telephone line shall be plugged in at the times specified by the State. If a dial tone is not found, or if inspection data is not transferred to the State at the specified time, an appropriate message shall be displayed the next time the power to the analyzer is turned on.

The analyzer shall be supplied with a twenty-five-foot (25') UL approved power cord. The manufacturer shall design the cabinet so that convenient storage is provided for any excess cord.

6.1.17 Power Requirements

6.1.17.1 Alternating Current

The NCAS shall operate only on alternating current (AC). No direct current (DC) models will be acceptable. A portable AC generating unit shall not power the NCAS. The manufacturer may seek an exception to this specification if it can be shown, to the satisfaction of the State, that the analyzer is immune to the line frequency variations of the portable AC generating unit. Immunity to line frequency variations is defined here as line frequency variations that will not cause more than one percent (1%) of full scale (FS) disturbances on any of the analyzers. Additionally, any portable AC generating unit used with the NCAS shall not have frequency excursions exceeding one (1) hertz from sixty (60) hertz.

6.1.17.2 Input Power

Input power shall be one hundred fifteen volts (115 VAC), sixty hertz (60 Hz). All analyzers shall meet the requirements contained in the NCAS specifications, with an input voltage variation of no more than +12 volts. Maximum allowable performance change due to line voltage variations shall not exceed one percent (1%) of FS value.

6.1.17.3 Main Power Switch

The analyzer shall have a main power switch located on the back panel. An optional power off/standby mode switch may be located on the front panel. All switches shall be clearly marked to indicate "main" or "standby". Either the main power switch or the standby switch may be used to power down the analyzer during periods of inactivity.

6.1.18 Warm-up Time and System Lockout

6.1.18.1 Warm-up

The analyzer shall reach stability within fifteen (15) minutes at forty-one degrees Fahrenheit (41 °F) from startup. During the warm-up, the main menu shall be displayed unless there is a maintenance message. If the inspector-mechanic selects any item from the main menu, a message shall be prominently displayed as follows: Warm-up in progress--checking for stability.

If an analyzer does not achieve stability within the allotted time frame, it shall be locked out from I/M testing and a message shall be displayed instructing the inspector-mechanic to call for service.

6.1.18.2 System lockout

Functional operation of the gas sampling unit shall remain disabled through a lockout until the analyzer meets stability and warm-up requirements. The analyzer shall be considered warmed-up when the zero and span readings for HC, CO and CO₂ have stabilized, within plus or minus three percent (+/-3%) of the full range of low scale, for five (5) minutes without adjustment. Evaluation of this feature will require demonstration of accuracy at both span points when the analyzer meets the warm-up criteria.

6.1.18.3 Stability

When stability is achieved and the warm-up requirements are satisfied, access to programs shall be allowed.

6.1.19 Analyzer Construction and Identification

6.1.19.1 Basic Construction

The analyzer shall be designed and constructed to provide reliable and accurate service in the automotive repair environment. The analyzer shall be supplied with a cabinet that is equipped with a storage area large enough to secure all accessories and operating manuals.

6.1.19.2 Materials

The materials used in analyzer construction shall be resistant to corrosive type substances found in the automotive repair environment and be designed to last for at least the period of the warranty.

6.1.19.3 Finish

The exterior and interior finish of the entire cabinet and console shall be sufficiently durable to withstand the chemicals and environmental conditions normally encountered in the automotive repair environment for the period of the warranty.

6.1.19.4 Mobility

The analyzer may be permanently mounted or mobile with wheels, and shall meet UL Standard 1244. If mobile, the analyzer shall be designed so that movement over rough surfaces (three-inch (3") deep holes) and on fifteen (15) degree inclines, will not cause it to tip over. Wheels must be at least five inches (5") in diameter and have a locking mechanism capable of preventing movement on fifteen (15) degree incline. Analyzers shall remain upright when placed at the center of an inclined plane that makes an angle of ten (10) degrees with the horizon and rotated three-hundred sixty (360) degrees. In addition, the analyzer shall remain stable and upright when rolled off the edge of a two-inch (2") high platform or when one (1) wheel is rolled over a depression, two inches (2") below the surface, and inside an eighteen-inch (18") diameter depression.

6.1.19.5 Identification

The manufacturer name, model number, analyzer serial number, the date of production, the county location code, the station number, the analyzer number and the Propane Equivalency Factor (PEF) shall be conveniently displayed on each analyzer in a manner meeting the State's approval. A DMV representative will assign the station number and the analyzer

number at the time of the installation of the analyzer. The analyzer number for each analyzer will be set as a part of the analyzer setup procedure and will also be displayed externally on the analyzer. The station owner will be provided a set of procedures to maintain a log of the analyzers assigned to the station to facilitate the numbering of analyzers. The county location codes are the same county codes to identify the registration county. These codes are found in Section 3 of these Specifications.

6.1.19.6 Electrical Design

Provisions shall be made for storing the power cord in a manner satisfactory to the State. Fuses or circuit breakers shall be used to protect individual electrical circuits and emission analyzers. Breakers and fuses shall be readily accessible from the exterior of the cabinet. Analyzer operation shall be unaffected by electrical line noise and voltage surges. The analyzer shall be sufficiently protected from voltage surges to prevent damage to the analyzer from the simultaneous start up of a two hundred and twenty (220) volt compressor, an arc welder, hydraulic controls and other equipment commonly found in the typical garage.

6.1.19.7 Electromagnetic Isolation and Interference

1. Electromagnetic signals found in an automotive environment shall not cause malfunctions or changes in accuracy in the electronics of the NCAS. The analyzer design shall insure that readings do not vary as a result of electromagnetic radiation and induction devices normally found in the garage environment (including high energy vehicle ignition systems, radio frequency (RF) transmission radiation sources and building electrical systems).
2. In addition, the manufacturer shall ensure that the analyzer processor and memory components are sufficiently protected to prevent the loss of programs and test records.

6.1.19.8 Vibration and Shock Protection System

Vibration and shock protection system operation shall be unaffected by the vibration and shock encountered under the normal operating conditions encountered in an automotive environment. Analyzers, motors, pumps and disk drives shall be shock-mounted to absorb any vibration that might affect the system operation.

6.1.20 Operator's Instruction Manual Storage

A drawer or enclosed cabinet with shelves shall be provided to store the analyzer operating instruction manual and the State Emission Inspection Manual and the Emission Application Manual. The operating manual shall include at least an overview of analyzer and software operation, emission inspection and test procedures, gas calibration procedures, leak check procedures and inspector-mechanic maintenance tips.

[8/24/00 (NC): Operator's instruction manual storage is not a requirement for OBDII, however, NCDENR is evaluating whether or not to include instruction manual availability during enforcement audits.]

6.1.21 Sampling System

The sampling system at a minimum, shall consist of a tailpipe probe, flexible sample line, a water removal system of the continuous draining type, particulate trap, sample pump and

flow control components. The flexible sample line shall be at least twenty-five feet (25') long.

6.1.21.1 Design

The system shall be designed to ensure durable, leak-free operation and be easily maintained. The operator's manual shall also indicate the capabilities of the particular system provided.

6.1.21.2 Contamination/Corrosion

Materials that are in contact with the gases sampled shall not contaminate or change the character of the gases to be analyzed. The sampling system shall be designed to be corrosion-resistant for at least five (5) years and be able to withstand typical vehicle exhaust temperatures. An optional probe and sampling system shall be available from the manufacturer and be capable of withstanding the higher temperatures associated with loaded mode testing.

6.1.21.3 Sample Hose

The sample hose shall be connected to the analyzer sample system with a screw-type fitting. The probe used to test vehicles with a single exhaust pipe shall be connected to the sample hose with a screw-type fitting which has a tee with a quick disconnect. The quick disconnect on the tee will allow the second probe to be easily attached for testing vehicles with dual exhaust. Quick disconnects will not be allowed on either the sample hose or the primary probe.

6.1.21.4 Fittings and connectors

Fittings and connectors used on the sample hose and probe shall be assembled in a manner that makes bypassing the sample line and probe, in an attempt to falsely pass a leak check, very difficult. Separate regulators shall be used for each cylinder necessary to perform a gas calibration. Alternative methods based upon a manifold apparatus may be approved by the State. Regulators shall be compatible with the gases of interest.

6.1.22 System Leak Check

A system leak check shall be performed within twenty-four hours before the test in low volume stations (those performing less than 4,000 inspections per year) and within four hours in high-volume stations (4,000 or more inspections per year) and may be performed in conjunction with the gas calibration. The analyzer shall not allow testing if a leak check is not performed within the preceding twenty-four hours in low volume stations and within four hours in high-volume stations or if the analyzer fails the leak check. The leak check shall be a procedure demonstrated to effectively check the sample hose and probe for leaks and shall be performed in accordance with good engineering practices. An error of more than +/- 2% of the reading using low range span gas shall cause the analyzer to require repair of leaks prior to further testing.

6.1.23 Integral Span Gas

6.1.23.1 Upon Delivery of Analyzer

Upon initial delivery of the analyzer, the analyzer manufacturer shall supply the analyzer with all required calibration gases needed for proper operation. The gases supplied shall be obtained from a blender meeting the requirements of California's Bureau of Automotive Repair current specifications for approved gas blenders incorporated herein by reference. The analyzer shall be equipped with a gas calibration port for the purposes of performing a probe to calibration port comparison.

6.1.23.2 Design

The analyzer shall be designed, in a manner approved by the State, to accommodate gas cylinders or other hardware necessary to perform the two-point gas calibration. Mounting locations for brackets, necessary for gas cylinders, etc., shall provide adequate room for routine access, servicing and replacement of secured components. Brackets and other hardware shall be located so that analyzer stability and impact protection is considered in the design.

6.1.23.3 Connectors

The analyzer manufacturers shall design the connectors used with span gas cylinders so that cylinders containing different concentrations or compositions of gas cannot be switched. As an alternative, manufacturers may use the same connectors on all required cylinders if they display a message instructing the inspector-mechanic to properly connect the hoses to the gas calibration cylinders when they are not connected correctly. In addition, for this alternative, some type of reasonably permanent, prominent label or tag shall be used to readily identify which hose should be attached to which cylinder. Other alternatives may be presented to the State for consideration.

6.1.24 Probe

The analyzer manufacturer shall equip the analyzer with two (2) sampling probes that meet the following general criteria:

6.1.24.1 Retention

The probe shall incorporate a positive means of retention to prevent it from slipping out of the tailpipe when in use.

6.1.24.2 Hand Grip

A thermally-insulated, securely-attached hand grip must be provided on the probe in a manner that insures easy probe insertion using one (1) hand.

6.1.24.3 Length and Flexibility

Manufacturers shall supply two (2) types of removable probe tips with each analyzer sold. The probe and both probe tips shall meet the following criteria:

1. The probe shall be designed so that the tip extends at least ten (10) inches into the tailpipe;

2. The probe and probe tip should be designed so they can be easily removed and reinstalled without special tools;
3. A handle, made of thermally insulating materials, shall be attached to a rigid, reasonably noncrushable portion of tubing made of stainless steel or something equivalent, which can be easily removed from the sample line and reinstalled by the operator; and
4. The probe tip shall be shielded so that the probe does not scoop debris up when it is inserted into the tailpipe.

6.1.24.4 First Probe

The first of the two (2) the probe tips supplied with the analyzer shall be of the traditional style meeting the following specifications:

1. Flexible enough to extend into a one and one-half inch (1-1/2") radius exhaust pipe having a three-inch (3") diameter, forty-five (45) degree bend; and
2. The flexible portion constructed so that it is sealed to prevent any sample dilution.

6.1.24.5 Second Probe

The second of the two (2) probe tips supplied with the analyzer shall be an essentially straight probe tip (no more than a fifteen (15) degree bend) meeting the following specifications:

1. Made of either stainless steel or copper, three-sixteenths inch (3/16") outside diameter (OD) solid-wall tubing, which is readily available; and
2. Designed so that the connector between the removable probe tip and the rigid portion of tubing is up inside the tailpipe at least three inches (3") to reduce the effects of any leak that might occur.

6.1.24.6 Serviceability

For the purposes of economical replacement, the flexible portion of the probe assembly must be designed so it can be replaced. The probes supplied shall be readily available.

6.1.24.7 Materials

The probe shall be made of materials that will withstand exhaust temperatures up to seven hundred (700) degrees Fahrenheit. Use of dissimilar metals with thermal expansion factors of more than five percent (5%) shall not be used in either the construction of probes or connectors.

6.1.24.8 Audit Gas Introduction

Probes shall be designed to allow, or supplied with an adapter allowing, the introduction of audit gas from a one-half inch (1/2") inside diameter flexible hose. The probe tip or the adapter shall be sized to provide a tight fit so that dilution cannot occur at the probe/hose connection.

6.1.24.9 Probe Cap

A probe tip cap suitable for performing a system leak check shall be provided if the vacuum decay method of leak check is utilized. Otherwise, whatever hoses and connectors are necessary shall be provided to allow the inspector-mechanic to perform the leak check.

6.1.25 Hang-up Check

Activation of the emission measurements mode of the NCAS shall be prevented unless a successful hang-up check has been performed immediately prior to the test sequence. Hang-up shall not exceed twenty parts per million (20 ppm) hexane prior to testing. A unit with a clean sample system shall have an HC hang-up time of no more than one hundred-twenty (120) seconds. If the HC hang-up does not drop below twenty parts per million (20 ppm) within one hundred-fifty (150) seconds, the analyzer shall prevent testing and the following message shall be displayed: Possible dirty filters or sample line. After each test, instructions shall appear on the display to direct the inspector-mechanic to remove the probe from the vehicle.

6.1.26 Dilution

6.1.26.1 Dilution Requirement

The analyzer supplier shall demonstrate to the satisfaction of the State that the flow rate on the NCAS unit shall not cause more than ten percent (10%) dilution during sampling of the exhaust of a 1.6 liter engine at normal idle. Ten percent (10%) dilution is defined as a sample of ninety percent (90%) exhaust and ten percent (10%) ambient air.

6.1.26.2 Dilution Procedure

The procedure for measuring flow rate dilution is as follows:

1. Set vehicle with 1.6 liter maximum engine displacement at factory-recommended idle speed, OEM configuration exhaust system, transmission in neutral or park, hood up (a blower to cool the engine may be used if needed). Set idle speed not to exceed nine hundred twenty (920) RPM. (Set for nine hundred (900) RPM with an upper tolerance of twenty (20) RPM).
2. With a laboratory grade analyzer system, sample the exhaust at forty centimeters (40cm) depth with a flow sample rate below three hundred twenty liters (320ltr.) per hour. Allow sufficient time for this test. Record all HC, CO and CO₂ readings. A chart recorder may be used to detect the point of stable readings.
3. Set the NCAS in the I/M mode and take HC, CO and CO₂ readings. Use the NCAS I/M MODE readings for the computations.
4. Repeat B.
5. If the difference of the readings between parts paragraphs 2 and 4 exceed five percent (5%) of the average of paragraphs 2. and 4., repeat parts paragraphs 2. and 4.; otherwise average paragraphs 2. and 4. and compare with paragraph 1. If paragraph 1 is within ten percent (10%) of the average of 2 and 4, then the equipment meets dilution specifications.

6.1.27 Barometric Pressure Compensation

Barometric pressure compensation shall be provided. Compensation shall be made for elevations up to six thousand feet (6000') (above mean sea level). At a given altitude and temperature, errors due to barometric pressure changes of +/-2 inches of mercury will not exceed the accuracy limits specified in this chapter. Manufacturers shall describe in writing how compensation will be accomplished. The method used shall be subject to approval by the State.

6.1.28 DLC Cord

The analyzer must be equipped with a standard SAE J1978 OBDII connector and communications link to allow an RPM signal, OBDII readiness codes, fault codes Malfunction Indicator Light (MIL) status, VIN number (when available), Calibration ID and PCM-ID to be downloaded from the on-board computer for applicable vehicles. The SAE J1978 OBDII connector must be such to allow the inspector the ability to connect to a vehicle freely (either remotely with a 25 foot range or with a cord of sufficient length to allow analyzer access to a vehicle 25 feet away).

The equipment design and operation must meet all Federal requirements (contained in 40 CFR 85.2207-2231) and recommended SAE practices (i.e., J1962, J1978 and J1979) for OBDII system inspections. Although not currently feasible, it is expected future NCAS upgrades will include equipment design and operation modifications to allow communication using Controller Area Network (CAN) protocol as defined in SAE J2284.

The OBDII interrogation process shall be fully integrated into the NCAS analyzer system. It must be automated and require no inspector intervention to collect and record the OBDII data retrieved via the OBDII diagnostic link.

6.1.29 Additional Testing Capabilities

The State does not anticipate incorporating diesel opacity testing, fuel-cap testing, or fuel system pressure and purge testing into the vehicle inspection program. However, provisions to allow analyzer upgrades to perform these functions may allow analyzer manufacturers a marketing advantage should these functions be required in future program changes.

6.1.30 Running Changes

Any changes to design characteristics or component specifications must be approved by State. It will be the analyzer manufacturer's responsibility to confirm that the changes have no detrimental effect on analyzer performance.

6.2 OBDII-Only Analyzers

6.2.1 General

The OBDII-only NCAS shall be compatible with all types of automotive service operating environments. The analyzer shall operate under the conditions and performance requirements listed here and in 40 CFR51. Appendix H of this Specification contains the amendment to the On-Board Diagnostic Checks final rule.

6.2.2 Environmental Operating Range

6.2.2.1 Temperature

The analyzer shall operate within the performance specifications described here in ambient air temperatures ranging from forty-one to one hundred ten degrees Fahrenheit (41-110°F). The State will attempt to simulate, as closely as possible, actual diurnal and seasonal temperature changes that might be experienced by the stations to evaluate this performance requirement. Analyzers must be designed so that adequate airflow is provided around critical components to prevent overheating (and automatic shutdown).

6.2.2.2 Humidity

The analyzer, including all of the software/hardware enclosed in the cabinet, shall operate within the performance specifications described here at up to eighty percent (80%) relative humidity throughout the required temperature range.

6.2.3 Power/Telephone Cord

The telephone line, separated from the power cord, shall be provided for the modem. The telephone line shall be enclosed in a protective cable meeting State and Underwriters Lab (UL) approval. Alternative methods to protect the telephone line may be submitted to the State for approval. The manufacturer shall include provisions to ensure that the power necessary to activate the modem at the appropriate time is available.

The telephone line shall be plugged in at the times specified by the State. If a dial tone is not found, or if inspection data is not transferred to the State at the specified time, an appropriate message shall be displayed the next time the power to the analyzer is turned on.

The analyzer shall be supplied with a twenty-five-foot (25') UL approved power cord. The manufacturer shall design the cabinet so that convenient storage is provided for any excess cord.

6.2.4 Power Requirements

6.2.4.1 Alternating Current

The NCAS shall operate on alternating current (AC). A portable AC generating unit shall not power the NCAS. The manufacturer may seek an exception to this specification if it can be shown, to the satisfaction of the State, that the analyzer is immune to the line frequency variations of the portable AC generating unit. Immunity to line frequency variations is defined here as line frequency variations that will not cause more than one percent (1%) of full scale (FS) disturbances on any of the analyzers. Additionally, any AC portable generating unit used with the NCAS shall not have frequency excursions exceeding one (1) hertz from sixty (60) hertz. The NCAS shall be allowed to operate on direct current (DC) if the manufacturer has obtained prior written approval to do so from the State. Any NCAS using DC power must also provide an optional external charger and AC adapter. NCAS DC power units must have an automatic shut down mode that activates if the battery life drops below 25 percent of full capacity. This shut down mode can not occur during the process of an inspection. If the 25 percent remaining capacity is detected during an inspection, the unit must not drop into the shut-down mode until the inspection is completed. Any additional inspections will not be permitted until such time

that there is sufficient battery life to complete an inspection and not fall below the 25 percent battery capacity.

6.2.4.2 Input Power

Input power shall be one hundred fifteen volts (115 VAC), sixty hertz (60 Hz). All analyzers shall meet the requirements contained in the NCAS specifications, with an input voltage variation of no more than +12 volts. Maximum allowable performance change due to line voltage variations shall not exceed one percent (1%) of FS value.

6.2.4.3 Main Power Switch And Initialization

The analyzer shall have a main power switch in a location that will not interfere with the normal operation of the device, nor be difficult to access when needed.. An optional power off/standby mode switch may be located on the front panel. All switches shall be clearly marked to indicate “main” or “standby”. Either the main power switch or the standby switch may be used to power down the analyzer during periods of inactivity.
Analyzer Construction and Identification

6.2.5 Analyzer Construction and Identification

6.2.5.1 Basic Construction

The analyzer shall be designed and constructed to provide reliable and accurate service in the automotive repair environment.

6.2.5.2 Materials

The materials used in analyzer construction shall be resistant to corrosive type substances found in the automotive repair environment and be designed to last for at least the period of the warranty.

6.2.5.3 Finish

The exterior and interior finish of the entire cabinet and console shall be sufficiently durable to withstand the chemicals and environmental conditions normally encountered in the automotive repair environment for the period of the warranty.

6.2.5.4 Mobility

The analyzer may be permanently mounted, mobile with wheels, a desktop unit, or any other state approved device and shall meet UL Standard 1244. If mobile, the analyzer shall be designed so that movement over rough surfaces (three-inch (3") deep holes) and on fifteen (15) degree inclines, will not cause it to tip over. Wheels must be at least five inches (5") in diameter and have a locking mechanism capable of preventing movement on fifteen (15) degree incline. Analyzers shall remain upright when placed at the center of an inclined plane that makes an angle of ten (10) degrees with the horizon and rotated three-hundred sixty (360) degrees. In addition, the analyzer shall remain stable and upright when rolled off the edge of a two-inch (2") high platform or when one (1) wheel is rolled over a depression, two inches (2") below the surface, and inside an eighteen-inch (18") diameter depression.

6.2.5.5 Identification

The manufacturer name, model number, analyzer serial number, the date of production, the county location code, the station number and the analyzer number shall be conveniently displayed on each analyzer in a manner meeting the State's approval. A DMV representative will assign the station number and the analyzer number at the time of the installation of the analyzer. The analyzer number for each analyzer will be set as a part of the analyzer setup procedure. Analyzer serial number shall be displayed externally on the analyzer. The station owner will be provided a set of procedures to maintain a log of the analyzers assigned to the station to facilitate the numbering of analyzers. The county location codes are the same county codes to identify the registration county. These codes are found in Section 3 of these Specifications.

6.2.5.6 Electrical Design

Fuses or circuit breakers shall be used to protect individual electrical circuits and emission analyzers. Analyzer operation shall be unaffected by electrical line noise and voltage surges. The analyzer shall be sufficiently protected from voltage surges to prevent damage to the analyzer from the simultaneous start up of a two hundred and twenty (220) volt compressor, an arc welder, hydraulic controls and other equipment commonly found in the typical garage.

6.2.5.7 Electromagnetic Isolation and Interference

1. Electromagnetic signals found in an automotive environment shall not cause malfunctions or changes in accuracy in the electronics of the NCAS. The analyzer design shall insure that readings do not vary as a result of electromagnetic radiation and induction devices normally found in the garage environment (including high energy vehicle ignition systems, radio frequency (RF) transmission radiation sources and building electrical systems).
2. In addition, the manufacturer shall ensure that the analyzer processor and memory components are sufficiently protected to prevent the loss of programs and test records.

6.2.5.8 Vibration and Shock Protection System

Vibration and shock protection system operation shall be unaffected by the vibration and shock encountered under the normal operating conditions encountered in an automotive environment. Analyzers, motors, pumps and disk drives shall be shock-mounted to absorb any vibration that might affect the system operation.

6.2.6 DLC Cord

The analyzer must be equipped with a standard SAE J1978 OBDII connector and communications link to allow an RPM signal, OBDII readiness codes, fault codes Malfunction Indicator Light (MIL) status, VIN number (when available), Calibration ID and PCM-ID to be downloaded from the on-board computer for applicable vehicles. The SAE J1978 OBDII connector must be such to allow the inspector the ability to connect to a vehicle freely (either remotely with a 25 foot range or with a cord of sufficient length to allow analyzer access to a vehicle 25 feet away).

The equipment design and operation must meet all Federal requirements (contained in 40 CFR 85.2207-2231) and recommended SAE practices (i.e., J1962, J1978 and J1979) for OBDII system inspections. Although not currently feasible, it is expected future NCAS upgrades will include equipment design and operation modifications to allow communication using Controller Area Network (CAN) protocol as defined in SAE J2284.

The OBDII interrogation process shall be fully integrated into the NCAS analyzer system. It must be automated and require no inspector intervention to collect and record the OBDII data retrieved via the OBDII diagnostic link.

6.2.7 Additional Testing Capabilities

The State does not anticipate incorporating diesel opacity testing, fuel-cap testing, or fuel system pressure and purge testing into the vehicle inspection program. However, provisions to allow analyzer upgrades to perform these functions may allow analyzer manufacturers a marketing advantage should these functions be required in future program changes.

6.2.8 Running Changes

Any changes to design characteristics or component specifications must be approved by State. It will be the analyzer manufacturer's responsibility to confirm that the changes have no detrimental effect on analyzer performance.

7 Section 7 – NCAS Documentation, Logistics and Warranty Requirements

PURPOSE: This section describes the documentation, logistics and warranty requirements for the North Carolina Analyzer Specification.

7.1 General

The following items shall be included with each analyzer submitted for certification or delivered to stations:

1. Instruction manual, securely held in a binder (or other suitable container) made of a material that is resistant to most petroleum-based products used in the garage environment;
2. An easily understood explanation of warranty provisions (including limitations and restrictions) and a listing of components covered and not covered, signed by a company representative and the purchaser, contained in the instruction manual;
3. Several extra particulate filter elements shall be included for units designed to perform exhaust emissions sampling;
4. Special adjustment tools to include all apparatus for gas calibration (internal/integral), and a probe tip cap if it is needed for conducting a leak check shall be included for units designed to perform exhaust emissions sampling; and

7.2 Instruction Manual

The instruction manual accompanying each analyzer shall contain the following minimum information:

1. Background information describing how emissions are formed during the combustion process, the general types of controls that are used on vehicles and what negative health impacts can result from vehicle emissions;
2. Functional diagrams (mechanical & electrical);
3. Accessories and options (included and/or available);
4. Model number and identification markings and locations;
5. Maintenance procedures and frequencies recommended by the manufacturer (the services that should be performed only by the manufacturer shall be clearly identified);
6. Gas calibration/leak check procedures (for exhaust emissions sampling units);
7. Brief description of the inspection/test procedures with a subject index;
8. Brief description of emission analyzer operating principles;
9. A listing and an easily understood explanation of warranty provisions (including the extended warranty), signed by a company representative and the purchaser, contained in the instruction manual. Information provided shall include a listing of warranty repair stations by name, address and phone number; and
10. Name, address and phone number of the manufacturer's representative in charge of sales and service personnel for the company in North Carolina. In addition, information shall be provided indicating the name, address and phone number for the company's vice president of service (or equivalent) who reports directly to the chief executive officer. The names of these representatives shall be verified, or updated as needed, every time a service technician visits a station.

7.3 Analyzer Warranty

7.3.1 Scope of Warranty

1. The cost of the analyzer shall include a two (2)-year transferable warranty covering parts and labor; an optional extension to this warranty shall be made available to all purchasers. For analyzers with a secure cabinet, the warranty shall cover all items that are located inside the secured area(s) of the analyzer. The manufacturer shall provide instructions to the purchaser describing the procedures needed to repair, replace or adjust components that are not covered by the warranty and can be accessed without compromising the security of the analyzer. The manufacturer shall provide the purchaser with the information necessary to properly select replacement parts not covered by the warranty to prevent degradation of analyzer performance, if applicable. In addition, an adequate number of qualified repair technicians shall be retained by the manufacturer to perform repairs on analyzers.
2. The Division of Motor Vehicles (DMV) shall not require preventive maintenance contracts. If the manufacturer feels that preventive maintenance is required or feels that it will reduce the warranty costs, it may be included in the price of the analyzer. The terms and conditions of the warranty shall not be contingent upon the purchase of any additional warranties or entering into a service agreement or maintenance agreement.
3. Equipment manufacturers shall provide State-approved software updates in accordance to Section 1.10 of these Specifications.

7.3.2 Warranty Provisions

Warranty provisions protecting the interest of the buyer shall include:

1. Location, phone number and address of the repair centers throughout the State. These shall be of an adequate number and so located to efficiently and timely meet statewide service needs. The response time established by the manufacturer may be long for a lower analyzer purchase price or short if the analyzer price is higher. All response time and cost provisions shall be clearly indicated in the warranty provisions;
2. Name of the manufacturer's representative closest to each franchised service center (if not a factory service center);
3. Coverage of at least all of the Inspection/Maintenance (I/M) hardware and software, whether contained inside the tamper resistant cabinet or not. A description of specific parts and labor covered by the provisions of the warranty shall be permanently provided to the purchaser. In addition, the warranty shall itemize the parts and labor which are not covered by the

- warranty. To ensure that purchasers are properly notified regarding the cost and provisions of the warranty, the North Carolina Analyzer System (NCAS) shall not be delivered until the purchaser and a company representative have signed a copy of the warranty. The purchaser shall initiate the service response time and/or loaner provisions. A copy of the signed warranty shall be provided to the purchaser, a copy forwarded to the State and a copy filed by the company;
4. The analyzer owner shall be provided a cost estimate prior to the performance of any service or maintenance unless the work will be covered by the warranty. Regardless of whether or not the work is covered by the warranty, the owner shall be provided a detailed description of the work performed when the job is completed. In addition to the description of the work performed, the owner shall be provided a toll free telephone number for the owner of the analyzer to call if s/he wants to complain about the work performed, the courtesy or competency of the manufacturer's technician or any other aspect of the warranty;
 5. Manufacturers shall provide stations with loaner analyzers if they are unable to repair analyzers within the specified time indicated in the warranty. For exhaust emission sampling units, loaner analyzers shall be gas calibrated, provided with new filters, and contain the latest version of I/M testing software. Printers shall be full of paper. Care shall be taken by the technician to maintain the sequence of the receipt/statements and to keep them in good condition; and
 6. All software updates must be approved by the State.

7.4 Replacement Parts

The analyzer manufacturer shall maintain an adequate supply of replacement parts and accessories to fulfill the service requirements of the analyzer warranty/extended warranty. The manufacturer, upon delivery, shall supply the purchaser with four (4) sets of filters (for exhaust emissions sampling units), at least five hundred (500) sheets of plain or fan-fold paper, two (2) extra printer ribbons and one (1) extra set of gas cylinders (if required for calibration of exhaust emissions sampling units). Replacement components for NCAS certified analyzers must be approved by the manufacturer. All analyzer components must function properly before conducting official State Inspections.

7.5 Service Centers

The analyzer manufacturer shall provide or contract for analyzer service/warranty repair stations within each region where analyzers are marketed. Shipping units by common carrier after repair or service is accomplished should only be done in cases where re-manufacturing is required or where solving a problem requires research beyond the capabilities of field service personnel.

7.6 Workmanship

Each manufacturer or his/her agent shall guarantee the repairs made for a period of ninety (90) days.

7.7 Parts Removed

All parts removed from an analyzer to accomplish repairs will be accounted for and given to the analyzer owner when the analyzer is returned to service except for parts covered under warranty. Parts that can be rebuilt and returned to service shall be listed on the completed work order.

7.8 Noncompliance With Any Portion of the NCAS Specifications

7.8.1 Term

The term of the NCAS certification issued by the State shall terminate no more than three years from the date of issuance. To renew the NCAS certification, each analyzer manufacturer shall demonstrate that the software update meets the State's specifications and has been installed in all applicable NCAS analyzer units to the State's satisfaction. Manufacturers must also correct any other problems identified by the State prior to having their certifications renewed. These terms and conditions are in addition to those specified in a conditional certification and or terms specified in other parts of the NCAS specifications.

7.8.2 Manufacturers' Certifications

Manufacturers' NCAS certifications will not be renewed, or may be conditionally revoked, if the State determines that an analyzer does not fully comply with all portions of the analyzer specifications and/or any of the following conditions exist;

1. Software updates are not performed within the time frame specified by the State or do not meet the requirements specified by the State; or
2. Analyzers in the field are found to be in violation of the NCAS specifications and the manufacturer is unwilling to resolve the matter either in the time frame requested by the State or in a way that is satisfactory to the State.

7.8.3 Revocation of Certifications

Revocation of the manufacturer's certifications may be limited to future sales of analyzers. Existing analyzers that do not conform to analyzer and update specifications will be locked out until they are brought into compliance. If problems identified are not corrected within the time specified by the State, a certification may be permanently revoked. If a certification is conditionally or permanently revoked the State will notify all licensed stations and representatives of the repair industry that new stations purchasing affected analyzers will no longer be licensed.

8 Appendix A: NCAS Microcomputer Specifications

8.1 General Requirements

8.1.1 Acceptance

1. All equipment and software submitted for certification must be the full and current configuration proposed for sale. PARTIAL, DATED OR INCOMPLETE MODELS ARE NOT ACCEPTABLE.
2. Acceptance of the microcomputer portion of the NCAS will be dependent upon the satisfactory performance of the full proposed configuration meeting all the requirements of this specification.
3. The proposed hardware configuration must be fully supported by all software and/or operating systems listed in the acceptance requirements or elsewhere in these specifications. Performance tests to prove compatibility will be required. The vendor will bear all shipping and equipment preparation charges for the certification testing.

8.2 Minimum Required Configuration

To review the minimum required configuration for BAR90 and BAR97 analyzers that received a Certification of Approval for use in North Carolina, refer to the October 1998 edition of the Specification for the North Carolina Analyzer System. Stand-alone OBDII and new BAR97 analyzers receiving a Certification of Approval after December 31, 2000 shall meet the requirements of this specification.

8.2.1 Operating System

Each unit must be supplied with an IBM PC-compatible operating system capable of performing all aspects required within this specification. System should provide TCP/IP capabilities as well. Operating systems must be of the type which are commercially available.

8.2.2 Processor

The microprocessor must be an IBM PC-compatible. Unit provided must be commercially available with sufficient capability to perform all tasks and functions identified within this specification.

8.2.3 RAM Memory

There shall be sufficient RAM memory to adequately support all functions of the NCAS.

8.2.4 BIOS

The system must include a ROM BIOS (Basic Input/Output System) that provides a self-diagnostic routine to check the performance of critical PC components (including, at a minimum, the processor, firmware ROM, hard disk, keyboard, clock, setup RAM and memory) upon power up and which enables full use of the operating system. This BIOS must fully support all supplied components.

8.2.5 Video

If a detached color display is provided, it must be no smaller than twelve inches (12") in diagonal measure and no greater than .28 dot pitch. A fully compatible video card capable of running color graphics and text in at least SVGA modes must support the display. The video card shall contain sufficient memory to support all activities required within this specification. All other color display units must be of sufficient size having graphic capabilities and programming to perform all aspects of the inspection process. These units must provide readable screens when held at arm's length by the inspector. The software must contain screen blanking protection or screen savers. If a key stroke entry is not made at least every 20 minutes, the screen will be blanked out or some other method to prevent damage to the phosphor on the inside of the CRT must be employed. Similar protection must be provided for flat screen (non-CRT) displays. When the operator strikes any key, the data screen will reappear. Alternative methods of screen protection may be offered for evaluation by the State I/M office.

8.2.6 Floppy Disk

Each analyzer must be equipped with a minimum of one standard 1.44 Mb, 3.5 inch, IBM compatible floppy disk drive. The analyzers shall be capable of reading, writing and formatting the high density 3.5 inch diskettes used in the State's IBM PC-compatible type microcomputers directly without the need for any conversion. If there are any major brands of floppy disks that are incompatible with a manufacturer's analyzer, the manufacturer must state so at the time the analyzer is submitted for certification. The State may require test data to support the manufacturer's claims. This floppy disk drive shall be designated the "A drive". This floppy, "A drive" is the drive that will be used for backup material as specified in Section 1.8. The manufacturer shall prevent customer access to the hard drive through this or any other drive units. Analyzers shall not be able to run personal software off the state floppy-drive. Additional floppy drives, providing access to hard drives other than the state emission program hard drive, may be provided for personal software, if desired.

If a manufacturer wishes to utilize a device other than a 3.5-inch diskette to record the data as required in Section 1.8 and identified in Section 1.1, the manufacturer must obtain prior written approval from the State. The manufacturer must also provide any documentation required by the State that substantiates the proposed device will meet the needs of the program. With the advancement in computer technologies, manufacturers may use, in lieu of "floppy disk drives", any removable flash technologies including thumb drives, flash drives, etc. These drives must perform the similar functions relating to "floppy drives" as described in this specification and therefore are equal substitutes whenever the term "floppy drive" is used. Manufacturers may be requested to provide documentation as required by the State to substantiate analyzer functionality if there are questions about the proposed device(s) meeting the needs of the program.

8.2.7 Compact Disk (CD) or Digital Video Disc (DVD)

At a minimum, each analyzer must be equipped with one CD ROM drive. However, if requested by the purchaser, individual NCAS units will be alternatively equipped with a DVD drive. However equipped, the disk drive must be protected from contamination in the shop environment. The minimum acceptable sustained transfer rate is 600 kilobytes per second, and the drive must have functionality to allow software to be loaded onto the NCAS

as well as provide a medium to read industry service products. The manufacturer may provide, with prior State approval, a NCAS analyzer equipped with a method of updating and loading software and providing a means to read industry service products through a method other than a CD, DVD, floppy drive or USB flash drive. This method must include a drive recognized by the system and utilize removable media commonly available. A means for providing security to prevent unauthorized access to lower systems functions shall be provided.

8.2.8 Mass Storage Device

Each NCAS unit must come with a mass storage device, hereafter called a device, of sufficient size to contain all required information, programs, etc., specified within this NCAS specification. The vendor may partition this device for its proprietary programs leaving sufficient usable storage for the State programs. The system shall warn the technician with a screen prompt when the device is within 10% of being full in any of the allotted storage areas. The device is to be self-parking (where applicable), shock mounted and able to operate reliably in the expected hostile garage environment. The device must also include a method(s) to limit customers' access to State data and programs. The device containing the State programs and files shall be designated the "C" drive. Manufacturers may offer additional devices within the NCAS that may run optional software/hardware application programs. The computer shall not be bootable from any drive unit, nor shall any programs, run from these drive units, have access to the computer's operating system. Programs run from an additional drive units shall not be capable of interfering with, modifying, corrupting or interrupting any inspection-related programs, procedures or files.

8.2.9 I/O Ports

The unit must include as many DOS/IBM compatible parallel printer ports, USB connection ports and serial ports as needed to support all peripheral hardware provided to meet the requirements of this specification. At least one (1) spare bi-directional parallel printer port (male DB-25) and RS232 serial port (DB-9) shall also be available. All ports must be clearly labeled and easily accessible by State authorized representatives.

8.2.10 Keyboard and Pointing Device

The NCAS keyboard must be commercially available fully interfaced with the microcomputer and have all of the necessary normal, numeric, cursor, control, shift, alternate and function keys needed to operate a standard IBM PC compatible microcomputer. A full-size keyboard with one hundred one (101) keys should be provided. The keyboard and any pointing device shall be removable and replaceable without requiring access to a secure area of the NCAS. A pointing device shall be provided if such a device is necessary for full NCAS functionality. The device must be active and compatible with a MS Mouse. The pointing device shall have a sensitivity adjustment available to the technician.

8.2.11 Modem

The analyzer shall be equipped to transfer vehicle test records to the State via a commercially available modem connected to a telephone line. Data transfer of the modem shall be rated at no less than 28.8 Kbps. This modem may be either internal (that is, located inside the cabinet or the CPU) or an external modem located outside the cabinet or the CPU. If an external

modem is used, the manufacturer shall ensure physical integrity to the modem. This modem is to be attached to a telephone line installed in the facility.

A telephone line, separated from the power cord, shall be provided for the modem. The telephone line shall be enclosed in a protective cable meeting State and UL or ETL approval. Alternative methods to protect the telephone line may be submitted to the State for approval. The manufacturer shall include provisions to ensure that the power necessary to activate the modem at the appropriate time is available.

The modem must be equipped with MNP level-5 error correction. The manufacturer must provide all necessary software and protocol for modem file transfers.

8.2.12 Expansion

The State is interested in ensuring that the NCAS will have expansion capability to add functions beyond those defined in this specification. For example, the NCAS unit may need to be updated to provide for additional support for diagnostic and repair capability which might include on-line maintenance manuals using new technology such as additional DVDs, optical disk storage devices or other removable flash drive technologies.

Two (2) full-sized or half-size PCI expansion slots or two (2) USB 2.0 ports must be available in the NCAS unit after the manufacturer has installed all features and adapters required to meet current specifications. These slots cannot be used by the manufacturers for additional options unless approved by the State and the use complies with and satisfies a State intended use for these expansion slots.

8.2.13 Printer

1. As a minimum requirement, the NCAS unit is to use commercially available laser printers or high-quality inkjet printers suitable for the expected environment to print vehicle inspection receipt/statements (VIRS), and other reports. The printer shall be capable of printing at least 4 pages of text per minute on 8.5" x 11" paper. The printer shall print a VIRS duplicating the example VIRS with font and clarity provided in Section 5. Printers may also use scaleable, "True Type" or "Postscript" fonts, as determined by the manufacturer. The printed characters used must be such that the number 0 is printed differently than the letter O. The printer must be able to copy graphic output from CRT displays.
2. There shall be unlimited access to the printer so that paper can be easily replaced, printer jams can be cleared and toner cartridges/ink cartridges can be replaced.
3. A second, separate printer may also be supplied.
4. The information printed on the receipt/statement shall use pica font, IBM-8 character set (or other character set approved by the State), twelve (12) point, twelve (12) characters per inch, six (6) lines per inch, eighty (80) characters per line. This is intended to ensure uniformity between manufacturers for style, size and number of characters per inch. If during the certification process the State finds that font styles vary between analyzers, OCR-A may be required to be used throughout the receipt/statement.
5. The receipt/statement will be a one-part document. The finished dimensions of the receipt/statement itself will be eight and one-half inches by eleven inches (8 1/2" X 11").

6. The analyzer must provide provisions of printing multiple copies of the VIRS.. It is expected that the inspector-mechanics will be required to give one original copy of the receipt/statement to the motorist and maintain the second copy of the completed VIRS, if required. If a completed VIRS drop box is provided, the inspector/mechanic should insert the second copy of the VIRS into the completed VIRS drop box. The completed receipt/statement drop box will be of the approximate size of the VIRS and will be designed to keep the VIRSs in sequential order. The completed VIRS drop box need not be a secured area, but shall prevent receipt/statements from being spilled out when access is gained. If a drop box is not provided, then the inspector/mechanic shall maintain VIRSs in sequential order in an area of his choosing.
7. If provided, the space designed to store unused paper shall be of such dimensions as to provide proper tension on stored paper..
8. Printers shall have at least one self-contained paper storage tray.
9. Printers are to be hardware and software compatible with the IBM type microprocessor. A standard parallel cable or USB cable is to be used for each. Likewise each shall fully conform to the setup, codes and operation of one of the major printer makes. Printers must be able to print, as a minimum, the full IBM standard PC character set, standard IBM VGA compatible graphics, and bar codes compatible with the AAIAG B-1 and B-2 standards.
10. Printers must be designed for the garage environment and must not be susceptible to overheating or other extended usage-related problems. The printers shall be capable of printing continuously for at least twenty-five (25) full pages of text without stopping due to overheating. The printers shall have an automatic thermal shutoff feature or the analyzer software shall display a message to the inspector-mechanic when, and only when, more than the recommended number of pages are to be printed all at one time.

8.2.14 Compatibility

1. Computers offered must be able to reliably read and write floppy disks for use with IBM compatible microcomputer 1.44 Mb 3.5" diskettes meeting the requirements for an operating systems per Section 8.2.1 All 1.44 Mb diskette drives must be fully functionally compatible with those provided as standard from the factory in IBM type computers. Systems must be able to interchange/use software and data files with existing State-owned IBM compatible microcomputers without requiring software or hardware reconfiguration.
2. Systems must be capable of producing graphic output from CRT and non-CRT displays. Graphics requirements include, but are not limited to, the ability to display graphic output from commercially available applications (if installed) such as Lotus 1-2-3, Microsoft Office, Gem, Decision Resources and applications developed by such users written in MS QUICK BASIC, MS BASIC and/or GWBASIC. Use of a "Prnt Scrn" key, or other vendor designated key entry, must cause text displayed on CRT to print on summary report printer. The graphics interface must fully support programs provided by the manufacturer.
3. The NCAS units are expected to operate without manual intervention to automatically answer, verify password, unload and download files with the

contacting computer. Modem speed is to self-adjust to calling computer and available line conditions. All system components (hardware and software) must be compatible.

4. If an analyzer is submitted to the State for certification as a NCAS and the unit does not meet all of the requirements of this specification, the State will: 1) reject the unit, 2) require the manufacture to modify the unit in order to meet this specification, or 3) require the manufacture to supply necessary documentation that demonstrates, that the unit will perform all required functions outlined in the specification.

8.3 Documentation Required by the State

8.3.1 Hardware

For the microcomputer portion of each NCAS system delivered, the vendor must provide complete technical/operational manuals covering installation and operation.

8.3.2 Software

All prepackaged applications software deliveries (including, but not limited to, Operating Systems and BASIC if offered) must include manuals that fully explain all installation and operating procedures. All such software deliveries must include warranty, a licensing agreement and (except for operating systems) a means for registration that provides for future updates. All software deliveries must include the version or release number. All software deliveries must include a list of the computers the software is guaranteed to run on and must be upward compatible

8.3.3 Manuals

All manuals must be commercially printed and must show title, manufacturer's name and address and copyright date.

8.3.4 Files

All State files must include a full record layout. This layout must identify file name, security and each field. For each field the delimiters, contents, definition and editing rules are to be provided, upon request in the form of a data dictionary.

9 Appendix B: NCAS Bar Code Reader Requirements

The bar code reader will be used to load emission control system information from application manuals, from the permanent bar code labels placed on the vehicle by the manufacturer, and from DMV-issued vehicle registration cards. The State may also bar code state documents, inspector-mechanic ID cards and other documents used in the emissions testing program. The supplied bar code reader must be able to read bar codes that are twenty-five feet (25') from the analyzer and be able to read bar codes placed on the door frames, under the hoods, and through the windshields. Manufacturers may offer, in lieu of the 1D scanners, a bar code reader that is classified as a 2D scanner. Scanners may be wired to the NCAS or could be wireless. No matter what type of scanner is supplied with the NCAS, it must meet the requirements in this specification. Manufacturers will be expected to include any software necessary to utilize the data gathered from labels in accordance with these specifications. To provide ample flexibility to permit use in this environment, the following or State-approved specifications are required. The analyzer shall be equipped with an RS232C, USB connection or equal connector for the bar code scanner. The State may consider alternative designs.

9.1 Bar-Coded Vehicle Identification Number Label. Reference: SAE J1877

9.1.1 Definitions (Reference AIAG B-2 Specification - Appendix A)

1. Vehicle Identification Number (VIN)
The VIN is a standardized series of letters and single-digit numbers that is assigned to a motor vehicle for identification purposes as required by Federal Motor Vehicle Safety Standard (FMVSS) 115 and Federal Motor Vehicle Safety Regulation (FMVSR) 567 and recommended under SAE J272 and J273.
2. Label.
The surface containing the information in bar-coded and corresponding human-readable (printed) formats.
3. Bar-code Reader.
A device for machine reading of bar codes that typically consists of a scanner, decoder and data communications device.

9.1.2 VIN Label Description (Reference AIAG B-2 - Appendix A)

1. Vehicle Identification Number.
The VIN bar code consists of the seventeen (17)-character vehicle identification number preceded by the data identifier I. The bar code also contains start and stop characters.
[4/20/07 (NC) Beginning with some later model year vehicles, auto manufactures started to drop the leading identifier of "I". If a VIN is scanned directly from a vehicle and does not contain the leading identifier of "I", the acceptance of the VIN must meet all of the following criteria: VIN must contain exactly 17 alphanumeric characters consisting of a mixture of either 0-9 or A-Z excluding I, O, Q; No special characters such as, !, @, #, \$, etc, or all alphas or all numeric shall be accepted.]
2. Label Title.
The bar code contains a title, VIN, unless it is part of the federal certification label as required pursuant to FMVSR 567 or if it is part of the VIN label located on the upper left side of the dash panel as allowed pursuant to FMVSS 115.

3. Human-readable Character Suppression.
The bar code characters for start, stop and the data identifier are suppressed from the human-readable printing.
4. Human-readable Character Height.
The minimum height of the human-readable characters is 2.38 mm (0.094 inches). This requirement is not intended to supersede government requirements. For example, FMVSR 567 dictates the minimum height of the characters when the VIN is placed on the certification label.
5. Horizontal or Vertical Printing.
The symbols may be printed horizontally or vertically. When the bar codes are printed horizontally, the human-readable data are printed directly above or below the bar codes and centered. When bar codes are printed vertically, the human-readable data should be printed vertically and centered to the left or right of the bar code.

9.1.3 General Symbology Specifications

1. Code 39 Symbology.
The VIN bar code conforms to Bar Code Symbology for 3 of 9 Bar Codes published by the Automotive Industry Action Group (AIAG B-1). All aspects of the bar-code symbology codes follows this specification except as described in the following sections.
2. Code Density and Dimensions (Reference AIAG B-2 Appendix A).
The average width of the narrow element is within the range of 0.19 mm (0.0075 inches) and 0.317 mm (0.0125 inches). The ratio is three to one (3:1) with an allowable range of 2.8 to 3.2. The minimum bar height is 9.5 mm (0.375 inches) or fifteen percent (15%) of the bar code length.

9.1.4 Scanning Devices (Reference AIAG B-2 - Appendix A)

Scanning devices shall use a light source at B633 nanometer range or in the visible red light spectral band range.

9.2 State Registration Cards

1. State registration cards will be bar coded with VIN.
2. The VIN has no leading identifier code.
[12/28/98 (NC) Bar code contains leading identifier of "I".]
3. Bar codes will conform to Bar Code Symbology for 3 of 9 codes.

9.3 License cards

License cards may be issued to inspectors, quality assurance auditors and DMV staff. The license cards will be bar-coded in 1D, 3 of 9 symbology. The format will be similar for all licenses, a leading identifier character followed by 12 characters. The leading identifier for an inspector-mechanic license will be a "/", a QA auditor will be a "q", and DMV personnel an "s". Thus a inspector-mechanic license could decode to "/123456789012". The leading identifier character is never displayed or stored in a record.

[12/16/98 (NC) The license number bar code will contain up to 12 characters. Compare as left-justified, trailing spaces.]

[12/2/98 (NC) Leading identifier for QA auditor is "Q" and DMV personnel is "S".]

9.4 Inspection Stickers

9.4.1 Sticker Booklets

~~— Bar Code Format for sticker booklets:~~

~~— Leading identifier character “B”~~

~~Sticker number = 8 characters. First character alpha to designate sticker type (IM, SI, or MT), second character alpha to designate series number, followed by six (6) numeric.~~

~~— Allowable letters for the first alpha character of IM stickers shall be “A”, “B”, “C”, “D”, “E”, “F”, “G”, “H”, or “I”. Allowable letters for first alpha character of SI stickers shall be “N”, “P”, “Q”, “R”, “S”, “T”, “U”, “V”, “W”, “X”, “Y”, or “Z”. Allowable letters for the first alpha character of MT stickers shall be “J”, “K”, “L”, or “M”.~~

~~— Do not save, display or print the leading “B” character.~~

~~— Example data: BI0012341~~

9.4.2 Individual Stickers

~~— Bar Code Format for individual stickers:~~

~~— Leading identifier character “+”~~

~~Sticker number = 8 characters. First character alpha to designate sticker type (IM, SI, or MT), second character alpha to designate series number, followed by six (6) numeric.~~

~~— Allowable letters for the first alpha character of IM stickers shall be “A”, “B”, “C”, “D”, “E”, “F”, “G”, “H”, or “I”. Allowable letters for first alpha character of SI stickers shall be “N”, “P”, “Q”, “R”, “S”, “T”, “U”, “V”, “W”, “X”, “Y”, or “Z”. Allowable letters for the first alpha character of MT stickers shall be “J”, “K”, “L”, or “M”.~~

~~— Do not save, display or print the leading “+” character.~~

~~— Example data: +S0654321~~

9.5 VEC Label Description. Reference: SAE J1892

9.5.1 Definitions

1. Vehicle Emission Configuration (VEC).
The VEC label identifies selected emission controls on a vehicle as well as partially identifies the engine family designation.
2. Engine Displacement.
The engine displacement signifies the engine size as expressed in liters. Two characters on the VEC label indicate the engine displacement; the decimal point is deleted.
3. Engine Family Designation.
An EPA-standardized system, as of January 1, 1988, for identifying each vehicle manufacturer's engine model for the purpose of new-vehicle emissions certification. The engine family designation is normally twelve (12) characters long for light-duty vehicles and eleven (11) characters long for heavy-duty

engines. Only a specified five (5) of the twelve (12) or eleven (11) characters, respectively, are coded in the VEC.

4. Emission Control System (ECS) Combination Code.
 A coded letter or single-digit number in the VEC that designates the combination of selected major emission controls that are installed on the vehicle by the vehicle manufacturer. The frequency of engine ignition is included in this code combination.
5. Label (Reference AIAG B-7 - Appendix A).
 The surface containing the VEC information in bar-coded and human-readable formats.
6. Bar-coded Reader (Reference AIAG B-7 - Appendix A).
 A device for machine reading of bar codes that typically consists of a scanner, decoder and data communications device.

9.5.2 VEC Label Descriptions

1. Vehicle Emission Configuration Label Content.
 The VEC bar code consists of eight (8) characters preceded by the data identifier 3T. The eight (8) characters are defined here. The bar code also contains a start and stop character. The label also contains a title, VEC, unless the bar code is part of the Vehicle Emission Control information Label.
2. Engine Displacement.
 - (a) The VEC label first contains two (2) characters for engine displacement specified in liters.
 - (b) For engine displacements less than ten (10) liters, the displacement is expressed to the nearest one-tenth (.1) of a liter and then multiplied by ten (10) on the VEC label. For displacements ten (10) liters and over (rare), the displacement is expressed to the nearest liter. (This procedure allows the elimination of the decimal point from the VEC label.)

Label

Character EPA

No. _____ Designation

- 1, 2 Engine displacement in liters (Example: 11=1.1 liters or 11 liters, in rare cases)

3. Partial Engine Family Designation - Light-Duty Vehicles/Trucks. The VEC label contains the following five (5) characters of the EPA twelve (12)-character engine family designation. (The alphabetical and numerical coding requirements for the engine family designation conforms to the EPA recommendations for standardizing engine family names.)

Label

Character EPA

No. _____ Designation

- 3 Vehicle and fuel type
- 4 Fuel metering type
- 5 Catalyst type
- 6, 7 Engine family suffix for unique identification - manufacturer selected

9.5.3 VEC Labels, Light-Duty Vehicles Label Character Definitions

Label	
Character	EPA
No. _____	<u>Designation</u>
1, 2	Engine displacement in liters. (Decimal ignored.) NCAS shall check characters for agreement with engine displacement code on VIN label.
3	Vehicle and fuel type V = Light-duty vehicle (gasoline) T = Light-duty truck (gasoline) D = Light-duty vehicle (diesel) K = Light-duty truck (diesel) W = Light-duty vehicle (gasoline) Calif. Stds. GM ONLY
4	Fuel Metering type. 0 = Multiple carburetors 1 = 1-barrel carburetor 2 = 2-barrel carburetor 3 = 3-barrel carburetor 4 = 4-barrel carburetor 5 = Electronic Fuel Injection 5 = Throttle Body Injection GM ONLY 6 = Mechanical Fuel Injection 7 = Multiport Fuel Injection GM ONLY 8 = Port Fuel Injection GM ONLY 9 = Port Fuel Injection Turbo GM ONLY 9 = Other
5	Catalyst type.

A = Single oxidation
B = More than one oxidation
C = Single reduction
D = More than one reduction
E = Three-way without feedback
F = Three-way with feedback
G = Three-way plus other catalyst without feedback
H = Three-way plus other catalyst with feedback
J = No catalyst
K = Other
L = Three-way catalyst with feedback
GM ONLY

6, 7 Engine family suffix for unique identification. NCAS shall read for engine family identification, but not define.

8 ECS Component Combination.

NOTE: Following codes A-D for engines with ignition frequency of one event per two engine revolutions (for NCAS measurement of RPM).

A = No Air Inj., No EGR
B = Air Inj., No EGR
C = No Air Inj., EGR
D = Air Inj., EGR

NOTE: Following codes S-V for engines with ignition frequency of one event per engine revolution (for NCAS measurement of RPM).

S = No Air Inj., No EGR
T = Air Inj., No EGR
U = No Air Inj., EGR
V = Air Inj., EGR

9.5.4 Partial Engine Family Designation - Heavy-Duty Engines

The VEC label contains the following five (5) characters: a two (2)-digit non-EPA-specified identifier for heavy-duty engines and three (3) characters of the EPA eleven (11)-character engine family designation. (The alphabetical and numerical coding requirements for the engine family designation is to conform to the EPA recommendations for standardizing engine family names.) Label character numbers three (3) and four (4) represent the two (2)-digit non-EPA-specified identifier and is specified as 80 for gasoline engines and 90 for diesel engines.

Label

Character No. _____	EPA <u>Designation</u>
3, 4	Heavy-duty engine identifier
5	Engine Type
6.	Emission Control System Type
7	Uniqueness Digit - manufacturer selected

9.5.5 VEC Labels, Heavy-Duty Vehicles Label Character Definitions

Label Character No. _____	EPA <u>Designation</u>
1, 2	Engine displacement in liters. (Decimal ignored.) NCAS should check characters for agreement with engine displacement code on VIN label
3, 4	Heavy-duty engine identifier. 80 = Gasoline 90 = Diesel
5	Engine Type. A = Spark ignition Carbureted B = Spark Ignition Fuel Injected C = Spark Ignition Turbocharged D = Compression Ignition, Naturally Aspirated E = Compression Ignition, Turbocharged F = Compression Ignition, Turbocharged, Intercooled or Aftercooled Z = Other
6	Emission Control System Type. A = Engine modifications B = Air Injection C = EGR D = Oxidation catalyst E = Reduction catalyst F = Three-way catalyst G = Air Injection plus EGR H = Air Injection plus Oxidation catalyst J = Air Injection plus Reduction catalyst K = Air Injection plus Three-way catalyst L = EGR plus Oxidation catalyst M = EGR plus Reduction catalyst

N = EGR plus Three-way catalyst
P = Smoke Puff Limiter
R = Air Injection, EGR, Oxidation catalyst
S = Air Injection, EGR, Reduction catalyst
T = Air Injection, EGR, Three-way catalyst
Z = Other

- 7 Engine family suffix for unique identification. NCAS should read for engine family identification, but not define.
- 8 ECS Component Combination.
NOTE: Following codes A-D for engines with ignition frequency of one event per two engine revolutions (for NCAS measurement of RPM).
A = No Air Inj., No EGR
B = Air Inj., No EGR
C = No Air Inj., EGR
D = Air Inj., EGR
NOTE: Following codes S-V for engines with ignition frequency of one event per engine revolution (for NCAS measurement of RPM).
S = No Air Inj., No EGR
T = Air Inj., No EGR
U = No Air Inj., EGR
V = Air Inj., EGR

9.5.6 Label Codes

The eighth character on the VEC label is the code for the ECS combination and the engine ignition frequency for vehicle inspection programs. The engine ignition frequency is specified because some engine designs have twice the ignition frequency of other designs. Label codes A through R describes the ECS component combination for vehicles with an ignition frequency of one (1) event per two (2) engine revolutions. Label codes S through nine (9) describes the ECS component combinations for vehicles with an ignition frequency of one (1) event per engine revolution.

9.5.7 Human-readable Character Suppression (Reference AIAG B-7 - Appendix A)

The bar code characters for start, stop and the data identifier shall be suppressed from the human-readable printing.

9.5.8 Human-readable Character Height (Reference AIAG B-7 - Appendix A)

The minimum height of the human-readable characters is 2.38 mm (0.094 inches).

9.5.9 Horizontal or Vertical Printing (Reference AIAG B-7 - Appendix A)

The symbols may be printed horizontally or vertically. When the bar codes are printed horizontally, the human-readable data is printed directly above or below and centered.

When bar codes are printed vertically, the human-readable data are printed vertically and centered to the left or right of the bar code.

9.5.10 Title

This label contains the title of VEC unless the bar code is part of the Vehicle Emission Control information Label.

9.6 General Symbology Specifications

9.6.1 Code 39 Symbology

1. The VEC bar code conforms to Bar Code Symbology for 3 of 9 Bar Codes published by the Automotive Industry Action Group (AIAG B-1). All aspects of the bar-code symbology codes follow this specification except as described in the following sections.
2. Code density and Dimensions (Reference AIAG B-7 - Appendix A)
3. The average width of the narrow element is within the range of 0.19 mm (0.0075 inches) and 0.317 mm (0.0125 inches). The ratio is three to one (3:1) with an allowable range of 2.8 to 3.2. The minimum bar height is 9.5 mm (0.375 inches) or fifteen percent (15%) of bar code length.

9.7 Scanning Devices (Reference AIAG B-7 - Appendix A)

Scanning devices shall use a light source of B633 nanometer range or in the visible red light spectral band range.

~~10 Appendix C: Emission Standards Table (for exhaust emissions sampling)~~

~~The emission inspection standards for all vehicle types at idle:~~

~~10.1 Light Duty Vehicle~~

~~Model Year of Vehicle CO (%) HC (ppm)~~

~~1975 - 1977 4.5 450~~

~~1978 - 1979 3.5 350~~

~~1980 2.0 250~~

~~1981 and later 1.2 220~~

~~10.2 Heavy Duty Vehicles~~

~~Model Year of Vehicle CO (%) HC (ppm)~~

~~1975 - 1978 5.0 500~~

~~1979 and later 4.0 400~~

~~[5/1/98 (NC) Analyzer number can be changed from state enforcement menu.]~~

~~11 Appendix D: ZF-4 Automatic Transmission Testing Procedures (for exhaust emissions sampling)~~

~~11.1 Display Prompt:~~

~~“Because of the possibility of transmission damage to this vehicle, the DMV 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.” (Enter abort code 17.)~~

~~If the inspector-mechanic chooses to continue testing a vehicle with the ZF-4 automatic transmission, display the following message before beginning preconditioning sequence 3 or 4, first-chance or second-chance tests:~~

~~—— “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.~~

~~—— After the engine reaches normal operating temperature, put the transmission in Park and turn the engine off for 30 seconds. Restart the Engine. After the engine is started, do not move the gear shift selector through the forward or reverse gears before or during the test sequence.~~

~~—— Do not exceed 2000 RPM.”~~

~~On this and all screens used during preconditioning sequence 3, the following prompt shall be prominently displayed:~~

~~—— “The steps in this sequence must be followed exactly, or serious transmission damage could result.”~~

~~On this and all screens used during preconditioning sequence 4, the following prompt shall be prominently displayed:~~

~~—— “Engine speed must not exceed 2000 RPM or serious transmission damage could result.”~~

~~11.2 Preconditioning Sequence 3 - 1984-1986 BMW, 1986-1991 Peugeot model 505, and 1987 BMW models 635Csi, 735i, and L7 vehicles, with ZF-4 automatic transmissions:~~

~~Display Prompt:~~

~~——“Special Preconditioning Procedure for BMW’s and Peugeots~~

~~—— Remove foot from gas pedal, step on brake and shift into “Drive.”~~

~~—— Let the engine idle for about 15 seconds.~~

~~—— Shift into “Park” and turn the engine off for two minutes.”~~

~~The analyzer, upon sensing no RPM, shall start a 2-minute count-down timer, which shall be displayed on this or a second screen. At the end of the 2-minute interval, the analyzer shall display:~~

~~——“Restart engine. Leave transmission in “Park.””~~

~~When the analyzer senses an engine speed above 400 RPM, the analyzer manufacturer’s standard preconditioning screen shall be displayed using 1800 RPM as a target, 2000 RPM as a maximum value, and 1600 RPM as a minimum value. First chance preconditioning time shall be 30 seconds; second chance preconditioning time shall be 90 seconds. The analyzer shall then revert to the normal sequences.~~

~~11.3 Preconditioning Sequence 4 - 1985-1988 Volvo model 740 vehicles with ZF-4 automatic transmissions, which have no overdrive switch on the gear selector, and the shift quadrant reads P-R-N-D-3-2-1:~~

Display Prompt:

~~——“Special preconditioning procedure for Volvos~~

~~—— Confirm installation of ZF 4 speed automatic transmission in vehicle. Only ZF equipped Volvos have a shift quadrant with the positions “P R N D 3 2 1”. There is no separate Overdrive switch on the selector itself. Press “CONTINUE” when ready.”~~

When “Continue” is selected, the analyzer shall display:

~~——“Leave transmission in “Park.”~~

~~When the analyzer senses an engine speed above 400 RPM, the analyzer manufacturer’s standard preconditioning screen shall be displayed using 1850 (+/- 150 RPM). Engine speed shall be held for 30 seconds for first chance preconditioning; engine speed shall be held for 180 seconds for second chance preconditioning. The analyzer shall then revert to the normal sequences.~~

12. Appendix E: Code of Federal Regulations – 40CFR51, Appendix B to Subpart S, Section (IV)

(IV) Preconditioned IDLE TEST

(a) General requirements--(1) Exhaust gas sampling algorithm. The analysis of exhaust gas concentrations shall begin 10 seconds after the applicable test mode begins. Exhaust gas concentrations shall be analyzed at a minimum rate of two times per second. The measured value for pass/fail determinations shall be a simple running average of the measurements taken over five seconds.

(2) Pass/fail determination. A pass or fail determination shall be made for each applicable test mode based on a comparison of the short test standards contained in appendix C to this subpart, and the measured value for HC and CO as described in paragraph (IV)(a)(1) of this appendix. A vehicle shall pass the test mode if any pair of simultaneous values for HC and CO are below or equal to the applicable short test standards. A vehicle shall fail the test mode if the values for either HC or CO, or both, in all simultaneous pairs of values are above the applicable standards.

(3) Void test conditions. The test shall immediately end and any exhaust gas measurements shall be voided if the measured concentration of CO plus CO₂ falls below six percent or the vehicle's engine stalls at any time during the test sequence.

(4) Multiple exhaust pipes. Exhaust gas concentrations from vehicle engines equipped with multiple exhaust pipes shall be sampled simultaneously.

(5) The test shall be immediately terminated upon reaching the overall maximum test time.

(b) Test sequence. (1) The test sequence shall consist of a first-chance test and a second-chance test as follows:

(i) The first-chance test, as described under paragraph (IV)(c) of this appendix, shall consist of a preconditioning mode followed by an idle mode.

(ii) The second-chance test, as described under paragraph (IV)(d) of this appendix, shall be performed only if the vehicle fails the first-chance test.

(2) The test sequence shall begin only after the following requirements are met:

(i) The vehicle shall be tested in as-received condition with the transmission in neutral or park and all accessories turned off. The engine shall be at normal operating temperature (as indicated by a temperature gauge, temperature lamp, touch test on the radiator hose, or other visual observation for overheating).

(ii) For all pre-1996 model year vehicles, a tachometer shall be attached to the vehicle in accordance with the analyzer manufacturer's instructions. For 1996 and newer model year vehicles the OBDII data link connector will be used to monitor RPM. In the event that an OBDII data link connector is not available or that an RPM signal is not available over the data link connector, a tachometer shall be used instead.

(iii) The sample probe shall be inserted into the vehicle's tailpipe to a minimum depth of 10 inches. If the vehicle's exhaust system prevents insertion to this depth, a tailpipe extension shall be used.

(iv) The measured concentration of CO plus CO₂ shall be greater than or equal to six percent.

(c) First-chance test. The test timer shall start (tt=0) when the conditions specified in paragraph (IV)(b)(2) of this appendix are met.

The test shall have an overall maximum test time of 200 seconds ($tt=200$). The first-chance test shall consist of a preconditioning mode followed immediately by an idle mode.

(1) Preconditioning mode. The mode timer shall start ($mt=0$) when the engine speed is between 2200 and 2800 rpm. The mode shall continue for an elapsed time of 30 seconds ($mt=30$). If engine speed falls below 2200 rpm or exceeds 2800 rpm for more than five seconds in any one excursion, or 15 seconds over all excursions, the mode timer shall reset to zero and resume timing.

(2) Idle mode. (i) The mode timer shall start ($mt=0$) when the vehicle engine speed is between 350 and 1100 rpm. If engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer shall reset to zero and resume timing. The minimum idle mode length shall be determined as described in paragraph (IV)(c)(2)(ii) of this appendix. The maximum idle mode length shall be 90 seconds elapsed time ($mt=90$).

(ii) The pass/fail analysis shall begin after an elapsed time of 10 seconds ($mt=10$). A pass or fail determination shall be made for the vehicle and the mode shall be terminated as follows:

(A) The vehicle shall pass the idle mode and the test shall be immediately terminated if, prior to an elapsed time of 30 seconds ($mt=30$), measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(B) The vehicle shall pass the idle mode and the test shall be terminated at the end of an elapsed time of 30 seconds ($mt=30$) if, prior to that time, the criteria of paragraph (IV)(c)(2)(ii)(A) of this appendix are not satisfied, and the measured values are less than or equal to the applicable short test standards as described in paragraph (IV)(a)(2) of this appendix.

(C) The vehicle shall pass the idle mode and the test shall be immediately terminated if, at any point between an elapsed time of 30 seconds ($mt=30$) and 90 seconds ($mt=90$), measured values are less than or equal to the applicable short test standards as described in paragraph (IV)(a)(2) of this section.

(D) The vehicle shall fail the idle mode and the test shall be terminated if none of the provisions of paragraphs (IV)(c)(2)(ii)(A),

(B), and (C) of this appendix is satisfied by an elapsed time of 90 seconds ($mt=90$).

Alternatively, the vehicle may be failed if the provisions of paragraphs (IV)(c)(2) (i) and (ii) of this appendix are not met within an elapsed time of 30 seconds.

(E) Optional. The vehicle may fail the first-chance test and the second-chance test shall be omitted if no exhaust gas concentration less than 1800 ppm HC is found at an elapsed time of 30 seconds ($mt=30$).

(d) Second-chance test. If the vehicle fails the first-chance test, the test timer shall reset to zero and a second-chance test shall be performed. The second-chance test shall have an overall maximum test time of 425 seconds. The test shall consist of a preconditioning mode followed immediately by an idle mode.

(1) Preconditioning mode. The mode timer shall start ($mt=0$) when engine speed is between 2200 and 2800 rpm. The mode shall continue for an elapsed time of 180 seconds ($mt=180$). If the engine speed falls below 2200 rpm or exceeds 2800 rpm for more than five seconds in any one excursion, or 15 seconds over all excursions, the mode timer shall reset to zero and resume timing.

(2) Idle mode--(i) Ford Motor Company and Honda vehicles. The engines of 1981-1987 Ford Motor Company vehicles and 1984-1985 Honda Preludes shall be shut off for not more than 10 seconds and then shall be restarted. The probe may be removed from the tailpipe or the sample pump turned off if necessary to reduce analyzer fouling during the restart procedure. This

procedure may also be used for 1988-1989 Ford Motor Company vehicles but should not be used for other vehicles.

(ii) The mode timer shall start ($mt=0$) when the vehicle engine speed is between 350 and 1100 rpm. If the engine speed exceeds 1100 rpm or falls below 350 rpm, the mode timer shall reset to zero and resume timing. The minimum idle mode length shall be determined as described in paragraph (IV)(d)(2)(iii) of this appendix. The maximum idle mode length shall be 90 seconds elapsed time ($mt=90$).

(iii) The pass/fail analysis shall begin after an elapsed time of 10 seconds ($mt=10$). A pass or fail determination shall be made for the vehicle and the mode shall be terminated as follows:

(A) The vehicle shall pass the idle mode and the test shall be immediately terminated if, prior to an elapsed time of 30 seconds ($mt=30$), measured values are less than or equal to 100 ppm HC and 0.5 percent CO.

(B) The vehicle shall pass the idle mode and the test shall be terminated at the end of an elapsed time of 30 seconds ($mt=30$) if, prior to that time, the criteria of paragraph (IV)(d)(2)(iii)(A) of this appendix are not satisfied, and the measured values are less than or equal to the applicable short test standards as described in paragraph (IV)(a)(2) of this appendix.

(C) The vehicle shall pass the idle mode and the test shall be immediately terminated if, at any point between an elapsed time of 30 seconds ($mt=30$) and 90 seconds ($mt=90$), measured values are less than or equal to the applicable short test standards described in paragraph (IV)(a)(2) of this appendix.

(D) The vehicle shall fail the idle mode and the test shall be terminated if none of the provisions of paragraphs (IV)(d)(2)(iii) (A), (B), and (C) of this appendix is satisfied by an elapsed time of 90 seconds ($mt=90$).

13. Appendix F: Code of Federal Regulations – 40CFR51, Appendix D to Subpart S, Section (I)

(I) Steady-State Test Exhaust Analysis System

(a) Sampling system--(1) General requirements. The sampling system for steady-state short tests shall, at a minimum, consist of a tailpipe probe, a flexible sample line, a water removal system, particulate trap, sample pump, flow control components, tachometer or dynamometer, analyzers for HC, CO, and CO₂, and digital displays for exhaust concentrations of HC, CO, and CO₂, and engine rpm. Materials that are in contact with the gases sampled shall not contaminate or change the character of the gases to be analyzed, including gases from alcohol fueled vehicles. The probe shall be capable of being inserted to a depth of at least ten inches into the tailpipe of the vehicle being tested, or into an extension boot if one is used. A digital display for dynamometer speed and load shall be included if the test procedures described in appendix B to this subpart, paragraphs (III) and (V), are conducted. Minimum specifications for optional NO analyzers are also described in this appendix. The analyzer system shall be able to test, as specified in at least one section in appendix B to this subpart, all model vehicles in service at the time of sale of the analyzer.

(2) Temperature operating range. The sampling system and all associated hardware shall be of a design certified to operate within the performance specifications described in paragraph (I)(b) of this appendix in ambient air temperatures ranging from 41 to 110 degrees Fahrenheit. The analyzer system shall, where necessary, include features to keep the sampling system within the specified range.

(3) Humidity operating range. The sampling system and all associated hardware shall be of a design certified to operate within the performance specifications described in paragraph (I)(b) of this appendix at a minimum of 80 percent relative humidity throughout the required temperature range.

(4) Barometric pressure compensation. Barometric pressure compensation shall be provided. Compensation shall be made for elevations up to 6,000 feet (above mean sea level). At any given altitude and ambient conditions specified in paragraph (I)(b) of this appendix, errors due to barometric pressure changes of +/-2 inches of mercury shall not exceed the accuracy limits specified in paragraph (I)(b) of this appendix.

(5) Dual sample probe requirements. When testing a vehicle with dual exhaust pipes, a dual sample probe of a design certified by the analyzer manufacturer to provide equal flow in each leg shall be used. The equal flow requirement is considered to be met if the flow rate in each leg of the probe has been measured under two sample pump flow rates (the normal rate and a rate equal to the onset of low flow), and if the flow rates in each of the legs are found to be equal to each other (within 15% of the flow rate in the leg having lower flow).

(6) System lockout during warm-up. Functional operation of the gas sampling unit shall remain disabled through a system lockout until the analyzer meets stability and warm-up requirements. The analyzer shall be considered "warmed up" when the zero and span readings for HC, CO, and CO₂ have stabilized, within +/-3% of the full range of low scale, for five minutes without adjustment.

(7) Electromagnetic isolation and interference. Electromagnetic signals found in an automotive service environment shall not cause malfunctions or changes in the accuracy in the

electronics of the analyzer system. The analyzer design shall ensure that readings do not vary as a result of electromagnetic radiation and induction devices normally found in the automotive service environment, including high energy vehicle ignition systems, radio frequency transmission radiation sources, and building electrical systems.

(8) Vibration and shock protection. System operation shall be unaffected by the vibration and shock encountered under the normal operating conditions encountered in an automotive service environment.

(9) Propane equivalency factor. The propane equivalency factor shall be displayed in a manner that enables it to be viewed conveniently, while permitting it to be altered only by personnel specifically authorized to do so.

(b) Analyzers--(1) Accuracy. The analyzers shall be of a design certified to meet the following accuracy requirements when calibrated to the span points specified in appendix A to this subpart:

Channel	Range	Accuracy	Noise	Repeatability
HC, ppm, as hexane....	0-400	+/-12	6	8
	401-1000	+/-30	10	15
	1001-2000	+/-80	20	30
CO, %.....	0-2.00	+/-0.06	0.02	0.03
	2.01-5.00	+/-0.15	0.06	0.08
	5.01-9.99	+/-0.40	0.10	0.15
CO2, %.....	0-4.0	+/- 0.6	0.2	0.3
	4.1-14.0	+/-0.5	0.2	0.3
NO, ppm.....	0-1000	+/-32	16	20
	1001-2000	+/-60	25	30
	2001-4000	+/-120	50	60

(2) Minimum analyzer display resolution. The analyzer electronics shall have sufficient resolution to achieve the following:

- HC..... 1 ppm HC as hexane.
- CO..... 0.01% CO.
- CO2..... 0.1% CO2.
- NO..... 1 ppm NO.
- RPM..... 1 rpm.

(3) Response time. The response time from the probe to the display for HC, CO, and CO2 analyzers shall not exceed eight seconds to 90% of a step change in input. For NO analyzers, the response time shall not exceed twelve seconds to 90% of a step change in input.

(4) Display refresh rate. Dynamic information being displayed shall be refreshed at a minimum rate of twice per second.

(5) Interference effects. The interference effects for non-interest gases shall not exceed +/-10 ppm for hydrocarbons, +/-0.05 percent for carbon monoxide, +/-0.20 percent for carbon dioxide, and +/-20 ppm for oxides of nitrogen.

(6) Low flow indication. The analyzer shall provide an indication when the sample flow is below the acceptable level. The sampling system shall be equipped with a flow meter (or equivalent) that shall indicate sample flow degradation when meter error exceeds three percent of full scale, or causes system response time to exceed 13 seconds to 90 percent of a step change in input, whichever is less.

(7) Engine speed detection. The analyzer shall utilize a tachometer capable of detecting engine speed in revolutions per minute (rpm) with a 0.5 second response time and an accuracy of +/-3% of the true rpm.

(8) Test and mode timers. The analyzer shall be capable of simultaneously determining the amount of time elapsed in a test, and in a mode within that test.

(9) Sample rate. The analyzer shall be capable of measuring exhaust concentrations of gases specified in this section at a minimum rate of twice per second.

(c) Demonstration of conformity. The analyzer shall be demonstrated to the satisfaction of the inspection program manager, through acceptance testing procedures, to meet the requirements of this section and that it is capable of being maintained as required in appendix A to this subpart.

14. Appendix G: Safety Inspection, Emission Inspection, Windshield Certificate Replacement Regulations

Published by:

North Carolina Department of Transportation
Division of Motor Vehicles
License and Theft Bureau
3125 Mail Service Center
Raleigh, NC 27699-3125

(Note: DMV to furnish electronic copy of revised manual, to be included with Specification release.)

15. Appendix H: 40 CFR 51 & 85, On-Board Diagnostic Checks Final Rule

Placeholder for 40 CFR Parts 51 and 85 dated April 5, 2001 entitled "Amendments to Vehicle Inspection Maintenance Program Requirements Incorporating the Onboard Diagnostic Check; Final Rule".

16. Appendix I: Logic Matrix for OBDII/Tailpipe Vehicle Inspections

	Inspection selected	Prev. record (this station)	Display Prompt (display previous r/s#, inspection type performed & date)	Select	Next	Next	Perform	Data
1	I-SE	N/A or >60* days old	--	--			I-SE	Default entries with any valid vehicle data from VID. Proceed through vehicle entry.
2	I-SE	All - Pass	<i>This vehicle has already passed an inspection. Do you want to begin a new inspection (y/n)?</i>	Yes	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
				No			Abort	
3	I-SE	I-SE – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SE	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer, gvwr, & for TPT, dual exhaust. No other changes allowed.
				No	Display - <i>Select new I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
4	I-SE	R-SE – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SE	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer, gvwr, & for TPT, dual exhaust. No other changes allowed.
				No	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
5	I-SE	R-SO - Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SO	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer (if applicable). No other changes allowed.
				No	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
6	I-SE	I-SO – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SO	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer (if applicable). No other changes allowed.
				No	Display - <i>Select new I-SE or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
7	R-SE	N/A or >60* days old	<i>No previous inspection is on file... Do you want to change the inspection to an Initial Inspection (y/n)?</i>	Yes	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with any valid vehicle data from VID. Proceed through vehicle entry.
				No			Abort	
8	R-SE	All - Pass	<i>This vehicle has already passed an inspection. Do you want to begin a new inspection (y/n)?</i>	Yes	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
				No			Abort	
9	R-SE	I-SE – Fail R-SE - Fail	None				R-SE	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer, gvwr, & for TPT, dual exhaust. No other changes allowed.

	Inspection selected	Prev. record (this station)	Display Prompt (display previous r/s#, inspection type performed & date)	Select	Next	Next	Perform	Data
10	R-SE	I-SO – Fail R-SO - Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SO	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer (if applicable). No other changes allowed.
				No	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.

Note: I-SE = Initial Safety-Emissions Inspection; R-SE = Reinspection Safety-Emissions; I-SO = Initial Safety-Only; R-SO = Reinspection Safety-Only; TPT=Tailpipe Testing

	Inspection selected	Prev. record (this station)	Display Prompt (display previous r/s#, inspection type performed & date)	Select	Next	Next	Perform	Data
11	I-SO	(Local) N/A or >60* days old	None	--	No VID Contact		I-SO	Default entries with valid data from previous inspection. Proceed through vehicle entry.
12	I-SO	(Local) All – Pass	<i>This vehicle has already passed an inspection. Do you want to begin a new inspection (y/n)?</i>	Yes	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
				No			Abort	
13	I-SO	(Local) R-SO – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SO	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer (if applicable). No other changes allowed.
				No	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
14	I-SO	(Local) I-SO – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes			R-SO	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer (if applicable). No other changes allowed.
				No	Display - <i>Select new I-SE or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
15	I-SO	(Local) R-SE – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes	Display – <i>The VID will be contacted to verify the previous inspection data.</i>	Save local record. Use if no record returned from VID. Convert to <u>R-SE</u> selected logic.	Contact VID (use R-SE selected logic).	Data from VID takes precedence.
				No	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
16	I-SO	(Local) I-SE – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes	Display – <i>The VID will be contacted to verify the previous inspection data.</i>	Save local record. Use if no record returned from VID. Convert to <u>R-SE</u> selected logic.	Contact VID (use R-SE selected logic).	Data from VID takes precedence.
				No	Display - <i>Select new I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
17	R-SO	(Local) N/A or >60* days old	<i>No previous inspection was found locally for this vehicle. The VID will be contacted to locate the previous inspection data.</i>	Contact VID	(VID) Record N/A or >60* days old	Display - <i>No previous inspection is on file... Do you want to change the inspection to an Initial Inspection (y/n)?</i>	Yes – Display - <i>Select new I-SE, I-SO or abort.</i>	Default entries with valid data from previous inspection. Proceed through vehicle entry.
							No – Abort	

	Inspection selected	Prev. record (this station)	Display Prompt (display previous r/s#, inspection type performed & date)	Select	Next	Next	Perform	Data
					(VID) All – Pass	Display - <i>This vehicle has already passed an inspection. Do you want to begin a new inspection (y/n)?</i>	Yes – Display - <i>Select new I-SE, I-SO or abort.</i>	Default entries with valid data from previous inspection. Proceed through vehicle entry.
							No – Abort	Abort
					(VID) I-SO – Fail R-SO – Fail	Display – none	R-SO	Transfer previous data. Move odometer to previous odometer. Prompt for odometer (if applicable). No other changes allowed.
					(VID) I-SE – Fail R-SE – Fail	Display - <i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes – R-SE	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for odometer, gvwr, & for TPT, dual exhaust. No other changes allowed.
							No – Display – <i>Select new I-SE, I-SO or abort.</i>	Default entries with valid data from previous inspection. Proceed through vehicle entry.
18	R-SO	(Local) All - Pass	<i>This vehicle has already passed an inspection. Do you want to begin a new inspection (y/n)?</i>	Yes	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.
				No			Abort	
19	R-SO	(Local) I-SO – Fail R-SO - Fail	<i>None</i>				R-SO	Transfer previous data. System shall automatically move historic odometer to previous odometer. Prompt for current odometer (if applicable). No other changes allowed.
20	R-SO	(Local) I-SE – Fail R-SE – Fail	<i>A previous inspection is on file for this vehicle... Do you want to perform a reinspection (y/n)?</i>	Yes	Display – <i>The VID will be contacted to verify the previous inspection data.</i>	Save local record. Use if no record returned from VID. Convert to <u>R-SE</u> selected logic.	Contact VID (use R-SE selected logic).	Data from VID takes precedence.
				No	Display - <i>Select new I-SE, I-SO or abort.</i>		Selection	Default entries with valid data from previous inspection. Proceed through vehicle entry.

Note: I-SE = Initial Safety-Emissions Inspection; R-SE = Reinspection Safety-Emissions; I-SO = Initial Safety-Only; R-SO = Reinspection Safety-Only; TPT=Tailpipe Testing
[*10/19/07 (NC) The sixty (60) day rule, instead of the previous 30 day rule currently becomes affective 1/01/09, but could be subject to change in the future. However, this number (days) will be sent by VID from NETWORK.DAT(Days Allocated for Re-inspection).]