Proceedings of the EPA/Industry Workshop on Paperwork Reduction in the Certification Process

U.S. Environmental Protection Agency
Office of Air and Waste Management
Office of Mobile Source
Air Pollution Control
Certification Division
Ann Arbor, Michigan 48105

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December 12-14, 1977

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TABLE OF CONTENTS

I. Introduction

A. Background

Since the establishment of the certification process in 1968, the amount of information EPA needs to certify vehicles and trucks has increased at least ten-fold; EPA currently processes 100,000 pages of material in the course of reviewing one model year's applications for certification and issuing certificates. Approximately 60 to 80% of these pages--the proportion varies from manufacturer to manufacturer--consists of revisions or amendments to documents previously submitted to EPA at earlier stages of the certification process. Every one of these revisions must be reviewed and evaluated. This involves comparing each revision line-by-line with the application pages proposed for replacement, manually filling the revision (if approved) into the proper section of the application, and storing the replaced pages elsewhere. These clerical tasks of proofreading and paper-shuffling, repeated thousands of times during a model year, drain the resources available to both EPA and the industry to do the technical evaluations essential to the certification process and adversely impact the timely certification of vehicles and engines.

B. Workshop Objectives

The workshop attempted to discover, propose, and consider a variety of techniques designed to reduce this 100,000 page-per-annum paperwork burden. More generally, workshop participants were invited to consider any method or procedure that might improve the efficiency of application processing. Although the session chairpersons sought primarily to stimulate ideas rather than to develop concrete implementation strategies, some efforts were made to assess the operational feasibility of the streamlining strategies discussed.

C. Workshop Topics

Prior to the workshop, representatives of EPA and industry determined that each of the following subjects should be treated in a specific workshop session: 1) Standard Indexing and Terminology in the Certification Program, 2) Sequenced Submission of the Application for Certification, 3) Referencing within the Application, and 4) Computerization of the Application for Certification. The findings and recommendations of these sessions are summarized in Section III and discussed at length in the workshop reports reprinted in Section IV. Short introductions to these topics are provided below:

1) Standard Indexing and Terminology in the Certification Program. Although EPA annually provides industry with a recommended format for the Application for Certification, these guidelines are sufficiently general so that manufacturers eventually submit applications which differ materially in structure and detail. This lack of uniformity impedes comparisons across manufacturers' data necessary to EPA

analyses, and, more importantly, slows the process of certification review, because each certification engineer must familiarize himself/herself with the formatting idiosyncrasies of every application he/she must process. This problem is aggravated by the discrepant technical vocabularies employed by the various manufacturers; one company's "aspirator" equals another's "reed valve" equals another's "pulseair," and the certification engineer must devote some energy to mastering these differences in terminology. The purpose of this workshop session, therefore, was to explore the feasibility and usefulness of (1) a standardized indexing scheme, to be employed by all manufacturers, which would definitively establish within the application the physical location of specific units of information; and (2) a standardized terminology for describing emission-related systems and hard-ware.

2) Sequenced Submission of the Application for Certification. In general, manufacturers wish to have their vehicles and engines certified well in advance of anticipated production dates. In their understandable eagerness to begin the certification process--to have their durability-data vehicles selected and accumulating mileage--they will regularly submit entire applications ten or eleven months prior to the projected "job 1" date. This operational deadline regularly necessitates that the first hastily produced application will contain omissions or deficiencies, and often guarantees that the application must be revised and updated as design marketing and production needs shift and/or become clarified. These changes and the paperwork they create might be reduced if sections of the application were not submitted until such time as EPA engineers needed to review the precise material those sections contain. For example, manufacturers might first submit only that material needed for the selection of the durability-data vehicle fleet. If these data were approved, manufacturers could then submit other material necessary for selection of emission-data vehicle fleets. Such sequenced submission of portions of the application would relax the manufacturers' submission deadlines, thereby providing additional time for the manufacturers to assure the currency and accuracy of the application; this measure could greatly reduce the number and volume of revisions required to the original application. The aims of this session, consequently, were (1) to assess the feasibility and desirability of a sequencing scheme; and (2) assuming that sequencing was judged worthwhile, to identify those factors (e.g., EPA's information requirements, industry's operational constraints) which would influence development of a sequencing plan.

3) Referencing within the Application.

Referencing would seek to reduce the size of an application for certification by eliminating duplication and redundancy from the document. In some applications, identical information may apply to several different engine families and, according to current procedures, is printed or copied in several different places in the application. Other data, such as description of test facilities and equipment, are often repeated verbatim from one year's application to the next. Wasted time, effort, and paper inevitably result when manufacturers must generate and EPA engineers reread these identical pieces of information. A more economic procedure might be to submit certain material only once, and then simply reference that submission whenever its contents would be required for review. The aim of the Referencing session was to assess the feasibility and utility of a standardized referencing method.

4) Computerization of the Application for Certification.

At the present time the manufacturers submit all of the Part I and Part II Application information in hard copy to EPA. Some of that information pertaining to specific vehicles to be tested is subsequently transcribed by EPA engineers onto computer input forms and then entered into the computer files. If EPA refines its data-processing capabilities and if manufacturers were to submit as much of the Application as practical to EPA in computer-compatible format, tremendous gains in the speed and efficiency of application processing could eventually be realized. In the area of revision processing, for example, both the industry and EPA could use a text-editing program to compare proposed revisions with the corresponding original pages, and the computer could mechanically locate more rapidly and accurately the differences which staff members must now spend hours identifying. Computerized applications would further provide an extensive data base, which EPA certification engineers could consult when faced with a complex decision regarding matters of fleet selection, running change testing requirements, etc. Such a data base, by making available for comparison a body of precedent certification judgments, would enable EPA certification staff members to make decisions with greater confidence and speed. The aims of this workshop session, in summary, were to 1) identify the data-processing and word-processing capabilities of EPA and manufacturers and 2) explore the costs and benefits of a more fully computerized certification program.

Other certification streamlining techniques were discussed and submitted in form of suggestions at the individual sessions, in the papers presented, in the reports of the sessions, and finally at the question and answer session during the last day of the workshop. All of these are summarized in Section III of the report apart from the main conclusions and recommendations.

II. Summary of Workshop Conclusions and Recommendations

Workshop participants agreed that the application of indexing, sequencing, referencing, and computerization to the certification process would result in substantial benefits to industry and EPA. Strategies for implementing techniques are described in detail in the Workshop Reports reprinted in Section IV, but the fundamental recommendations will be summarized below. This summary will also include various other recommendations, proposed by industry, covering both changes in administrative procedure and modifications to the certification protocol itself. These suggestions (Recommendation 3 below) were not examined in detail during the workshop, and considerable further investigation will have to be done before they can be evaluated and implemented.

Recommendation 1: Revise the format of the application for certification. A new application format should be developed, establishing a standardized terminology and incorporating techniques of indexing, referencing, and sequencing. This application should be sufficiently standardized so that it will be fully compatible with computerization, and yet general enough to be used for light duty vehicles, light-duty trucks, heavy-duty engines, and motorcycles. It should be so structured that errors in submission will be actively discouraged. The possibility of making all applications a set of standard forms, distributed by EPA and then filled out by manufacturers, should be considered.

Follow-up actions:

- Establish an eight-member task force to devise standard names for all application sections and subsections and develop an indexing method adaptable to all classes of applications.
- Establish a second eight-member task force to develop a sequencing strategy.
- Hold joint task force sessions to coordinate efforts and results by February 1978 so that the new format will be ready for Model Year 1980.

Recommendation 2: Increase the use made of automatic data-processing during the certification review. Although some certification information, such as engineering drawings and blueprints, cannot be submitted to EPA in machine-readable form, strategies to computerize the certification process should be developed and tested.

Follow-up actions:

- Identify the technical data whose computerization would be most beneficial to EPA and industry.
- Review the new application format to assure its compatability with computerization.

- Develop new and/or modify existing software to facilitate on an experimental basis a computer-assisted certification review.

- Develop and run a pilot project in which technical data from selected engine families would be received and processed in machine-readable form. Processing steps might include: durability-data vehicle fleet selection, preliminary emission-data vehicle fleet selection, processing of revisions via a text-comparison program, etc.

- Evaluate the pilot project. On the basis of the project's results, initiate further follow-up actions.

Recommendation 3: Miscellaneous Recommendations. The following suggestions propose modifications to administrative practice and the certification protocol itself. Many of these urge changing the procedures for running and testing durability-data vehicles and deriving deterioration factors. These include:

- Use broader family definition to reduce the number of 50K certification vehicles.

- Freeze durability regulations at least six months prior to the start of mileage accumulation.

- Reformulate the definitions of exhaust emission families to reduce the number of 50K certification vehicles required.

- Change the mileage accumulation route to raise average speed from 30 to 35 or 40 mph.

- Eliminate the current 50K vehicle certification program and derive D.F.s from bench testing.

- Give manufacturers the option of using a standard deterioration factor or running a vehicle.

- Eliminate the requirement for 50K certification testing and calculate D.F.s from previous fleets or in-use vehicles.

Other recommendations for modifying the certification process are:

- Reduce the information required for submission. Only those data frequently accessed by EPA should be submitted; hard copy data rarely utilized could be accessed from industry at EPA's request.

- Define in a more formal fashion the fleet selection criteria such that the manufacturer can select his own durability and emission data vehicle fleets.

- Eliminate requests for duplicate information in Parts I and II and zero mile books.

- Eliminate the need for resubmission of duplicate applications for carry-over. Grant carry-over on the basis of a letter of request and requisite updated information, such as revised sales figures.

- Eliminate repeated EPA approvals of the same data. EPA should establish a single approval point for reviewing information common to light-duty vehicle and truck applications and make efforts to standardize the reviewing criteria practiced by the various certification teams.

- Reduce the number of emission-data vehicle tests by testing only the worst case vehicles.

- Permit manufacturers to implement running changes concurrently with their submission, assuming that manufacturers are willing to assume the normal legal consequences of the running change vehicles failing subsequent certification tests.

- Define more clearly the meaning of Auxiliary Emission Control Device (AECD).

- Review the requirements of the certification and fuel economy programs to identify where redundancy can be avoided.

Several other recommendations are listed in the reports to the workshop sessions (see especially Section III,pp. 54-64) which. in the interests of paper conservation, will not be reprinted here. EPA is currently reviewing the practicality and usefulness of these miscellaneous recommendations and will begin implementing as soon as possible those identified as feasible and consistent with EPA's regulatory function.

III. Session Reports

Many of the papers presented during the workshop have been included in the following reports.

Report of the Session on
Standard Indexing and Terminology

Paperwork Reduction Workshop
December 12, 13, and 14, 1977

Greg Dana
Jan. 9, 1978

TOPIC

The topic of this session of the Paperwork Reduction Workshop was Standard Indexing and Terminology; our purpose was to explore the feasibility of these ideas and make plans for implementing them.

PROPOSALS AND COMMENTS

A. There are differences between light-duty, heavy-duty, and motorcycle informational requirements which could make the indexing scheme presented (W. Henny - Cummins) more complex; some changes would be necessary for light-duty and motorcycle (proposals for indexing are contained in Attachments I and II).

B. It is possible for an indexing system to go into too much detail, thereby reducing its flexibility and its ability to be used by many manufacturers.

C. Is there a need to standardize terminology? A cross-reference listing or dictionary may be better.

D. Emission control devices have been developed independently and are necessarily different. An attempt to standardize terminology would be futile.

E. Agreement can be reached on broad topics of emission control (e.g., "EGR system" should evoke the same meaning for all manufacturers).

F. It was noted that there is an SAE paper on standardized terminology: "Emissions Terminology and Nomenclature--SAEJ1145a" (see Attachment III).

G. Pre-printed formats are used in Sweden--some manufacturers attempt to use the EPA format as a pre-printed format and find it very inadequate--adding revision date blocks to the format pages and allowing more space to fill in the required data would help.

H. Reasons were given why a pre-printed format is not useful:

1. Cannot be used by a word processing system

2. Rearrangement of the data permits more efficient use of the page

I. Standardized forms and terminology should be developed for items frequently submitted, such as data and maintenance logs (see Attachment IV).

J. Standardization of fuel economy and emission certification data input requirements would be beneficial.

COMMENTS NOT DIRECTLY PERTINENT TO SESSION TOPIC

A. What is an Auxiliary Emission Control Device (AECD)? There is not a good definition.

B. What are the essential items needed for durability selection?

C. Standardization and non-redundancy of data input, not only within EPA but between other government agencies, would be desirable.

CONCLUSIONS

A. There is a need to develop a standard indexing system for the application format.

B. There is a need to determine the differences between light-duty, heavy-duty, and motorcycle which impact upon a common indexing system.

C. There is redundancy in the data submission requirements of the various EPA programs.

D. Standard terminology is useful and necessary in the broad sense, such as used in an indexing system, but it is not feasible on a detailed level. A cross-reference dictionary may be useful.

E. When the format is revised, EPA should bear in mind that some manufacturers use it as a pre-printed format and this should be taken into consideration whenever possible.

RECOMMENDATIONS

A. EPA should look at the requirements of the certification and fuel economy programs to see where redundancy can be avoided and formats can be standardized.

B. A task force should be organized to explore ways to implement the ideas of standard indexing and terminology. The target of this task force is to develop a plan which can be implemented in the 1980 model year application format.

1. A task force was organized consisting of the following people:

Willi Henny - Cummins	Bob Wilson - GM
Merle Liskey - AMC	Bill Kostin - Ford
Dan Bonawitz - Toyota	John Thomson - EPA
Greg Dana - EPA	

2. It was decided that this task force would be combined with the task force on referencing; both this task force and the task force on sequencing will work together developing a plan to restructure the application format using the ideas of this workshop with implementation planned for the 1980 model year.

Attachments

INDEXING OF THE APPLICATION

W. HENNY
CUMMINS

DECEMBER 12, 1977

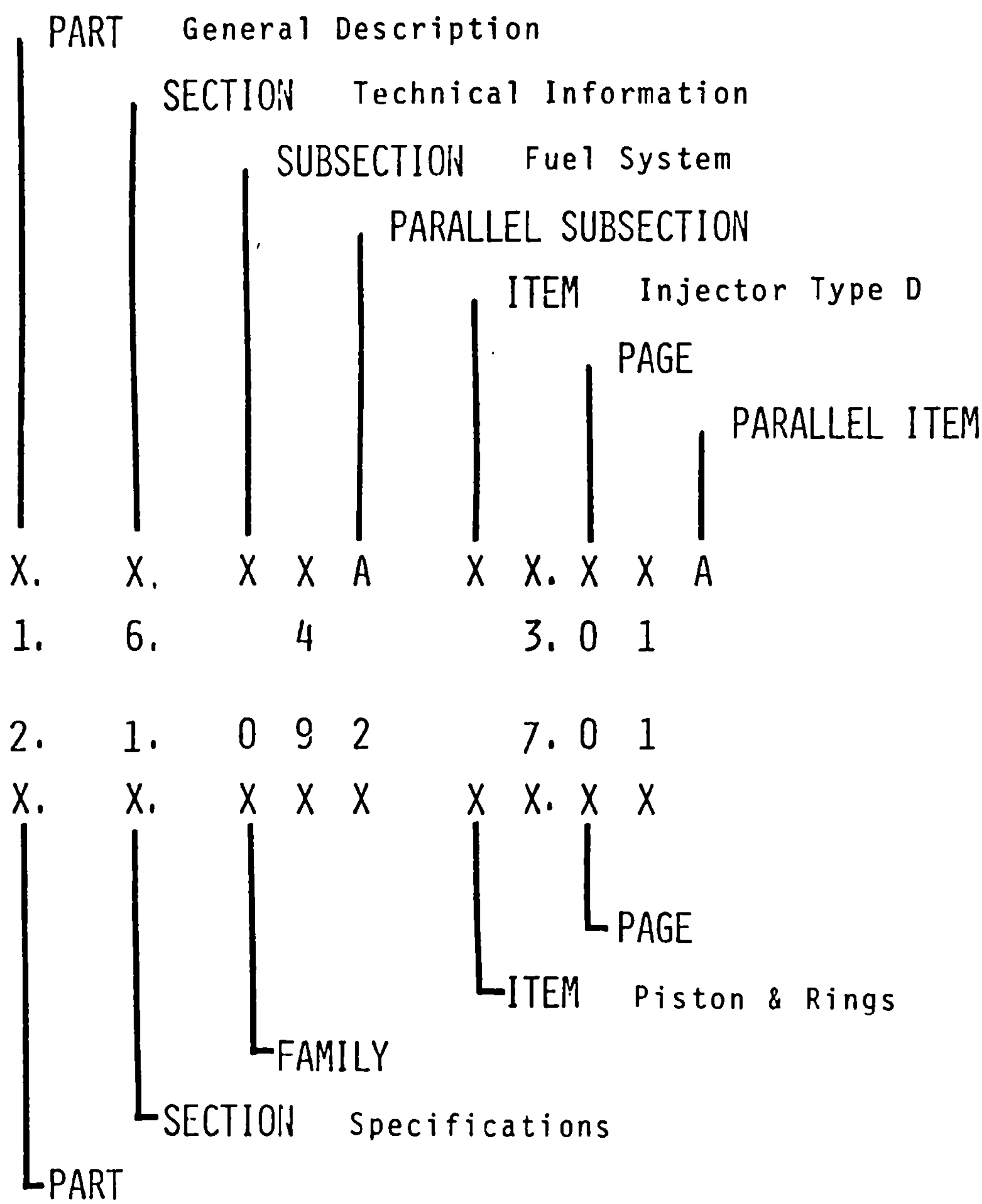
BASE REQUIREMENTS OF INDEXING SYSTEM

- LOGICAL SYSTEM TO FACILITATE REFERENCING.
- UNIVERSALLY ADAPTABLE SYSTEM TO ACCOMMODATE LD, MD & HD AS WELL AS VARIATIONS IN PRODUCTS.
- PROVIDE FLEXIBILITY TO ADD, MODIFY OR DELETE WITHOUT DISTURBING REST OF SUBMISSION.
- ADAPTABLE TO COMPUTER.

ONE TIME SUBMISSION

PART IA

SECTION I	TECHNICAL REPRESENTATIVES
SECTION II	MAILING INFORMATION
SECTION III	STATEMENT OF CONFIDENTIALITY
SECTION IV	TEST FUELS
SECTION V	FACILITY & TEST PROCEDURE DESCRIPTION
SECTION VI	GENERAL TECHNICAL INFORMATION
SECTION VII	TEST ENGINE MAINTENANCE
SECTION VIII	ENGINE LABEL
SECTION IX	DETAILED SPECIFICATIONS
SECTION X	TEST DATA & ENGINEERING REPORTS
SECTION XI	RUNNING CHANGES
SECTION XII	AMENDMENTS


PART General Description
SECTION Technical Information
SUBSECTION Fuel System
PARALLEL SUBSECTION
ITEM Injector Type D
PAGE
PARALLEL ITEM
X. X. X X A X X. X X A
1. 6. 4 3. 0 1
2. 1. 0 9 2 7. 0 1
X. X. X X X X X. X X
PAGE
ITEM Piston & Rings
FAMILY
SECTION Specifications
PART

PART 1

PART 2

SECTION 1 - SPECIFICATIONS

PISTON, RINGS, COMBUSTION CHAMBER

CPL CODES	0155	0187	0220 0270 0189 0217
Configuration (See Page PII-I-15)	Fig. 1	Fig. 2	Fig. 2
Compression Ratio	14.1	14.3	15.8
Surface to Volume Ratio	8.2	9.9	11.7
Piston Material	Aluminum	Aluminum	Aluminum
Dimensions: α (deg)	23.5	33	33
A (in.)	3.367	3.210	3.298
B (in.)	3.762	3.777	3.777
C (in.)	1.400	1.390	1.315
D (in.)	.695	.530	.655
E (in.)	.328	.070	.060
F (in.)	Not Appl.	4.020	4.030
No. of Piston Rings	4	4	4
Type: First	Keystone	Keystone	Keystone
Second	Keystone	Keystone	Keystone
Third	Keystone	Keystone	Keystone
Oil	Grooved & Expander	Grooved & Expander	Grooved & Expander
Matl: First	Cast Iron, Chrome	Cast Iron, Chrome	Cast Iron, Chrome
Second	Cast Iron	Cast Iron	Cast Iron
Third	Cast Iron	Cast Iron	Cast Iron
Oil	Cast Iron, Chrome	Cast Iron, Chrome	Cast Iron, Chrome

PT (TYPE D) INJECTOR

Two (2) different PT (TYPE D) - commonly called PTD - injectors are used:

. PTD "Standard" (see next page)
. PTD "Top Stop" (see next page)

The PTD "Top Stop" injector functions like the PTD "Standard" injector except that the upward plunger travel is limited by a stop device which retains the injector spring at a preloaded position. The details of the "Standard" and of the "Top Stop" injectors are shown on the next page VIa - 4a.4 The lower portion of the "Standard" injector and the "Top Stop" injector are identical. The injector cup, barrel and plunger which determine the performance of the engine are unchanged.

Fuel Injection Cycle - PTD Injector

Metering

Fuel enters (9) the injector at low pressure as determined by the throttle and/or governor. The metering orifice (10) controls the quantity of fuel that enters the injector cup (1) at a pressure determined by the fuel pump and the time interval during which this metering orifice in the barrel (3) is uncovered by the injector plunger (4).

Injection

When the plunger moves down fuel entry through the feed orifice in the barrel is cut off. When the plunger continues down it forces fuel out of the cup at high pressure through the injector spray holes as a fine spray that permits complete burning of the fuel in the combustion chamber.

Purging

As the plunger moves down the groove in the plunger connects the feed orifice in the barrel to the scavenging orifice just above it and fuel begins to flow through the return passage (16) to the fuel tank. After injection the plunger remains seated until the next metering and injection cycle, fuel flowing freely to cool the injector and also warm the fuel in the tank. The timing of metering and injection is determined by the engine camshaft and fixed for the most efficient operation at all engine speeds.

PART II
PROPOSED INDEXING SYSTEM

General Section

Family Section

Emissions Terminology and Nomenclature—SAE J1145a

SAE Recommended Practice
Last revised October 1977

THIS IS A PREPRINT AND WILL
APPEAR IN THE 1979 EDITION
OF THE SAE HANDBOOK

Society of Automotive Engineers, Inc.
400 COMMONWEALTH DRIVE, WARRENDALE, PA 15096

PREPRINT

EMISSIONS TERMINOLOGY AND NOMENCLATURE—SAE J1145a

SAE Recommended Practice

Report of Automotive Emissions Committee approved August 1976 and last revised October 1977.

1. Purpose—This SAE Recommended Practice was prepared to standardize terminology and nomenclature in order to facilitate clearer understanding for engineering discussions, comparisons, and the preparation of technical papers.

2. Scope—This recommended practice applies to nomenclature of emissions and emissions reduction apparatus as applied to various engines and vehicles.

Modifying adjectives are omitted in some cases for the sake of simplicity. However, it is considered good practice to use such adjectives when they add to clarity and understanding.

3. Auxiliary Air Systems

3.1 **Air Distribution Manifold**—The manifolding which distributes and proportions air to the individual exhaust ports. NOTE: The manifolding may consist of external tubing or integral passageways.

3.2 **Air Pump Diverter Valve**—A valve which interrupts the delivery of air to the exhaust ports—typically during vehicle deceleration in order to prevent engine backfires.

3.3 **Air Injection Tube**—A tube in the exhaust manifold or cylinder head which directs injected air from the air distribution manifold to the vicinity of the exhaust valve.

3.4 **Air Injection Relief Valve**—A pressure relief valve, usually integral with the air pump or air pump diverter valve, which limits the maximum delivery pressure of the injected air.

3.5 **Bypass Valve**—Use Air Pump Diverter Valve.

3.6 **Gulp Valve**—A valve that briefly admits a metered flow of air to the intake manifold after a sudden closure of the throttle. NOTE: This prevents an over-rich mixture being caused when high vacuum evaporates liquid fuel in the manifold.

3.7 **Pulsating Air System**—A system which uses sub-ambient pressure pulses in the exhaust system to introduce ambient air into the exhaust system for the purpose of oxidizing HC and CO.

4. Catalytic Systems

4.1 **Base Metal Catalyst**—A catalyst in which the active catalytic material is one or more non-noble metals such as copper or chromium.

4.2 **Catalyst**—A substance which accelerates a chemical reaction but which itself undergoes no permanent chemical change. Note: For automotive emission control applications, catalysts are classified as oxidation catalysts (oxidizes HC and CO), reduction catalysts (reduces NO_X), or three-way catalysts (oxidizes HC and CO and reduces NO_X simultaneously).

4.3 **Catalyst Poisoning**—The deterioration of catalyst efficiency when foreign materials—such as lead, phosphorus, or sulfur—are introduced to the catalytic converter, lessening or eliminating the chemical action of the catalysts on the exhaust pollutants.

4.4 **Catalytic Converter**—An assembly, including such major components as a structural shell, substrate, and the catalyst material. Depending on the type of catalyst—oxidation, reduction, or dual—this assembly decreases HC and CO emissions, or NO_x emissions, or all three of these exhaust pollutants.

4.5 **Catalyst Assembly**—Use Catalytic Converter.

4.6 **Catalytic Efficiency**—Use Conversion Efficiency.

4.7 **Conversion Efficiency**—The percentage of a given exhaust constituent that is changed into chemically different species as a result of the operation of the convertor.

4.8 **Converter Bypass**—A method for routing exhaust gas around a catalytic converter—typically to prevent converter damage due to excessively high operating temperatures.

4.9 **Dual-Catalyst System**—A system that uses two catalyst beds, one oxidation and one reduction, to decrease the HC, CO, and NO_x pollutants in the engine exhaust. These two beds may be packaged together or in two separate containers.

4.10 **Light-Off Temperature**—The temperature at which the conversion efficiency reaches a given value.

4.11 **Monolithic Substrate**—A unitary catalyst substrate usually of honeycomb structure.

4.12 **Noble Metal Catalyst**—A catalyst in which the active material is made from a precious metal such as platinum, palladium, rhodium, or ruthenium.

4.13 **Oxidation Catalyst**—A catalyst that promotes the oxidation of HC and CO to form water vapor and carbon dioxide.

4.14 **Pelleted Substrate**—A catalyst substrate having such forms as pebbles, beads, small cylinders, or small spheres.

The ϕ symbol is for the convenience of the user in locating areas where technical revisions have been made to the previous issue of the report. If the symbol is next to the report title, it indicates a complete revision of the report.

4.15 **Rare Earth Catalyst**—A catalyst in which the active material is a rare earth element such as lanthanum and cerium. NOTE: The rare earth elements range in atomic number from 57 to 71.

4.16 **Reduction Catalyst**—A catalyst that promotes the chemical reduction of nitrogen oxides (NO_x) by reaction with carbon monoxide (CO), free hydrogen (H_2) or hydrocarbon (HC). The desired products of the chemical reaction are nitrogen gas, carbon dioxide, and water.

4.17 *Simultaneous Oxidation Reduction Catalyst*—Use Three-Way Catalyst.

4.18 **Space Velocity**—The exhaust flow in ft^3/h (m^3/s), measured at standard temperature and pressure, divided by the catalyst volume in ft^3 (m^3) equals the space velocity.

4.19 **Substrate**—A thermally stable material, usually catalytically inert, to which the active catalyst is affixed, imbedded, or in some other way joined. Pellets and monolith represent two physical forms of substrate.

4.20 **Three-Way Catalyst**—A catalyst that simultaneously oxidizes HC and CO and reduces NO_X exhaust emissions. Note: For maximum conversion efficiencies, the engine must operate over a very narrow range of air-fuel ratios near stoichiometric conditions.

4.21 **Washcoat**—A material applied to the substrate by the catalyst manufacturer to provide increased surface area for depositing the catalyst.

5. Chemical Terms

5.1 **Aldehyde**—A class of chemical compounds having the general formula RCHO, where R is an alkyl (aliphatic) or aryl (aromatic) radical.

5.2 **Aromatics**—A hydrocarbon having a ring-type structure with the general formula C_nH_{2n-6} and containing three double bonds in the ring.

5.3 **Methane**—A hydrocarbon represented by the chemical formula CH_4.

5.4 **Naphthenes (Cycloparaffins)**—A hydrocarbon having a ring-type structure with only single bonds between the carbon atoms.

5.5 **Olefin**—A hydrocarbon having a chain structure with one or more double bonds between two of the carbon atoms. The general formula is C_nH_{2n}.

5.6 **Oxides of Nitrogen (NO_x)**—The sum total of the nitric oxide and nitrogen dioxide in a sample expressed as nitrogen dioxide.

5.7 **Paraffin**—A hydrocarbon having a chain structure, and the general formula C_nH_{2n+2}.

5.8 **Polynuclear Aromatic Hydrocarbons** (PNA)—Relatively high molecular weight compounds synthesized in all combustion processes. They consist of three or more fused carbocyclic rings, each of which contains five or six carbons. Benzo(a)pyrene has often been measured as an index to the total and was chosen because it is a potent carcinogen.

5.9 **Stoichiometric**—The exact proportions of substances for a specific chemical reaction that will combine with no excess of any reactant. Note: An example is the ratio of air and hydrocarbon fuel which ideally combines to form only N_2, CO_2, and H_2O.

5.10 **Sulfate**—An ion having the formula SO_4. Note: Exhaust constituents including SO_3, H_2SO_4, and some metallic sulfates, are measured as sulfate ion and hence are referred to as sulfate emissions.

5.11 **Zero Grade Air (Air Zero Gas)**—Air containing less than 1 ppm hydrocarbon on a methane equivalence basis, 1 ppm carbon monoxide, 400 ppm carbon dioxide, and 0.1 ppm nitric oxide. Note: This gas is normally used to zero hydrocarbon analyzers and may also be used to zero analyzers for carbon monoxide, carbon dioxide, and oxides of nitrogen. It should not be used to zero analyzers measuring at or near ambient concentration of carbon dioxide.

6. Engine Hardware

6.1 **Air Gap Pipes**—Double walled exhaust pipes with either an annular air space or other insulating material between two basically concentric pipes.

6.2 **Air-Fuel Ratio Control Device**—A device which limits the amount of fuel to that which can be burned with the air available during acceleration of a turbocharged diesel engine.

6.3 **Anti-Diesel Device**—A device to close the throttle further or block the idle fuel within the carburetor when the ignition is turned off.

6.4 **Breakerless Ignition System**—A system which differs principally from a conventional ignition system in the following two ways. First, the conventional cam and breaker points are replaced by a pulse generator. Second, a solid state electronic device uses the pulse generator signal to switch ignition coil primary current on and off.

6.5 Carburetor Deceleration Combustion Control Valve—Use Fuel Decel Valve

6.6 Closed-Loop Control—Use Feedback System for Controlling Air-Fuel Ratios.

6.7 Coolant Override Valve—Use Thermal Vacuum Switch.

6.8 Deceleration Spark Advance Control—A device that advances spark timing during deceleration conditions.

6.9 Deceleration Throttle Modulator—A device which regulates the rate of closure of the carburetor throttle.

6.10 Dual Diaphragm Distributor—A distributor with two vacuum diaphragms which can either advance or retard spark timing depending on the vacuum signals applied to it. NOTE Spark is often retarded at idle and during deceleration for emission control but advanced for part-throttle fuel economy.

6.11 Electronic Ignition System—Use Breakerless Ignition System

6.12 Exhaust Gas Recirculation (EGR)—A system which returns a portion of the exhaust gases to the combustion chamber. The lower combustion temperatures in turn reduce the formation of oxides and nitrogen.

6.13 EGR Control Valve—The valve which controls the amount of recirculated exhaust gas entering the engine induction system.

6.14 EGR Vacuum Port—The carburetor port or opening from which vacuum to control the EGR system is sensed.

6.15 Exhaust Port Liner—A sheet metal or ceramic component inserted in the exhaust ports for the purpose of reducing heat losses from the exhaust gas.

6.16 Feedback System for Controlling Air-Fuel Ratios—A system which uses feedback signal generated from an exhaust gas sensor to control the air-fuel ratio of the combustion mixture.

6.17 Fuel Decel Valve—A valve which uses engine vacuum during deceleration to either open the throttle slightly or to meter an additional amount of air-fuel mixture from the carburetor around the closed throttle blades, thereby providing more complete combustion.

6.18 Heat Shield—A device, usually a sheet metal shield, placed adjacent to a high temperature component (exhaust system) to protect the surrounding environment.

6.19 Insulated Pipes—Use Air Gap Pipes

6.20 Lean Reactor—A thermal reactor system that typically operates at air-fuel ratios leaner than stoichiometric.

6.21 Positive Crankcase Ventilation (PCV)—A system which routes gases from the crankcase (blowby and air) to the air induction system of the engine

6.22 PCV Valve—A valve that regulates the flow of gases from the crankcase into the intake manifold

6.23 Proportional Exhaust Gas Recirculation—An EGR system designed to recirculate a fixed percentage (based on engine air flow) of the exhaust gas.

6.24 Quick-Acting Choke—An electrical or mechanically operated device designed to shorten the choking period during engine start-up.

6.25 Quick-Heat Intake Manifold—An exhaust-heated intake manifold having relatively large crossover passages and, typically, a thin sheet metal section in the plenum floor. NOTE The sheet metal floor may have fins, convolutions or similar means to obtain a high rate of heat transfer between the crossover exhaust and the intake charge. The objective of these manifolds is to provide rapid intake mixture warmup by promoting evaporation of fuel droplets

6.26 Reactor Liner—A sheet metal or ceramic component inserted in the thermal reactor for the purpose of reducing heat losses from the exhaust gas.

6.27 Rich Reactor—A thermal reactor system that typically operates in the range of air-fuel ratios richer than stoichiometric.

6.28 Spark Advance—The number of degrees before top dead center at which the spark discharge occurs.

6.29 Spark Delay Device—Calibrated restrictor in the vacuum advance hose which delays the vacuum spark advance

6.30 Spark Port—The carburetor port from which vacuum to control the distributor spark advance is sensed.

6.31 Speed Controlled Spark—A system, generally used with an automatic transmission, that controls the vacuum to the distributor preventing vacuum advance below a selected vehicle speed.

6.32 Stove—The portion of the intake manifold which is heated by exhaust gases. NOTE This term may also denote a system which heats carburetor inlet air by passing it over the exhaust manifold. May also denote a heat exchanger that supplies hot air to the bimetal coil of an automatic choke (choke stove)

6.33 Temperature Modulated Air Cleaner—An inlet air system, usually consisting of a stove, tubes, and control valve, for controlling the temperature of the air entering the carburetor within a specified range.

6.34 Thermal Reactor—An enlarged exhaust manifold—often with interior flow passages and/or insulation—that permits the combustion process to continue after the exhaust gases leave the engine combustion chambers NOTE The reactor retains the exhaust gases at a high temperature for the time required to oxidize HC and CO

6.35 Thermal Vacuum Switch—A coolant temperature sensing vacuum control valve which modulates distributor and EGR vacuum to increase spark advance either as an override or protection device

6.36 Transmission Regulated Spark—Use Transmission Spark Control Valve

6.37 Transmission Spark Control Valve—A valve that routes manifold vacuum to the distributor advance unit only when transmission is operating in one or more specific drive gear ratios

6.38 Vacuum Control Valve—Use Thermal Vacuum Switch.

6.39 Venturi Vacuum Amplifier—A device which amplifies carburetor venturi vacuum in order to modulate manifold vacuum to control the EGR valve.

7. Exhaust Emissions

7.1 Black Smoke—Particles composed of carbon (soot), usually less than 1 µm in size, which have escaped the engine's combustion process.

7.2 Brake Specific Emissions—Mass (grams or pounds) of pollutant emitted per brake horsepower hour.

7.3 Diesel Smoke—Particles, including aerosols, suspended in the engine's gaseous exhaust stream which obscure, reflect, and/or refract light.

7.4 Emission Index—Grams of pollutant emitted per kilogram of fuel burned.

7.5 Exhaust Emissions—Any substance (but normally limited to pollutants) emitted to the atmosphere from any opening downstream from the exhaust port of the combustion chamber of an engine.

7.6 Parts per Million Carbon (ppmC)—The mole fraction times 10^6 of hydrocarbon measured on a methane equivalence basis.

7.7 White and Blue Smoke—Particles composed of essentially colorless liquid (droplets) which reflect and refract the observed light NOTE The observed color results from the refractive index of the liquid in the droplets and the droplet size. White smoke is usually due to condensed water vapor or liquid fuel droplets. Blue smoke is usually due to droplets resulting from the incomplete burning of fuel or lubricating oil.

8. Evaporative Emissions

8.1 Carbon Canister for Evaporative Emissions—A component of an evaporative control system which is used to collect and store evaporative hydrocarbon emissions from the fuel tank and/or carburetor

8.2 Charcoal Canister—Use Carbon Canister for Evaporative Emissions.

8.3 Diurnal Breathing Losses—Fuel vapors emitted during the controlled increase in fuel tank temperature. NOTE This temperature increase simulates the daily range of ambient temperatures which fuel tanks experience in service.

8.4 Evaporative Emissions—Fuel vapors emitted into the atmosphere from the fuel system, that is, gas tank, carburetor, etc., of the vehicle

8.5 Fuel Tank Check Valve—A mechanical device at the fuel tank which prevents liquid fuel from entering the evaporative storage system

8.6 Hot Soak Losses—Fuel vapors emitted during a specified period beginning immediately after the engine is turned off.

8.7 Purge Valve—A vacuum or electrically actuated device in the evaporative emission control system used to release entrapped hydrocarbons to the engine induction system.

8.8 Refueling Emissions—Hydrocarbon emissions that can occur during filling of the vehicle fuel tank. NOTE These emissions are made up of displaced fuel tank vapor, entrained droplets in this vapor, liquid spillage, and nozzle drip during insertion and removal of the nozzle from the filler neck.

8.9 Running Losses—Fuel vapors emitted during operation of the vehicle under the specified test schedule

8.10 Vapor Canister—Use Carbon Canister for Evaporative Emissions.

8.11 Vapor Separator—A trap in the evaporative emission control system to prevent liquid fuel from passing into the vapor storage device

9. Fuel Systems

9.1 Filler Tube Restrictor—A device in the fuel tank filler pipe that will only admit a small diameter fuel filler nozzle dispensing non-leaded fuel.

9.2 Fuel Filler Cap—The cap on the fuel filler tube which normally provides a positive seal and may contain relief valves for pressure and vacuum venting

9.3 Fuel System—The combination of fuel tank, fuel lines, pump, filter, and vapor return lines, carburetor or injection components, and all fuel system vents and evaporative emission control systems or devices.

10. General

10.1 Curb Weight—The weight of the vehicle in operational status with all standard equipment, the weight of fuel at nominal tank capacity, and the weight of optional equipment.

10.2 Diesel Engine—Any compression ignition internal combustion engine, using the basic diesel cycle, that is, combustion results from the spraying of fuel into air heated by compression

10.3 Gas Turbine Engine—Any engine using the basic gas turbine or Brayton cycle consisting of adiabatic compression, constant pressure heating, and adiabatic expansion

10.4 Gross Vehicle Weight (gvw)—The manufacturer's gross weight rating, consisting of the curb weight plus pay load

10.5 Heavy Duty Engine—Any engine which the engine manufacturer could reasonably expect to be used for motive power in a heavy-duty vehicle

10.6 Heavy-Duty Vehicle—Any motor vehicle designed primarily for transportation of property and rated at more than 6000 lb (2722 kg) gvw or designed primarily for transportation of persons and having a capacity of more than 12 persons

10.7 Light-Duty Vehicle—A motor vehicle having a rating of 6000 lb (2722 kg) gvw or less and designed primarily for the transportation of persons on a street or highway and having a capacity of 12 persons or less.

10.8 Light-Duty Truck—A motor vehicle having a rating of 6000 lb (2722 kg) gvw or less and designed primarily for the transportation of property or designed for off-street or off-highway use

10.9 Loaded Vehicle Weight—The manufacturer's estimated weight of a vehicle in operating condition For the purpose of emission testing, it is the curb weight of a light-duty vehicle plus 300 lb (136 kg)

10.10 Spark Ignition Engine—Any internal combustion engine using the basic Otto cycle, with combustion initiated by an electric spark.

11. Test Procedure and Equipment

11.1 Analytical Train—The entire system required to obtain and analyze a particular constituent in exhaust gas Typically, this train will include such items as sample piping, particulate filter, condenser, sample pump, analytical instrument, and flow meter.

11.2 Batch or Grab Sample—A sample taken in a sealed syringe over a short period of time for a composite analysis

11.3 Beer-Lambert Law—For purposes of diesel smoke measurement, an equation expressing the relationship between the opacity of a smoke plume, the optical path length through the plume, and the opacity of the smoke per unit path length, may be used

$$\text{Opacity} = 1 - e^{-KL}$$

where:

e = base of natural logarithms
K = attenuation (or extinction) coefficient
L = path length through the smoke, in

11.4 Calibrating Gas—Gas of known concentration used to establish instrument response.

11.5 Chassis Dynamometer—A laboratory power absorption unit capable of simulating to a limited degree the road operation of a vehicle. The dynamometer possesses the capability to simulate the inertia and road-load power developed by a vehicle.

11.6 Chemiluminescent Analyzer—An instrument in which the intensity of light produced by the chemiluminescence of the reaction is proportional to the concentration of the component analyzed, as with the reaction of nitric oxide and ozone.

11.7 Constant Volume Sampling—A technique for sampling exhaust gas in which a sampling pump draws a constant volume flow rate This flow is provided from both the exhaust of a vehicle and from dilution air Note The technique allows for monitoring of continuous emissions on a mass basis and also (with the addition of a second pump) provides an aggregate total mass sample from a vehicle operated through an entire test cycle

11.8 Detector—That component in an analytical instrument which responds to a particular exhaust gas constituent.

11.9 Driver Aid—An instrument intended to guide the vehicle driver in operating the vehicle in accordance with the acceleration, deceleration, and cruise operating modes of a specific driving procedure

11.10 Dynamic or Continuous Sampling—A technique in which a portion of the exhaust is continuously withdrawn and pumped through an analytical train.

11.11 Filter Cell—That portion of the NDIR instrument which is filled with a particular gas in order to reduce interference signals

11.12 Flame Ionization Detector (FID)—A hydrogen-air diffusion flame detector that produces a signal proportional to the mass flow rate of hydrocarbons entering the flame per unit time

11.13 Gas Chromatogram—The recorder output versus time of a detector signal from a gas chromatograph, which shows deflections to indicate, for example, the presence of individual hydrocarbons

11.14 Hang-Up—A term to describe the phenomena whereby higher molecular weight hydrocarbons are retained in the sample train, causing an initial low analyzer reading, followed by higher readings in subsequent tests. Excessive hang-up causes errors in the analysis of the hydrocarbons in exhaust gas

11.15 Gas Chromatograph—An instrument commonly used to detect individual gases in complex gaseous mixtures. Note: In automobile exhaust gas analysis such instruments can be used to separate and determine the concentration of individual hydrocarbon species in a complex hydrocarbon mixture.

11.16 Hexane Equivalent Concentration (ppm hexane)—The concentration of a propane calibrating gas in terms of its hexane equivalent concentration For NDIR, hexane equivalent concentration has been established as propane concentration times 0 52. For FID, hexane equivalent concentration equals propane concentration times 0 50

11.17 Idle Speed—The engine's low idle speed as specified by the manufacturer

11.18 Inertia Weights—A series of weights on a chassis dynamometer used to simulate the test weight of a vehicle

11.19 Intermediate Speed—The peak torque speed or 60% of the rated speed, whichever is higher.

11.20 Mode—A particular event (for example, acceleration, deceleration, cruise, or idle) of a vehicle test cycle.

11.21 Nondispersive Infrared (NDIR)—Electromagnetic radiation used as the light source in NDIR instruments capable of measuring CO, CO_2, NO, and unburned hydrocarbons in exhaust gas

11.22 Nondispersive Ultraviolet (NDUV)—Electromagnetic radiation used as the light source in NDUV instruments capable of measuring NO_2 concentrations in exhaust gas.

11.23 Non-Methane Hydrocarbons (NMHC)—All organic hydrocarbon compounds, excluding methane, present in an exhaust sample

11.24 Smoke Opacimeter—An optical instrument designed to measure the opacity of diesel exhaust gases. The full flow of exhaust gases passes through the optical unit. One such smoke opacimeter is described in SAE J255

11.25 Span Gas—A single calibrating gas blend routinely used in calibration of an instrument such as those used for detecting hydrocarbons, carbon monoxide, and nitric oxide

11.26 Steady-State Condition—An engine operating condition at a constant speed and load and at stabilized temperatures and pressures.

11.27 Opacity—The fraction of light transmitted from a source which is prevented from reaching the observer or instrument receiver, in percent (Opacity = [1 − Transmittance] × 100)

11.28 Photographic Smoke Measurement—A measurement technique which relies upon an instrumental or visual comparison of the photographic image of a smoke plume with an established scale of blackness or opacity to determine the opacity of the original smoke plume

11.29 Probe—A device inserted into some portion of an engine or vehicle system in order to obtain a representative gas or liquid sample

11.30 Proportional Sampling—A method of obtaining a composite sample of exhaust gas representative of all driving modes in a test cycle This sample, when analyzed, will represent the average molar concentration of a constituent properly weighted for mass flow rates.

11.31 Rated Power—The maximum brake power output of an engine, in horsepower or kilowatts, as stated by the manufacturer

11.32 Rated Speed—The engine speed at which the manufacturer specifies the rated brake power of an engine

11.33 Rated Torque—The maximum torque produced by an engine, as stated by the manufacturer.

11.34 Reid Vapor Pressure—The vapor pressure of gasoline at 100°F (37 8°C) determined in a special bomb in the presence of a volume of air which occupies four times the volume of liquid fuel (ASTM procedure D 323)

11.35 Reference Cell—That portion of the NDIR instrument which provides the reference signal to the detector

11.36 Resolution—The minimum distinguishable reading, for a given trace width and scale combination, expressed as a percent of full-scale

11.37 Sample Cell—That portion of the NDIR instrument which contains the sample gas being analyzed

11.38 Sampling—The technique of obtaining an accurate sample of exhaust gas for analysis Sampling may be grab, continuous, or proportional.

11.39 Test Cycle—A sequence of an engine or vehicle operating modes usually designed to simulate road usage of the vehicle.

11.40 Test Fuel—A fuel for use in a given test and having specific chemical and physical properties required for that test

11.41 Transmittance—That fraction of light transmitted from a source, through a smoke-obscured path, which reaches the observer or instrument receiver.

$$\left(\text{Transmittance} = 1 - \frac{\text{Opacity}}{100}\right)$$

11.42 Variable Dilution Sampling—Use Constant Volume Sampling.

11.43 Variable Rate Sampling—A technique to obtain an exhaust sample which takes a specific and constant fraction (for example, 1/1000) of the total exhaust stream at each mode so that when the aggregate sample is analyzed for its molar constituents, it is weighted in proportion to the average flow rate through the cycle.

11.44 Visual Smoke Measurement—A measurement technique which relies upon human observation of an engine's smoke plume to rate that plume's appearance against an established scale of blackness or opacity (usually a gray scale on either a transparent or opaque white base).

STANDARD NOMENCLATURE FOR 1978 EMISSION TEST LOGS

Initial Certification

O-K
4K
4K HWFET
4K EPA
4K EPA (OFFICIAL)
4K EPA HWFET
4K EPA RETEST - COMMENT (i.e. F.E. 10% out)
4K EPA HWFET RETEST - COMMENT
4K CONF. TEST
4K CANADIAN
4K CANADIAN HWFET

*Running Change or Post Certification

B/L R/C DISP-# (i.e. 302-21T)
F/L R/C DISP-# Fix # (if multiple fixes in R/C)
CANADIAN B/L R/C DISP-#
CANADIAN F/L R/C DISP-#
EPA F/L R/C DISP-#
EPA HWFET F/L R/C DISP-#
CVS-CH TEST
Note: All EPA Tests should include EPA Test # (i.e. EPA Test Number 78-5344)

*Mileage is not to be included in remarks concerning post-initial cert. testing.

SHED TESTS

1978 SHED D.F. TEST (4K HARDWARE)
1978 SHED D.F. TEST (50K HARDWARE)
1978 SHED D.F. TEST (SLAVE HARDWARE)
HWFET
VOID TEST // EXPLANATION

STANDARD NOMENCLATURE FOR 1978

<u>Void Tests</u>

Void Tests should carry the usual remark followed by the word "Void" and an explanation (i.e. 4K EPA HWFET - Void // Vehicle prepped at wrong H.P.)

<u>Fuel Economy Data Vehicles (FEDV)</u>

City F.E. Test
1/ HWFET
EPA City F.E. Test
1/ EPA HWFET

Note: All EPA Tests should include EPA Test #
(i.e. EPA Test Number 78-5166)
Retests or Voids should be handled in the same way as initial cert. tests.

<u>Durability Vehicle Tests</u>

O-K
"X"K where "X" equals the test mileage as given on the Sigma-3 or TC-8 (i.e. 5,10,15,20,etc.)
Tests before or after scheduled maintenance should be entered as follows:
30K B/4 Sched. Maint.
30K Aft. Sched. Maint.
Tests before or after unscheduled maintenance should be entered as follows:

1/ 21K B/4 Unsched. Maint. - Appr./EPA <u>Name</u> <u>Date</u>
21K Aft. Unsched. Maint.- Appr./EPA <u>Name</u> <u>Date</u>

Tests required at EPA should be entered as follows:
50K EPA

Confirmation Tests should be entered as follows:
50K Conf.

1/ Revised: 12-1-77

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION

December 12, 13, and 14, 1977

DECEMBER 13

Session I

Sequenced Submission of the Standard
Application for Certification
Chairperson: Virginia Sink, Chrysler
EPA Contact: B. Patok

CONCLUSION

It was agreed that the concept of a sequenced submission of the application for certification in very desireable to reduce paperwork, redundancy, and expenditure of time. However, agreement was not reached on the specific information required at each sequencing step, expecially that needed for emission data fleet selection since final calibrations are not available at the time when selection is made.

A Task Force on Sequencing was established to recommend the items needed at each step. A detailed recommended format will be submitted to the Indexing and Referencing Tast Force at its meeting on January 10, 1978 for consolidation.

PROBLEM IDENTIFICATION

- Repeated submission of information common to all applications.
- Duplication of information in Parts I & II.
- Duplication of information in Part I and Zero Mile Books.
- Late start on durability vehicles jeopardizing timelines of Job #1 with emission data vehicle calibrations being developed against unknown deterioration factors.

RECOMMENDATIONS

A Task Force on Sequencing was appointed which will supply its report to the Tast Force on Indexing and Referencing before its meeting on Janualy 10, 1978. The results of these task forces considerations should result in a proposed detailed format with a definition of referencing and index requirements which should be implemented as soon as feasible.

EPA-INDUSTRY WORKSHOP ON CERTIFICATION PAPERWORK REDUCTION

DECEMBER 13 (Cont'd.)

PAPERWORK REDUCTIONS IDEAS FROM SESSIONS

(Short term for immediate paperwork reduction)

Eliminate request for duplicate information in Parts I & II and zero mile books (i.e., part numbers, sketches, vehicle logs, engineering evaluations, etc.).

Permit referenceing between applications.

Define in a more formal fashion the fleet selection criteria such that the manufacturer can select his own durability and data vehicle fleets.

Submit the Part I information sequencially to allow fleet selection before all calibration information is known in detail and to avoid large/many updates.

(Long term for paperwork reduction)

Establish a new method to prove durability.

Use broader family definition to reduce the number of 50K certification vehicles.

SEQUENCING OF THE APPLICATION FORMAT FOR CERTIFICATION

October 16, 1977

Mobile Source Air Pollution Control
Certification Division

Proposal

PROBLEM:

Application format as presently composed does not give sufficient guidance to manufacturers for an orderly submission. Certification personnel sifts through huge amounts of paper to detect deficiencies, categorizes them and notifies the manufacturer. This procedure has been found to be inefficient with respect to review time and manpower. Present format not suited for computerization.

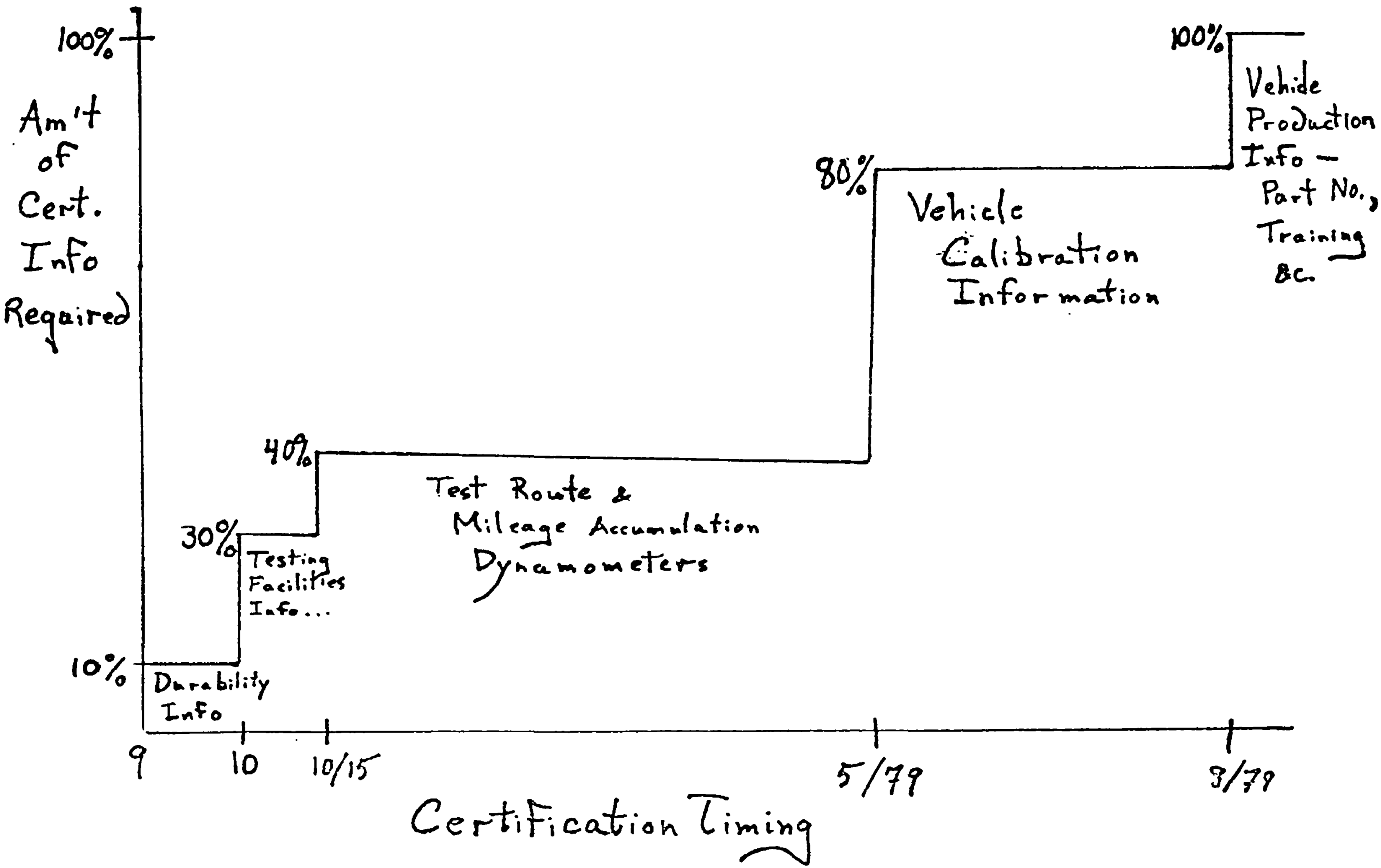
RECOMMENDATION:

Develop the format into a tool with which any manufacturer may work his way through the certification process in an orderly step by step progression. Organize the format subject matter into sequential building blocks leading to certification. Each such section will tell the manufacturer precisely what information he must submit and for what specific approval purpose. This will encourage manufacturers to concentrate their efforts and resources on the one specific section which hinders the progression because of missing information. A manufacturer, nevertheless, may submit any partial information for any section at anytime, but he will know himself, without EPA notification, in what areas he is deficient and what else he must do to progress.

For the purpose of computerization a rigid format is essential and it must be followed precisely by each applicant. The "Sequenced Application Format" meets this requirement as well.

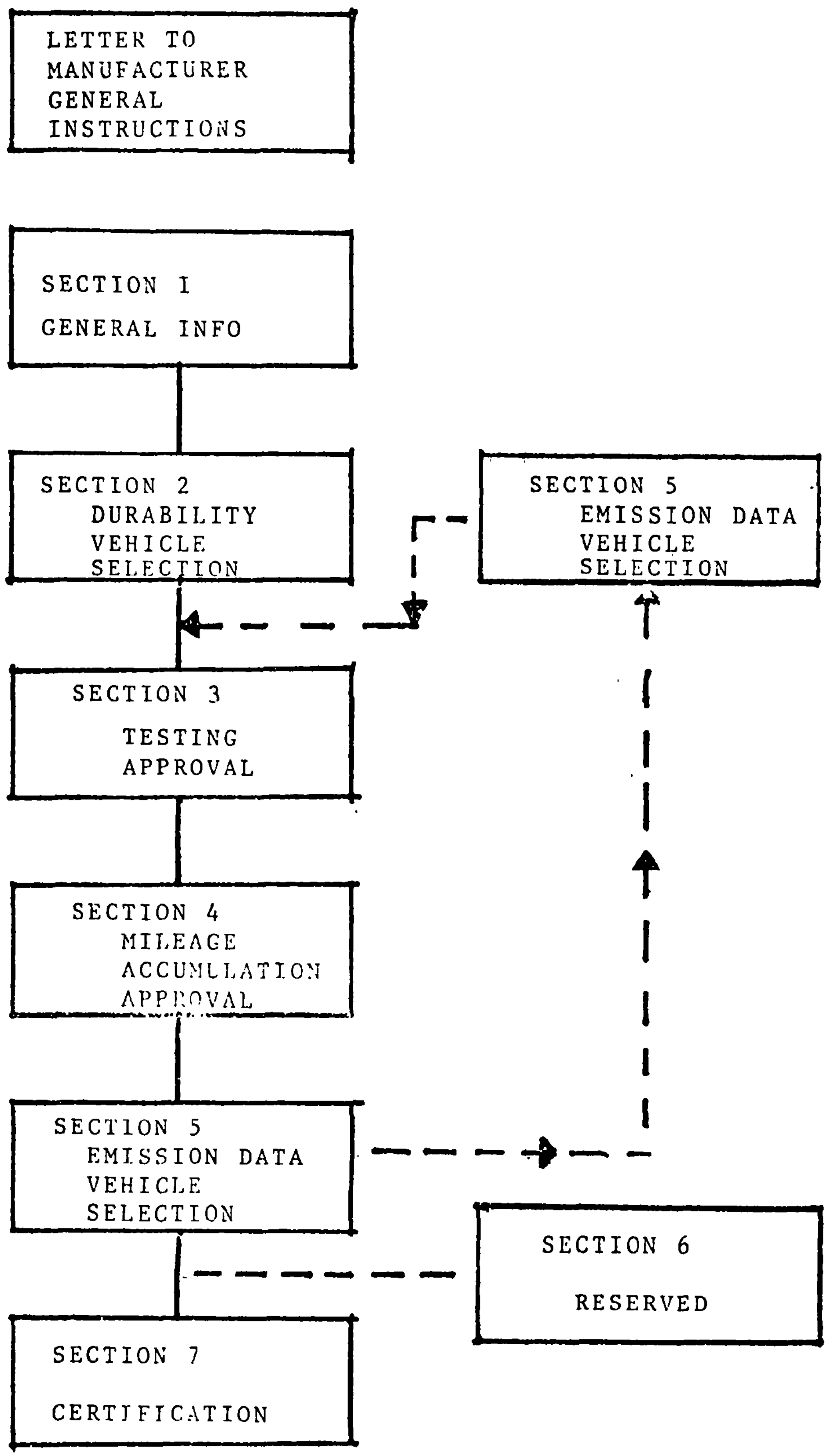
An organizational breakdown based on the 1979 Format has been prepared and is attached.

Sequencing



-32-

CERTIFICATION - NORMAL PROGRESSION



No Section:

(Formerly: Introduction, General Instructions,
Sections XI, XII, XIV)

Introduction

General Instructions (Note: 2 copies of application required, one for MSED).

Elements from Fleet Letter

Fuel Filler Inlet

Data Reporting Procedures

Telephone Log

P.12: Revision cover letter required for revision, including taped revisions.

Disposition: Put in letter to manufacturers, A/C.
Revise to include ref. to computerization.

Section 1.

General Information

(Formerly: Part I Application, Sections I, III)

Model Year

Manufacturer's Name

Kind of Application (LDV, etc.)

Standards to comply with

Mailing Address

Technicbl Representatives' Names, Phone Numbers, (U.S. Importer's Name).

Chain of Command*

Statement of Business Confidentiality

Disposition: Tape compatible, except chain of command.
*Flagged O.K. for later submission.

Section 2.

Durability-Data Vehicle Selection

(Formerly: Sections VI minus non-essentials, Sections VII a&b, IXa, XIII)

(Note: Emission-Data Vehicle Selection at Manufacturers Special Request, See Section 5.)

Elements from Fleet Letter ("add." vehicles, multiple engine families)

Exhaust Family Discriminators, Specific (EPA list)

Exhaust Family Discriminators, "may be" (EPA list)

Exhaust System Discriminators, (EPA list)

Exhaust Sub-System Discriminators (EPA list)

Fuel Systems

Evap. Family Discriminators (EPA list)

Evap. System Discriminators (EPA list)

AECDs

Exhaust Family Sales

Evap Family Sales

Vehicle Description, Sales, Displacement, etc.

Maintenance Schedules

Emission Control System Descriptions

Graphics, as Required

Exhaust Family Names

Evap Family Names

Disposition: EPA durability-data vehicles selected, go to: Paper & tape (Pt II), tape compatible (except graphics?), program vehicle books to Part II (i.e., Section 7)

Section 3.

Testing Approval

(Formerly: Sections IV, VB & C)

Elements from Fleet Letter ("Zero-Miles" requirement)

Fuel Analysis

Test Equipment and Procedures, Exh. & Evap.

Starting Instructions

Shifting Instructions

Dyno H.P.: Durability
*Emission-Data (Ref. Section 5)

Disposition: On tape and Fuel analysis to comparator
*Required prior to Section 5.

Section 4.

Mileage Accumulation Approval

(Formerly: Section VA)

Elements from Fleet Letter

Mileage Accumulation Route

and/or

Mileage Accumulation Dynamometer

Disposition: Route on tape, Dynamometer on paper

<u>Section 5.</u>

Emission-Data Vehicle Selection

(Formerly: Sections VI Minus Durability Parameters, VIII)

Elements from Fleet Letter (p.3-engine/evap code etc.)

Exhaust Family Parameters (Minus Discriminators, ref. Section 2)

Exhaust System Parameters (Minus Discriminators, ref. Section 2.)

Evap Family Parameters (Minus Discriminators, ref. Section 2)

Evap Systems Parameters (Minus Discriminators, ref. Section 2)

Graphics as Required

Engine Codes (Calibrations)

Evap Codes (Calibrations)

AECDs (Calibrations)

Optional Equipment

Disposition: On tape (except graphics?), A-vehicle selection program, emission-data vehicle selection on paper & tape (Pt II), vehicle books to Part II (i.e., Section 7)

Section 6.

Reserved

Section 7.

Certification

(Formerly: Pt. II Application Sections I, II, IIIA, IIIB, IV, V, VI, and New Information)

* EPA Durability-Data Fleet (new) (ref. Section 2)

* EPA Emission-Data Fleet (new) (ref. Section 5)

**Vehicle Books (new)

Carryover Information

Maintenance Log, including unscheduled (Note: Data bank for concurrent reporting)

Engineering Reports (Data bank for concurrent reporting)

Remainders as Presently Specified in Pt II

Certificates Information (new)

Disposition: All on tape, except engineering reports
*Compare tapes
**Referenced information

Ford

December 12, 1977

EPA Industry Workshop on Certification Paperwork Reduction

III. Sequenced Submission of the Standard Application for Certification

Background

EPA has accurately described in the topic discussion attachment of the 11/16/77 Harrington letter what is probably the greatest concern/highest jeopardy problem in the current certification process; the inability to get durability data vehicles approved to begin mileage accumulation in a timely manner, such that Job #1 is not jeopardized. The resultant late start in 50K mileage accumulation requires that 4K production calibrations be developed against an "unknown" D.F., which presents an excessive risk to the manufacturer. It is impossible to develop an optimum calibration which balances the need for high confidence in emission and fuel economy compliance. Thus, an excessive number of running changes are often required to optimize the calibration after initial certification.

Subsequent time delays in review and revision of 4K calibration Part I application preceding fleet pick and approval to begin mileage further delay certification and jeopardize Job #1.

Ford Proposals

The following proposals would eliminate or reduce the problem:

- Eliminate the requirement for 50K certification testing.
  - D.F.'s could be calculated from analysis of abundant data from previous fleets by very general system e.g., separate D.F. for oxidation catalyst/air/EGR, oxidation catalyst/non-air/EGR, TWC/air/EGR, etc. These D.F.'s would be inherently more representative than current method because of increased sample size.
  - D.F.'s could be generated for only new general systems as described above with a large enough sample size for statistical confidence.
  - Durability would be proven using the extensive PV and DV testing required in-house to release a new part to production.
- Replace the current 50K vehicle certification program with a bench D.F., similar to the evaporative system bench D.F.
  - A larger sample size would be feasible and more testing at each interval (4K & 50K) could be contained to reduce test-to-test variability.
  - ECD's and AECD's could be bench cycled on corporate rapid aging cycles which incorporate thermal and vibrational aging more representative of customer operation than the current durability cycle.

EPA Industry Workshop on Certification Paperwork Reduction (con't)

- Use broader family definition to reduce the number of 50K certification vehicles required.
  - There is no significant statistical correlation between current criteria for family differentiation and D.F.
  - Such criteria as deck height, cam to crank centerline and valve diameter should be eliminated and displacement criteria widened.
- Speed up the mileage accumulation cycle to allow faster mileage accumulation i.e., 40 or 50 MPH average.
- Allow the use of an assigned D.F. for low volume pilot programs to speed the implementation of new technology to the field.
- Tighten up the fleet selection criteria such that the manufacturer could select his own durability and data vehicle fleets and begin running immediately upon submittal of all Part I information. The time consuming detailed review of the application by EPA could be completed as mileage is being accumulation.
  - Ford has always and will continue to be responsive to all EPA questions/concerns on system/part definition without the threat of holding up the vehicle from accumulating mileage.
  - The manufacturer would assume the risk of disqualification for a mis-pick or a potential defeat device. 50K jeopardy would certainly be minimal.
- Submit the Part I information sequencially to allow fleet selection before all calibration information is known in detail and to avoid large/many updates. However, for this sequencing to improve certification timing/workload significantly, EPA will be required to sign up to a specific turn-around timing for review/approval. A detailed timetable for submittal/review for "ideal" certification timetable is shown on Exhibit I.

Summary

It is believed that the current 50K certification requirements leave much to be desired in terms of yielding representative deterioration factors and hardware durability results. It is well known that the 50K certification requirement and its' corresponding long lead timing for Part I application, detailed review by EPA and mileage accumulation is one of the biggest jeopardies in a manufacturers' ability to meet Job #1 for vehicle manufacture. Therefore, proposals have been presented to substitute methods of obtaining deterioration factors and proof of hardware durability which would be more representative, less time consuming and less paperwork consuming.

It is hoped that, although some of the proposals are rather far-reaching and would have a large impact on EPA/Industry ways of doing business, they be given serious consideration based on their merit in meeting the intent of the Clean Air Act requirements while saving considerable engineering energy which could be put to better use.

Exhibit I

IDEAL 1980 CERTIFICATION TIMING

SEQUENTIAL APPLICATION SUBMISSION AND CORRESPONDING EPA TURN-AROUND TIME

Incidence/Document Submitted to EPA (Per 1979 EPA Suggested Part I & II Application Format)	Weeks Prior To Job #1	Approximate Date
50K Fleet Selection Part I Sections 1/ to EPA / Sections VIa- A. Common Engine Family Parameters; VId- A. Common Evaporative Family Parameters; VIIa-b- Engine/Evaporative Family Sales; IXa- Vehicle Description; X A.- Proposed 50K Data Fleet	92	10/24/77
50K Fleet Selection From EPA	90	11/07/77
50K Calibration Part I Sections 1/ to EPA / Sections I, II, III, IV, V (Common Sections); VIa - B, C, D, E, F, & G (Calibration Parameters); VId - B & C (Evap. Individual Config. Parameters); VIe - Schematics; VIII; IXb, X B & C; XI, XII, XIII, & XIV.	88	11/21/77
EPA Approval to Begin 50K Mileage Accumulation	85	12/15/77
4K Cert. Development Vehicles/Hardware Required	56	07/18/78
50K Vehicles Complete Mileage Accumulation	50	09/04/78
4K Part I to EPA / Part I Update (Common Sections VIa-A.;VId-A.;VIIa-b;IXa;X-A.)	42	11/07/78
4K Fleet Selection from EPA	39	11/28/78
4K Calibration Part I Sections to EPA	38	12/5/78
EPA Approval to begin 4K Mileage Accumulation	35	12/26/78
4K Vehicles Complete Mileage Accumulation	22	3/28/79
Certification Received From EPA	20	4/11/79
Engine Job I	12	6/06/79
Vehicle Job I	0	9/15/79

1/ Ford Format is slightly different i.e.-EPA Section VIa= Ford Section VIIIa.

SEQUENTIAL SUBMISSION OF PART II 50K AND DF DATA (SEQUENCING)

EPA should review and approve the complete durability data vehicle log plus associated DF shortly after a "prime" vehicle has completed testing. Furthermore, the manufacturer should be permitted to reference this EPA approved DF submission rather than resubmit the same information in the Part II.

Advantage to EPA: It helps to reduce peak work load, since EPA would be able to review the DF and logs, in some cases, several weeks before final Part II submission. Also, only the data logs for 50K vehicles intended to be certified, prime vehicles, would be submitted to EPA for this early review.

Advantage of Manufacturer: It reduces the amount of time EPA would require to review and approve the final Part II submission. Therefore, it could shorten the time required to certify a family. Also, it could save about 1700 pages of duplication for Ford, since we would avoid making 3 additional copies of an average 12 page log for 47 Part II submissions.

REDUCE AVERAGE TIME REQUIRED TO APPROVE RC BY 2 DAYS (SEQUENCING)

EPA should not require, as a pre-condition for subsequent approval of a RC, that the manufacturer submit a data log update consisting wholly of the final EPA fix test results. Instead, EPA should approve the RC on the basis of: (1) the fully-up-to-date maintenance and test logs describing all the events preceding the final EPA fix test, and (2) the fact the manufacturer's test vehicle has passed the final EPA fix test.

Such a procedure could save an average of two working days in obtaining EPA approval after test completion. Also, updated logs showing both the final EPA fix and HWFET tests would be submitted to EPA shortly after the test results are received from EPA. The single submission would eliminate the added submission of the HWFET.

EPA CAN REDUCE PAPER WORK BY ELIMINATING THEIR SEPARATE VEHICLE BOOK FILE

Presently, EPA requires that we submit them three copies of each data log update affecting the Part II. EPA files one copy in their certification book file, and one copy in their Part II update file, and forwards one copy to Washington.
I recommend that EPA eliminate their vehicle book file. That elimination could save Ford about _____ pages of duplication. Also, it could save about 1-2 days in getting certificate on some families. This is because EPA has delayed issuance of a certificate until they have received a vehicle book file update. Occassionally, those updates are not sent, lost, or misfiled.

Ford Motor Company

The American Road
Dearborn, Michigan 48121

December 21, 1977

Ms. Margaret J. Stasikowski
Chief, Operations Office
Certification Division
Mobile Source Air Pollution Control
2565 Plymouth Road
Ann Arbor, Michigan 48105

Dear Ms. Stasikowski:

Subject: Final Report - Session on Referencing Within the Application EPA-Industry Workshop on Certification Paperwork Reduction

Attached is the final report for the session on Referencing Within the Application. The report contains many of the oral and written comments, made by the participants in that session.

Also included with this submission is a list of Ford recommendations for short term, 1979 model year procedural revisions which can reduce Part II Certification paperwork plus EPA review time. A paper is attached which discusses these Ford recommendations. Furthermore, a brief listing of short term proposals, prepared by other manufacturers, for reducing certification paperwork is attached.

It is my understanding that each of these short term recommendations or proposals for reducing paperwork will receive a "yes, no, or give us more information" type of response from EPA at the next manufacturers meeting. We would appreciate such a response.

Sincerely yours,

W. A. Kostin

W. A. Kostin
Certification Programs Department
Automotive Emissions and Fuel
Economy Office

Attachment

Session Report

REFERENCING WITHIN THE APPLICATION

Submitted For

EPA-Industry Workshop on
Certification Paperwork Reduction
December 12, 13 and 14, 1977

Prepared by:

W. A. Kostin

on

December 21, 1977

Includes Oral and Written
Comments of Session Participants

W. A. Kostin
12-19-77

REFERENCING WITHIN THE APPLICATION

Problem--LDV Format Needlessly Increases Workload

The current light-duty vehicle (LDV) application format contains duplicate and redundant information which needlessly increases workload of both EPA and the regulated industry.

Facts Bearing on the Problem

1. In 40 CFR 86.079-21(a), separate applications are required for each class of vehicle and set of standards.

2. In 40 CFR 86.079-31, provisions are made for separate certification of portions of a manufacturer's product line.

3. Past certification practice has been to require engine descriptions to be completed for each family, even where the differences were minor.

4. Approval of carryover has been conditioned on resubmittal of information from past model years.

5. Test data submitted during the certification program had to be resubmitted in the Part II before certification could be granted.

6. Referencing is already being used in some parts of the light-duty motor vehicle application such as use of reference to the Part I where there has been no change in component calibration from test vehicles to production.

7. Referencing is used more extensively in the 1979 heavy-duty engine application for certification through a new general section and through a mechanism which eliminates resubmittal of certain information each year.

General Solution: Referencing

Five general referencing techniques can be implemented which will have a substantial impact on the amount of information which the industry must prepare, and which EPA must review and store. To a certain extent these techniques were used to develop the new 1979 Heavy-Duty (HD) Engine Application format. The five techniques are described next.

1. Reference Between Model Years

One technique, reference more between model years. To accomplish this, a special permanent section of the Application would be created (similar to Section lA of the HD Application) which would contain information that does not change greatly from year-to-year. Such a section would be submitted once by the manufacturer and then updated by amendment. No new re-submittal would be required each model year.

The permanent Part I section would also include space for the inclusion of test data as it is generated and submitted. This provision would eliminate the need to resubmit data for carry-over determinations.

One potential problem in this area is the ability to reconstruct the application as of a certain date. Periodic microfilming would solve this problem.

Another potential problem is: the New EPA Team may require the revision of carryover information previously approved by the preceding Team. The revision may be due to the new Team's belief that the old Team overlooked an information requirement specified in the old Application format. Nevertheless, the year-to-year referencing technique won't save paper unless there's a uniform interpretation among the Teams of the kind and form of the information to be submitted in the Application.

2. Reference Within the Application Itself

A second major technique for reducing needless paper work and review would be to restructure the Application so that more referencing can be done within itself. One extension of this technique would be to describe families which differ in only a few areas once in a common section. Then, in each engine family section only the differences would be described.

To successfully achieve a reduction in paper work plus review time via this technique, the list of differences must be small relative to the list of common items.

Another extension of this technique would be to have a common section which describes the operation of all emission control devices used on all LDV's or LDT's. Then only brief description of the production specifications for the device would appear on applicable calibration description sheets throughout the Application.

A general requirement of any technique for referencing within the application is: it must not cause an increase in the time required by the EPA Team to assemble and review a module of information. In other words, the referencing technique should not force the Team to repeatedly refer to several different places in the Application in order to accomplish a review of a single document such as an engine code (calibration) description.

3. Reference Between Applications

A third technique for reducing certification paperwork is to reference between the LDV, LDT and HD engine Applications. For example, the same statement of Emissions Systems Warranty is contained in these Applications. Certification paperwork could be reduced if referencing between Applications was permitted or utilized.

Generally, the duplicate submission of the same information in distinct Applications results from the fact those records are simultaneously needed by two different EPA offices, such as the Passenger Car Team and the LD Truck Team. As a consequence, referencing between Applications may increase work load for EPA.

4. Index the Application

One means to facilitate referencing is to implement a rigid system for indexing the Application. Two examples of indexing schemes are shown by Figures 1 and 2.

Four-basic requirements of an indexing system are that it should be: (1) logical; (2) adaptable to computerization; (3) universally applicable to LDV; LDT or HD applications; and (4) flexible enough to permit the addition modification, or deletion of same page without disturbing the remainder of the Application.

A corrollary requirement for any referencing scheme based on indexing is: There should be a block on each indexed page which shows the latest revision number and date.

Only be use of this block can the EPA reviewer easily identify which of two pages assigned the same unique index is the latest.

5. Avoid Unnecessary Referencing

A fifth referencing technique is to avoid referencing notes or statements which create additional paper-work. One extension of this rule is to avoid using a referencing note expression which contains a time and date. For example, do not state, "See Section V, page 6, dated Dec. 3, 1977 for a current description of the calibration". This kind of referencing generates extra paper-work, since both the reference note and the Section V must be updated whenever page 6 of Section V is revised.

Another extension of this rule is to eliminate unnecessary referencing in the 1979 Part II of the revision date for the final production curves and calibrations contained in the Part I. As a consequence of this referencing requirement, both the 1979 Part I and II--instead of the Part I only--must be formally updated whenever there's a minor revision (typographical error) on the curve or calibration sheet which does not require a running change request. Also, this requirement generates extra review work load for EPA and the manufacturer.

Recommendation--Develop New 1980 LDV and LDT Format

Develop a new format for the 1980 Light Duty Vehicle (LDV) and Light Duty Truck (LDT) Application for Certification which utilizes the referencing techniques described herein as well as those techniques utilized in the Application format for 1979 Heavy Duty engines. The task force formed from the session on Standard Indexing and Nomenclature should undertake this recommendation.

Some of the desired features of the recommended new 1980 format are as follows:

- A special permanent section, similar to Section 1A of the 1979 HD Application, should be created in the 1980 LDV and LDT Application Format which would contain information that does not change greatly from model year to model year.

- The new 1980 LDV and LDT Format should enable the manufacturer to submit in a single section information common to one engine displacement. Then each derivative engine family section would contain only the engine parameters unique to that family. For example, this new section could contain two subsections: one for base engine parameters, and another for manifold and combustion chamber drawings.

- The new 1980 Format should minimize the amount of Application information which a manufacturer would be required to resubmit in order to obtain a certificate for a carryover engine family. Ideally, a manufacturer should only be required to submit a letter of request plus possibly some altered sales projections in order to obtain a certificate. (The task force on Standard Indexing and Nomenclature has been assigned the responsibility for proposing an Application Format for achieving this recommendation).

Recommendation--More Uniform Interpretation of Information Required in Application

There should be a more uniform interpretation and application among the EPA Teams of the kind and specific format of the information required to be submitted within the Application by each manufacturer. This should preclude the instances where the new Team requires the revision of carryover information previously approved by the preceding Team.

Establish Single Approval Point for LDT and LDV

EPA should establish organizationally a single approval point for the submission of and approval of information common to the 1979 LDV and LDT Applications for Certification.

Recommendation--Manufacturers Should Investigate Indexing

Each manufacturer should thoroughly investigate--and where practical try out during the 1979 or 1978 model year--the rigid indexing systems that Cummins has used in its 1978 HD Engine Application for Certification.

Recommendation--Where Practical, Implement Revisions to 1979 Format

Implement as many short term revisions as practical to the 1979 LDV and LDT Application which would enable referencing to be employed to reduce paperwork. Because 1979 Part I's have already been submitted to EPA for review, these short term revisions will probably be limited to the Part II and the Zero Mile Vehicle Book.

Specific Proposals -- Short Term

The specific proposals listed below were made by various manufacturers who attended the session on Referencing. Because of insufficient time, these proposals (recommendations) were not discussed at the Session. Nevertheless, because of these proposals may reduce certification paperwork and EPA review time, each proposal should receive a "yes, no, or give us more information" type of response from EPA.

1. EPA should not require a manufacturer to resubmit a complete previously approved Application as a condition for obtaining approval of a carryover engine family. Since a carryover in itself precludes substantial changes in the Application, the letter of request with possibly altered sales figures should be sufficient. This could be implemented even for model year '79 and would result in a substantial paperwork saving.

2. Delete the stipulation from the 1979 LDV and LDT Application Format which requires the manufacturer to resubmit complete copies of the durability data vehicle as well as emission data vehicle test and maintenance logs within the Part II.

3. Submit the calibration curves only once during the whole certification process. Apparently, some manufacturers have been required to resubmit the same curves in the Part I, Part II, and zero mile banks for 4K and 50K vehicles. Changing of the calibration curves could still be maintained until the zero mile test with emission vehicles has been scheduled.

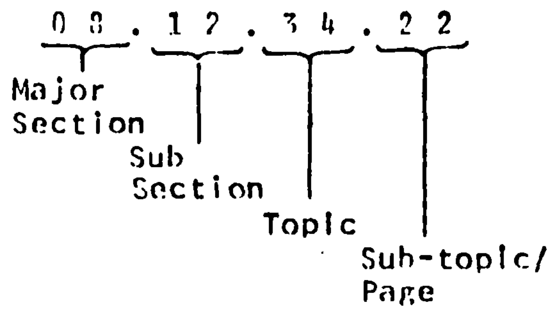
4. Don't ask for the listing of a certain part as AECD when it is already described in the text part - or vice versa. Decide to use either this or that method of description.

5. The whole text in Section VIa is to be questioned. Shouldn't it be sufficient to use self-explanatory drawings and schematics only, with some written information similar to our tabular description of the AECD's?

FIGURE 2 - INDEXING FOR COMPUTERIZATION

The use of indexing in computerization must be fully considered.

- Section indexes should use sufficient codes to fully define the lowest levels of data.



- Dating conventions on each page should allow for the determination of original submission or revision text.

  Issued: 12/01/77
  Revised: New (Original Submission)

  Issued: 12/01/77
  Revised: 12/15/77

- A manufacturer code should be included to allow for the positive determination of the submitting company.

  FO - Ford Motor Company

  GM - General Motors Corporation

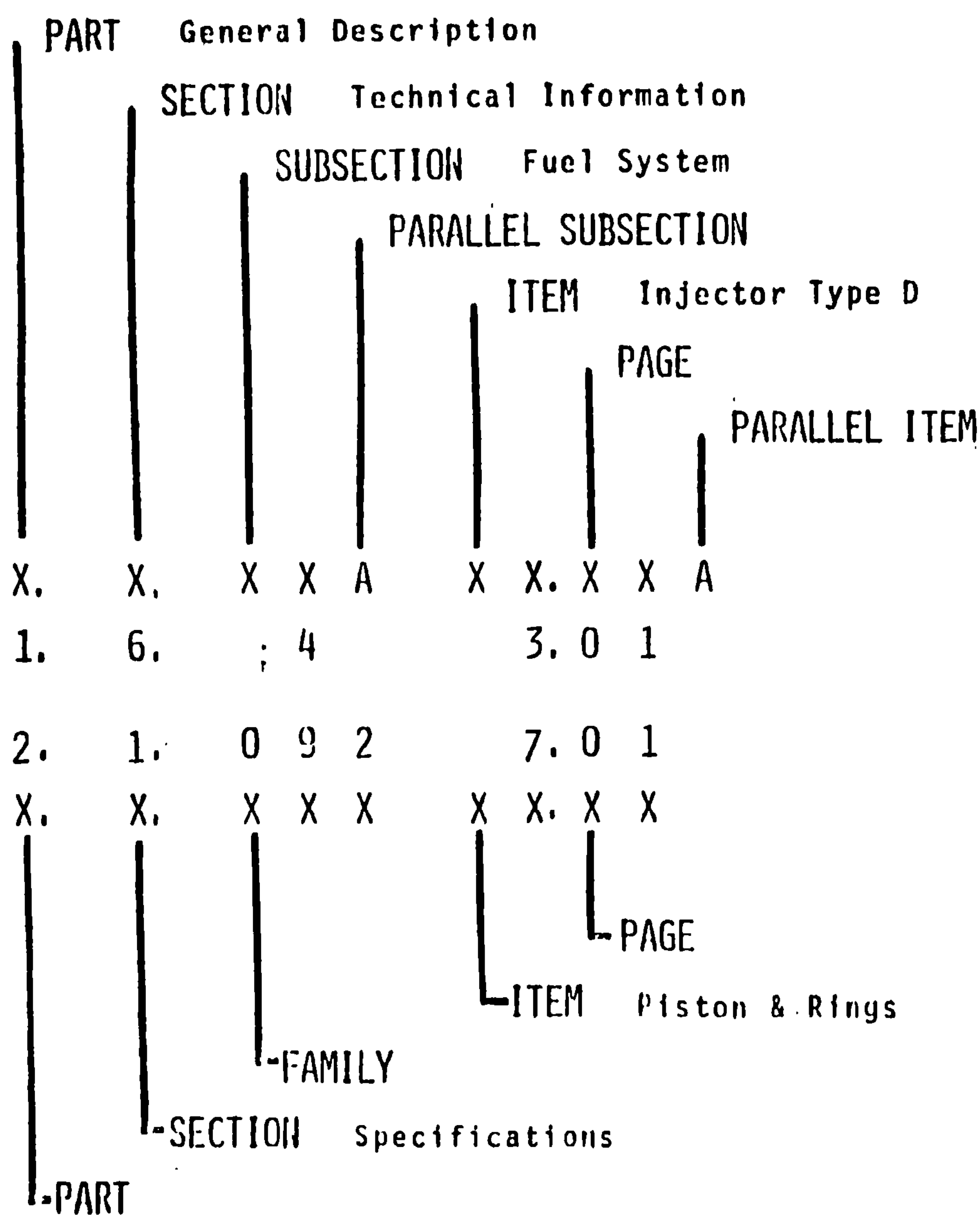
  CH - Chrysler Corporation

- Each sheet should contain a reference block with all mandatory indexing information.

Mfg	Index
Issued	Revised

Computer Science Dept.
Systems Planning Group
December 15, 1977

FIGURE 1


PART General Description
SECTION Technical Information
SUBSECTION Fuel System
PARALLEL SUBSECTION
ITEM Injector Type D
PAGE
PARALLEL ITEM
X. X. X X A X X. X X A
1. 6. ; 4 3. 0 1
2. 1. 0 9 2 7. 0 1
X. X. X X X X X. X X
PAGE
ITEM Piston & Rings
FAMILY
SECTION Specifications
PART

EPA-INDUSTRY WORKSHOP ON CERTIFICATION PAPERWORK REDUCTION
December 13, 1977

Participant List

Topic 3: Referencing within the Application

Name	Representing
Virginia Sink	Chrysler Corporation
R. C. Smith	EPA
J. Thomson	EPA
T. Hiramatsu	Toyota
D. Bonawitz	Toyota
Gene Bolton	General Motors Corporation
Merle Liskey	American MOtors
M. R. Wilson	General Motors Corporation
Bill Kostin	Ford Motor Company
Hugh Daugherty	Cummins Engine Company, Inc.
B. Patok	EPA
Mark Wolcott	EPA
Karl Weber	Mercedes Benz
Richard Mazur	EPA
Les Ryder	EPA
M. Stasikowski'	EPA
R. E. Harrington	EPA
B. W. Schomer	BMW

Ford Motor Company
W. A. Kostin
12-19-77

SHORT TERM 1979 MODEL YEAR PROCEDURAL REVISIONS WHICH CAN REDUCE PART II CERTIFICATION PAPER WORK AND SHORTEN CERTIFICATION TIME

Estimated Savings		Proposal
1700 pages annually; 2 days	I.	EPA should review and approve the complete durability data log plus associated DF shortly after 50K test completion. Then, the manufacturer should be permitted to reference this approved DF submission rather than resubmit the same information in the final Part II.
Reduced Cert. time by 2 days; 800 pages annually	II.	EPA should approve a RC on the basis of: (1) the submission of fully updated logs describing all the maintenance and test events preceding the final EPA fix test, and (2) the fact the manufacturer's test vehicle has passed the final EPA fix.
	III.	EPA should only forward Part II updates, furnished by the manufacturer, to Washington on a quarterly basis. This eliminates the handling of multiple separate revisions to the same page.
7500 pages annually	IV.	EPA should formally permit and encourage the establishment of master Part II addendum information sections for 1979 LDV and LDT engine families. Individual Part II submissions should not be required to contain a time dated reference to the addendum.
2-3 days in obtaining a certificate; 1700 pages annually	V.	After review of a "dummy" Part II submission, EPA should provide the manufacturer with a list of all desired changes in format to be included in actual subsequent Part II submissions.
five man-days 470 pages minimum; potentially avoid 2340 extra pages	VI.	EPA should eliminate their requirement that the manufacturer reference in the Part II the latest revision dates for the final production curves and calibrations contained in the Part I,

Estimated Savings		
750 pages annually; (additional 1450 pages saved internally by Ford)	VII.	EPA should not require a manufacturer to resubmit complete copies of the emission data vehicle maintenance and test logs within a Part II submitted for initial certification.
1920 pages annually; (additional 3840 pages for Ford)	VIII.	Remove the requirement for "preliminary" engineering reports. The preliminary engineering report is unnecessary since it is a restatement of the report of contact which is kept jointly by the EPA and manufacturers. Also, the use of "engineering judgment" could reduce the total number of engineering reports required. To date, Ford has submitted two copies of 319 reports on 1978 MY vehicles to EPA.
	IX.	The following changes in the Part I will lower the amount of paperwork which must be processed.

(a) Remove the requirement for dimensional combustion chamber drawings. Since cylinder heads change so infrequently, we see no use for these drawings to be included in the Part I.

(b) Test fuels need not be included in the Part I; should only be included if different from federal regulations.

W. A. Kostin
Revised: 12-9-77
12-19-77

I. SEQUENTIAL SUBMISSION OF PART II 50K AND DF DATA

EPA should review and approve the complete durability data vehicle log plus associated DF shortly after a "prime" vehicle has completed testing. Furthermore, the manufacturer should be permitted to reference this EPA approved DF submission rather than resubmit the same information in the Part II.

Advantage to EPA: It helps to reduce peak work load, since EPA would be able to review the DF and logs, in some cases, several weeks before final Part II submission. Also, only the data logs for 50K vehicles intended to be certified, prime vehicles, would be submitted to EPA for this early review.

Advantage of Manufacturer: It reduces the amount of time EPA would require to review and approve the final Part II submission. Therefore, it could shorten the time required to certify a family. Also, it could save about 1700 pages of duplication for Ford, since we would avoid making 3 additional copies of an average 12 page log for 47 Part II submissions.

II. R/C APPROVAL BASED ON EPA FIX TEST DATA

EPA should not require, as a pre-condition for subsequent approval of a RC, that the manufacturer submit a data log update consisting wholly of the final EPA fix test results. Instead, EPA should approve the RC on the basis of: (1) the fully-up-to-date maintenance and test logs describing all the events preceding the final EPA fix test, and (2) the fact the manufacturer's test vehicle has passed the final EPA fix test.

Such a procedure could save an average of two working days in obtaining EPA approval after test completion. Also, updated logs showing both the final EPA fix and HWFET tests would be submitted to EPA shortly after the test results are received from EPA. The single submission would eliminate the added submission of the HWFET.

III. ELIMINATION OF THE REGULAR WASHINGTON UPDATE

Presently, EPA requires that we submit them three copies of each data log update affecting the Part II. EPA files one copy in their certification book file, and one copy in their Part II update file and forwards one copy to Washington.

W. A. Kostin
12-8-77
12-19-77

EPA should discontinue the practice of forwarding copies of all routine Part II updates to Washington. Instead, EPA should only forward to Washington Staff on a Quarterly basis updated Part II's containing information certified (approved) during that Quarter. This quarterly update would be furnished by the manufacturer to EPA. A/C-66 could be amended to provide for such a submission.

The quarterly update would save both EPA and Ford paper work as well as reduce work load, since multiple copies of revisions made to the same page would not be sent to Washington. And, the legal status of the information forwarded to Washington remains unchanged since the records kept in Ann Arbor are those required for any Court submission.

IV. AVOIDING THE REPEATED SUBMISSION OF MATERIAL COMMON TO ALL PART II'S

EPA should formally encourage the establishment of master Part II addendum information sections like Ford has created for 1978.

Each addendum would contain statements common to a major subset of engine families such as LDV, LDT, MDV or HD families. The manufacturer would be required to keep the addendum sections current. And, the manufacturer would not be required to reference these addendum sections in each individual Part II submission. Instead, for example, the manufacturer would make the statement that the LDV addendum section applies to all LDV Part II's.

Information which would be included in the addendum sections are:

- Name of Representative
- Statements of Compliance (Device Safety)
- Emissions Systems Warranty
- Recommended Customer Maintenance
- Training Programs for Emission Controls
- Samples of VECI Decals Plus a Statement of Label Location

Also, a separate Part II addendum section should be created for the Evaporative Emission DF data organized by Evap-control system combination. This section would contain a chart depicting the correspondence between the applicable exhaust emission family and the evap DF. A partial example of this Evap. Section is attached.

ESTIMATED PAPER SAVINGS IN 1979:

Assuming there are 47 individual Part II submissions to be made to EPA and CARB in 1979, and five copies are made of each submission, then about 6200 pages of duplication can be avoided by using the [illegible] addendum section. An additional 1[illegible]0 pages of duplication could be saved if a common evap addendum section is used for 11 evap families. Therefore, the total paper savings could be [illegible] pages.

Also, the singular submission relieves EPA of the added burden of reviewing 47 repeated submissions of the same material.

W. A. Kostin
12-8-77
12-19-77

V. PART II FORMAT CHANGES

Each year our initial Part II submissions to EPA include the format changes requested by last year's EPA team. It seems that no matter how well we prepare the Part II, the new team invariably requests new additional changes in format.

Examples of actual minor changes in format, which required that we update all Part II's previously submitted to EPA, are as follows:

- Change the transmission code from C-4 to Auto (C-4) on all emission test logs.
- Add the actual odo correction factor to the header page of the log, even though it's shown on all subsequent pages.
- Add the latest revision date on the Calibration Description Sheet contained in the Part I to the CAPL.

If identified early, these changes would be easily handled.

PROPOSED SOLUTION

Each member of the new EPA team should examine a manufacturer's "dummy" Part II about four weeks before the scheduled submission of his first "actual" Part II. As a result of this examination, EPA would provide the manufacturer with a list of the changes in format, which would be included in all subsequent Part II submissions. After publication of that list, EPA would agree not to make additional minor changes in format which would apply to Part II's in EPA's possession.

BENEFITS

We could probably save at least 2-3 days in obtaining a certificate, and about 350 pages of paper work.

VI. ELIMINATE UNNECESSARY REFERENCING IN THE PART II OF PART I DATA

EPA should eliminate their requirement that the manufacturer reference in the Part II the latest revision dates for the final production curves and calibrations contained in the Part I. The explanation for this recommendation follows:

> To reduce paper work, Ford submits in the Part I only, instead of both the Part I and II, the final production carburetor and distributor curves. Ford also submits the calibration description sheets only in the Part I.

However, EPA's recommended format for the 1979 Part II requires the following:

> "For any production curve or calibration referenced in this section that is identical in all respects to a curve or calibration already submitted in Part I of this application, reference the curve number and latest revision date in this section rather than re-submitting the curve or calibration. If the curve or calibration differs from the Part I submission, please explain the difference."

As a consequence, now both the Part I and II must be formally updated whenever there's a minor revision (typographical error) which does not require a running change request. In short, added paper work and checking time is generated for both EPA and Ford by this referencing requirement.

PAPER SAVINGS

This proposal could save EPA and Ford at least 470 pages based on the experience of the 1978 certification program. Potential additional savings of 2340 pages (estimated).

/:n

VII. Eliminate the Resubmition of Data Logs Within the 1979 Part II

EPA should not require a manufacturer to resubmit within the Part II complete copies of the emission data vehicle maintenance and test logs within a Part II submitted for initial certification.

The primary reasons for this deletion are as follows:

1. The 1979 HD Application Format does not require the resubmition of emission engine logs within the Part II.

2. The results of all certification tests and maintenance are reported to EPA within 3 working days and one week, respectively. These logs are filed in EPA's vehicle bank, apparently a permanent file.

3. The final official 4000 mile certification test is conducted by EPA; and the results are reported to EPA on the Official Test Result summary page contained in the Part II.

SUMMARY REPORT
on The Session on
THE COMPUTERIZATION OF THE CERTIFICATION PROCESS
(Topic #4) of
The EPA - Industry Workshop on
Certification Paperwork Reduction

December 14, 1977

Chairman, G. F. Gruska, GM
EPA Contact, L. M. Tucker

OBJECTIVE

The objective of this workshop session is to determine the feasibility/time constraints for the utilization of computer capabilities in the certification process in order to reduce certification related paperwork and provide efficiency to the certification approval process.

FACTS BEARING ON ISSUE

Because of the prerequisites of system/media compatability and standardized formats, initial utilization of computer capabilities in itself will not in general reduce the size of the certification process submission, but makes the process more efficient and reduces the total amount of paperwork necessary to produce a submission. In order to determine the impact to EPA and to the industry, a computerization survey was passed out during the introductory session. The information from completed surveys were subsequently used during this session (a survey completed for the EPA facility and summary are attached).

In general, any proposal should result in a definite reduction in the time required by EPA to audit a certification submission. A computerization proposal should also permit both industry and EPA to internally reduce the amount of manual transcription of data from one format to another format for data input for presentation and associated error.

Concern should also be given to the security of the transmission media of the information and the impact of any proposal on small companies. Finally, the computer also should not be used to generate documents which can be more easily and cheaply manually prepared, or to store information for which there is no need and which can be stored more inexpensively in hard copy form.

Some of the disadvantages and impacts of proposals for computer applications should be mitigated by the results of the indexing and sequencing task forces.

RECOMMENDATIONS

In general, it is recommended that all participants should investigate the feasibility of internal uses of word processing/automatic data processing. The following areas are being recommended for short term implementation by EPA.

- Transmission of test log results in computer readable media - This is a present EPA capability which should be enhanced and encouraged. This option will be affected by the work of the indexing task force.

- Single approval point - For every portion of the certification submission, there should be a single EPA element responsible for approval of the information content. Although this is more a management issue than one of computerization, it was felt that the use of the computer could greatly assist in the implementation and maintenance of such a management policy.

The following have variable implementation time table, depending upon the extent of the capabilities utilized. These capabilities can be implemented sequentially (that is provided that the initial system is to be extensible) and have the feature that their use would reduce the amount of paperwork needed to be submitted.

- Minimize required information to be submitted (short to medium term) - This recommendation would require that the major information elements within the submission be categorized as to their required accessibility, what elements need immediate accessibility because they are highly utilized? Which elements are only occasionally utilized and do not need to be readily available? Within this proposal, the second set of elements (occasionally utilized), would be retained at the manufacturer and submitted only upon request and within a reasonable time frame.

- Computerize storage/retrieval of submissions (medium to long term) - This proposal would require EPA to provide the hardware and software necessary in order to economically store and make readily available to the EPA elements any processed submission. (The complexities of updating initial submissions under such a mode of operations was discussed with the conclusion that it was not a major limiting factor).

- Commonized data reporting forms - The implementation time frame would be from short to long term depending upon the extent of commonization., That is, within the short term, the forms within the certification branches could be commonized, medium term throughout EPA, long term throughout the Federal regulatory agencies.

- Common Data Base - This proposal extends the above by the maintenance by EPA of a general data base of certification related items. Information would be submitted to the data base directly rather than on specified report forms.

Since implementation/development of many of these capabilities are dependent upon the existing/future system capabilities of EPA and industry, it is further recommended that EPA set up committees to run pilot feasibility projects on these different capabilities. These committees should be formed by EPA based upon the information contained in the computerization survey forms completed during the workshop. (It is requested that companies forward to EPA a fully completed survey if they have not done so yet.) Besides discussing selected portions of the above, these committees should also consider other problems such as the concerns related to the various forms of information transmission/input and the efficacy of obtaining each capability with respect to EPA and industry (small/large).

DISCUSSION

A computerized system has the capabilities of the storage and the selective or wholesale retrieval of information, the generation of report documents, the analysis of information, and the transmittal of information. There are several possible systems design categories with respect to the certification process. These are:

Complete - all information stored and all capabilities available.

Partial - all capabilities available but specified groups of information are stored off line.

Limited - storage of test data only with some capabilities available.

Manual - all information stored off line and no capabilities available.

Of these possible systems, the first (complete system) was not considered in further discussions since, although it is technically feasible, it is not economically feasible at the present. Further, the last system, manual, was also not considered since EPA's present capabilities are at the limited system design level.

These systems can be further subdivided by considering the accessibility of information. That is, information can be handled as text in which all elements are considered as character strings regardless of whether they are numbers or alphabet, or as items (data) in which elements have a meaning other than a character string. Restricting the utilization of computers to text forms is ofter referred to as word or text processing.

Word processing can be catagorized into several functional levels as follows:

- o Manual typewriter mode - In this level all manipulation of textual information is done by the operator.
- 1 Automatic typewriter - Here the mechanism provides a capability to store limited amounts of text as well as providing editing capabilities.
- 2 Mini computer based systems - These systems extend the storage and editing capabilities available to the operator as well as provide additional capabilities of communication and long term storage.
- 3 "Large" systems based - At this level the textual information is manipulated utilizing the full capabilities of large scale computers.

There are certain processing efficiencies and cost tradeoffs attributed to each of these levels. General Motors and Cummings presented examples of the advantages and impacts of implementing the second and third levels of word processing.

The workshop generated the following advantages and disadvantages to the utilization of word processing:

Advantages:

- Reduction of paperwork, especially during the generation phase of the document.
- Faster throughput/approval - for example, an automatic revision checking capability.
- Ease of changes/correction.
- Ready accessibility to the information.
- Minimum format restriction.
- Assists referencing lookup.
- A single approval center.
- Cost.

Disadvantages:

- Requires a functional computer.
- Standard page format.
- Analysis only on the gross (index) and character levels.
- Needs trained personnel.
- Cost.
- Requires machine readable copy.

In general, the advantages can be summarized to Automation and Productivity while the disadvantages to Changes in the standard operating procedure.

Discussions on the item (data) form were initiated by a presentation of the advantages and impact by the Ford Motor Company. The advantages of this mode that were identified by the workshop are:

- Analysis capabilities
- Entry verification/validation
- Faster throughput/approval, for example during running changes
- Efficiency of internal control by the minimization of the proliferation of error
- Provides for a centralized data base.

The last advantage, a centralized data base, also has accompanying disadvantage, that is the coordination and/or reorganization of requirements within the government. Other disadvantages identified are:

- Applicable only to selective information elements
- Format/information restriction.

The disadvantages of the format restrictions should be mitigated by the results of the indexing and sequencing task forces.

A fundamental requirement of any system mentioned above, it the transmission of information from industry to EPA. The various modes of transmission are:

- o Manual - this could take on various forms from the present method of providing hard copy to the keying in of information directly into the computer.

- o Punched card - this mode is limited to small amounts of information and primarily that of the item (data) form.

- o Magnetic tape - this is primarily utilized for the transmission of large amounts of information.

- o Diskette - an alternate for magnetic tape.

- o OCR (optical character recognition) - these devices allow the information contained on typed documents to be inputted directly into the computer.

- o Telecommunications - with this media there would be a direct or indirect connection between industries and EPA's word/data processing devices.

With respect to any of these modes of transmission, there are certain concerns that must be recognized. These are:

- o Submission verification/accountability
- o Security during transmission and subsequent accessibility
- o Time required to "cycle" a submission
- o Investment on the part of EPA and/or companies in equipment or contracted services support. No recommdation was made regarding which mode of transmission should be used by EPA.

CONCLUSION

The overall conclusion of this session was that the utilization of computer capabilities within the certification process with proper cognizance of the concerns given above can result in an efficiency in the approval process as well as a actual reduction in the amount of paper necessary to gain this approval. Further, this utilization is affected by and can assist in the full efficacy of indexing, referencing, and sequencing.

GFG/frg/w/382
12/23/77

EPA-INDUSTRY WORKSHOP

ON CERTIFICATION PAPERWORK REDUCTION

December 12-14, 1977

COMPUTERIZATION SURVEY

Company Name: Environmental Protection Agency

Name of Person(s) Completing Survey: John Kargul

Mailing Address: 2565 Plymouth Road, Ann Arbor, Mi 48105

Phone No.: 668-4399

Note: If a computer system or device is given as an answer to a question, please enumerate its characteristics.

I. BASIC COMPUTER SYSTEM DESCRIPTION

A. Do you have onsite or timesharing computer capability which you currently do your certification work on? Yes

B. Describe your system

1. Mainframe Hardware: Ahmdal 470 V6 (Remote Time Sharing)
2. Configuration: Standard
3. Memory Size: 4 Mb
4. Operating System: Michigan Terminal System (MTS)
5. Timesharing Software: MTS
6. Communication Link (e.g., Host/Satellite, HASP/2780)
   Host - HASP, DATA 100 Satellite - HASP Model 20 RJE
7. Other Major Features: ____________
8. # of Peripherals: of the RJE
   a. Card Readers: 1 Speed: 200 CPM
   b. Line Printers: 1 Speed: 300 LPM
   c. On-line disk storage: Ø Size: ____
   d. Tape Drives 1 Track 9 Speed 45 LPS
      Density 1600
   e. X-Y Plotter: Ø

f. Optical character recognition devices: Ø

g. Microfilm writers: Ø

h. Microfilm readers: Ø

i. Other: ________

9. Programming Languages available: FORTRAN, PL1, COBOL, Assembler, ALGOL

10. Programming Languages Preferred: FORTRAN, PL1

11. # of Test Sites Supported: No Direct Hardwired Support

12. Other testing support equipment (e.g., calculators etc.):
HP-21MX, TI-960 Mini-Computers
HP-9825 Calculator

II. TEST DATA COLLECTION AND DERIVATION

A. Basic Test Data Description

1. % numeric test data: 80%
2. % text test data: 20%
3. % engineering drawings: 0%

(items 1–3: 100%)

4. % certification related data: 60%
5. % experimental related data: 40%

(items 4–5: 100%)

B. How do you collect your numeric certification test data?
Currently we collect the data manually.

1. % lab instrument read and manually transposed: 100%
2. % manually derived: 0%
3. % computer read and stored: 0%

C. If an engine family is carried over from one year to the next what percentage of the data is:

1. numeric: 15%
2. text: 15%
3. drawing: 0%
4. other: 0%

III. BASIC DATA TRANSFER, ANALYSIS, STORAGE, AND REPORT GENERATION DESCRIPTION

A. Do you transfer test data to your computer system?

Yes X No ____ If so, what percentage is transferred and how?

1. Manual methods: 100% data sheet coding and card entry or terminal entry.
2. Automatic methods: 0%
3. Other: 0%

B. Do you transfer data between computer systems (local or remote)? We could but we do not need to. How? 9-track magnetic tape.

C. How do you validate the transferred data? not applicable

D. Do you have a high error rate? Not Applicable (%): ____

E. Do you consider your current method of data transfer adequate? Not Applicable

F. How would you change it if you could? It would be nice to establish a communication network between the systems.

G. How do you perform certification data analysis? Most of our analysis is done manually (overall).

1. 80 % Manual; explain: All analysis of Part I's and Part II's are done manually.
2. 20 % automatic data processing; explain: All EPA test processing is automated, but not much else for certtification data.
3. 0 % other; explain: ____

H. Types of certification data analysis performed:

1. % engineering analysis of numeric data: 30%
2. % engineering analysis of text: 40%
3. % engineering analysis of drawings: 10%
4. % statistical analysis: 20%

   What kinds? Standard deviations, regressions.

I. How is your certification data stored? (% manual, % automatic, % other)

1. Numeric: 100% automatic test data - 0% automatic Part I, Pt.II data
2. Text: 100% automatic test data - 0% automatic Pt. I, Pt. II data
3. Drawings: 0% automatic
4. Other: ______

J. Do you have a Data Base Management System? No

1. What kind(s)? ______
2. How long have you had it (them) operational? ______

K. Do you have a Data Dictionary/Directory System? No

1. What kind(s)? ______
2. How long have you had it (them)? ______

L. Do you have a host language interface capability with your DBMS? No What Lanuguages? ______

M. Do you have a query language capability with your DBMS? No Is it adequate? ______

N. Do you have a graphics interface with your DBMS? No Is it adequate? ______

O. Do you have a report generation capability with your DBMS? No Is it adequate? ______

P. What kinds of reports do you generate?

1. % numeric data? 85%
2. % text data? 5%
3. % drawings? 5%
4. % combination? 5%
5. % other? ______

Q. Are EPA's requirements primary considerations in the procedural aspects of data handling storage, and report generation at your facility? Yes

Explain: Our processing is completely specified by EPA's requirements.

R. Are EPA's requirements satisfied as one of many users of your information? Yes

1. % system use for EPA: 99%
2. % system use for other: 1%

IV. WORD PROCESSING FOR CERTIFICATION PART I AND PART II PREPARATION

A. Do you have on-site, remote, or contracted word processing service to process certification data? Yes - on-site

If so, what kind(s)? IBM Mag Card II typewriter

B. What is the text-editing capabilities of your WP service?

1. Limited (standard typewriter with a few controls): ______
2. Moderate (includes internal programming and core storage): X
3. extensive (Shared Logic, or Mini Computer based system, Computer Timesharing): ______

C. Explain briefly the configuration of your WP service:

IBM Selectric Typewriter plus a Mag Card unit

D. List the type, size, and speed of each kind of storage your WP service has. (e.g., magnetic cards, magnetic tapes, disc or diskette, other) mag cards - 1 page per card

E. Does your WP service have searching capability? No

F. Does your WP service have a reformating capability? No
Explain: Not without extensive changes to the data.

G. List the type and speed of each display and printing device your WP service has: IBM Selectric typewriter - 15 cps

H. What is the speed of your WP service?
It depends upon the length of the job, generally 1 day turn around.

I. What character type does your WP service use?
What ever type-ball you put on the Selectric

J. Does your WP service have a communication capability? Yes
a. with your computer-data storage system? Yes
b. with other WP devices?
If so, what is the protocol (IBM, ASCII, other), type (dial up, hard wire), and speed?
Protocal is ASCII, dial-up type, 15 characters per second.

K. How are your Part I's prepared? Not Applicable

1. % manual: ________

2. % automatic: ________

3. % other: ________

L. How are your Part II's prepared? Not Applicable

M. If manually prepared, do you have any plans to automate the process? Not Applicable

If so, what are they? ________

N. How is the certification text entered into the WP service? Currently no certification text is entered into our word processing service.

O. Are you satisified with the WP service for certification work? Not Applicable

V. GENERAL

What plans do you have to modify or upgrade equipment and capabilities? (please elaborate): We are currently developing a Real-Time Computer System using dual SEL32/55's to process our certification and experimental test data. The system will have a HASP link to a larger timesharing service. We are also upgrading our work processing equipment to VYDEC Model 1200 equipment which has full page CRT screen & keyboard, "floppy" disk storage, and independent printer.

RETURN SURVEY TO:

Environmental Protection Agency
2565 Plymouth Road
Ann Arbor, Michigan 48105

Attention: Linda Tucker, Data Branch

I. BASIC COMPUTER SYSTEM DESCRIPTION

	AMC	GMC	CHY	FORD	PEUG	AUDI	TOYOTA	CUMMINS
A. Computer System(s) B.-1 Used for certification	HONEYWELL SERIES 600-6000	IBM 370/158	(1) CYBER NETWORK (2) CDS SYSTEM 17 (3) Process cont.	(1) HONEYWELL 6080 (2) HP 2000 F	IBM 370/158	NONE	UNIV 1100/42 time-sharing	XEROX SIG IX
4. O.S.	GCOS	OS/SVS TSO	(1) NOS/BE (2) Mass storage O.S.	(1) GCOS/TSS (2)			EXEC8E	TIY
6. COMM. LINK	HOST/ SATELITTE	HASP/2780	19.2KB Link between	(1) GERTS (2)	TELEX (time-sharing)			
d. TAPE DRIVES	10-9 track 1800 BPI	3-9 track 800/1600 BPI	(1) 11-7/9 556/1600 BPI (2) 2-9 1600 BPI	(1) 15-7,9 track 800,1600 BPI (2) 1-9 track 800 BPI			10-9 track 800/1600 BPI	9 track 800/1600 BPI
f. OCR	NONE	NONE	(1) 1-CDC	NONE	NONE		NONE	NONE

II. TEST DATA COLLECTION AND DERIVATION

		AMC	GMC	CHY	FORD	PEUG	AUDI	TOYOTA	CUMMINS
A. DATA DESCRIP.	Num	80%	80	50	30	95		25	90
	Text	20%	20	50	70	5		75	5
	Draw	0	0	0	0	0		0	5
	Cert	50%	100	75	90	40		3	75
	Exp	50%	--	25	10	60		97	25
B. DATA COLLECTION	Lab Inst	100%	0	0	20%	100		100	50
	Man derived	0	0	0	80%	100		0	40
	Comp read	0	100	100		0		0	10
C. DATA CARRY-OVER	Num	20%	40	40	20	95			50
	Text	20%	30	40	75	5			50
	Draw	5%	30	0	5	0			0
	Other	55% back ground work	--	0	0	0			--

III. BASIC DATA TRANSFER, ANALYSIS, STORAGE, AND REPORT GENERATION DESCRIPTION

	AMC	GMC	CHY	FORD	PEUG	AUDI	TOYOTA	CUMMINS
A. DATA TRANSFER TO COMP. SYSTEM	100% term entry	100% term entry	100% data sheet/ term entry	100% remote terminal input	100% terminal entry		100% data sheet entry	Keyed entry & AUTO from test cells
B. DATA TRANSFER BETWEEN COMPUTER SYSTEMS	NO	NO	YES-CDC Sys 17 to CDC CYBER	YES-REMOTE TERMINAL INPUT	NO			
G. CERT DATA ANALYSIS	80% manual 20% AUTO	100% AUTO	60% manual	100% AUTO	95% manual 5% AUTO		98% manual 2% AUTO (EPA tests)	80% manual (hand calc) 20% on Xerox
J. DBMS	YES-part of GCOS	ADABAS Fortram, PL1, assembler	Fortram, text edit	TEXT EDITING, Special basic Data Reporting and Info retrieval	NO		NO	NO

IV WORD PROCESSING FOR CERT PART I & II PREPARATION

	AMC	GMC	CHY	FORD	PEUG	AUDI	TOYOTA	CUMMINS
A. DO YOU HAVE WP CAPABILITY	Contracted Computor-based	On-site WANG WP-30	On-site File storage & report gen.	HONEYWELL RUN-OFF TEXT PROCESSING	NO	NO	Cannot Answer	WANG, ATMS
B. TEXT-EDITING CAPABILITY	extensive	extensive	limited for part 1 extensive for part II	moderate	Limited			extensive
D. STORAGE CAPABILITY	Tape, disc	Disc-4000P DISKETTES-120P/ea	disc	Buffer storage timesharing disk				WANG-DISKETTE ATMS-DISK
J. COMMUNICATION CAPABILITY	NO Possible ASCII, handivers 9600 band	NO-will have ASCII, modem 30 cps.	YES ASCII dial-up 30-120 cps.	YES dial-up IBM/ASCII, 30 cps time-share service				WANG-NO ATMS-YES 4800 band IBM
WP Part I & II Prep	YES	I-70% Man 30% Auto II-90% Man 10% Auto	I-100% Man II-50% Man 50% Auto	I- 100% Man II- 50% Auto				I-10% Man 90% Auto II-100% WANG
K.								
L.								

IV GENERAL

	AMC	GMC	CHY	FORD	PEUG	AUDI	TOYOTA	CUMMINS
Plans WP	Patten after Ford	YES	Not in near future		None Planned			Move to ATMS from WANG
COMPUTERIZATION	Intergrate parts of Cert. on new computer system	ADD OCR	increase comm. to 57.6 K, add line printer, card reader	augment GCOS with MULTICS, Upgrade HP 2000 to HP 3000	automatic data-col-lection for span measurement & calc.		NONE	

COMPUTERIZATION AT CUMMINS

CURRENT: WANG WORD PROCESSOR

- ON-LINE EDITOR
- "MASTER" DOCUMENTS ON RETRIEVABLE MEDIA
- CREATION/CHANGE TIME GREATLY REDUCED
- MORE CONSISTENT PRODUCT
- ADDED A DISTANCE FACTOR IN CREATION/CHANGE CYCLE

COMPUTERIZATION AT CUMMINS

GOALS:

- EFFICIENT, FAST SERVICE
- ABILITY TO ELIMINATE KEYING REPETITIVE DATA
- ABILITY TO COMMUNICATE WITHIN CUMMINS
- MINIMIZE, AS MUCH AS PRACTICAL, THE PAPER FLOW BETWEEN CUMMINS AND EPA
- UTILIZE CAPABILITIES OF COMPUTER TO REDUCE THE WORK REQUIRED TO SUBMIT/PROCESS CERTIFICATIONS

Attachment B

COMPUTERIZATION AT CUMMINS

PROPOSED: ADVANCED TEXT MANAGEMENT SYSTEM

SAME AS CURRENT PLUS

- PROVIDE ABILITY TO COMMUNICATE WITHIN CUMMINS
- WILL ALLOW CERTIFICATION RELATED DOCUMENTS TO BE CREATED LOCALLY
- OPENS THE DOOR TO A MECHANIZED INTERFACE WITH EPA
- WILL EASILY INTERFACE WITH ADVANCED RETRIEVAL SYSTEM (STAIRS)

[illegible]

A DISCUSSION OF THE PROPOSAL TO COMPUTERIZE THE APPLICATION FOR CERTIFICATION

Prepared By

W. A. Kostin

Of

Ford Motor Company

On

December 14, 1977

W. A. Kostin
December 12, 1977 (3)

COMPUTERIZATION OF THE APPLICATION FOR CERTIFICATION

Purpose

This paper presents some thought provoking ideas which should be discussed during the EPA-Industry Workshop on Certification Paper Work Reduction. The paper does not represent a fixed formal position of Ford Motor Company on this matter.

Documents Most Likely To Be Computerized

The documents, currently computerized, most likely to be submitted to EPA in computer readable format within about 1-2 years are as follows:

1. Emission Vehicle Test Logs
2. EPA Official Test Results
3. Durability Vehicle Maintenance and Test Logs
4. FEDV Packages

(Examples of computerized versions of items 1-4 are attached.)

The following documents, currently not computerized, appear feasible for computerization, but will probably not be implemented at Ford for about 2 years:

- Section VIII of Part I, Vehicle Description
- Individual Calibration Description Sheets

The computerization of these documents is currently being investigated.

Criteria for Judging Whether to Computerize

The following criteria are proposed for judging whether to computerize individual documents contained in the Part I or II.

1. The proposal should result in a definite reduction in the time required by EPA to audit a Part I or II -- especially a reduction in the time required after Part II submission to get a certificate. (1)

2. The computerization should permit Ford and EPA (if possible) to internally reduce the amount of manual transcription of data from one format to another different format for presentation. For example: the computerization of 1978 emission test log enabled Ford to practically automatically generate FEDV packages, DF's and EPA Official Test Result sheets. This was possible because the latter documents were subsets of the emissions data base. (In fact, about 5.5 man-weeks were saved in the preparation of FEDV packages by computerization.)

3. Where practical, the proposal should result in an exact definition of the format and nomenclature required for Part II data submissions. Specifically, the certification vehicle test logs data should be transmitted to EPA in a well defined format. This would help avoid last minute minor changes in Part II data format. Such changes directly delay the issuance of a certificate and generate extra paper work.

4. The computer should not be used to generate documents which can be more easily and cheaply manually prepared. For example: the emissions systems warranty, statement of device safety, and training statements are examples of documents containing qualitative information that rarely changes.

5. The computerization proposal should result in the establishment of a data base by which additional secondary statistical studies or problem searches can be made. For example: the Ford durability data vehicle maintenance was computerized so that we could more easily do oil economy studies or collect data on the repeated concurrence of unscheduled maintenance. Also, the computerization of the durability test data has enabled us to more easily compute DF's as well as perform a multitude of studies concerning alternative ways for calculating the DF.

Internal Benefits Obtained By
<u>Ford's Computerization of Part II</u>

The computerization of the 1978 durability vehicle test and maintenance log plus 1978 emission vehicle test log has resulted in the following internal benefits to Ford:

- It saved at least 5.5 man-weeks via the computer preparation FEDV packages. (2.5 hours saved per package times 88 packages submitted to EPA for 1978 MY)
- It enriched jobs by substantially reducing the repeated clerical transcriptions of the same data on the different forms.
- It reduced typing of data logs by up to 50%.
- It reduced by 50% the time required to update the logs for a vehicle involved in back-to-back testing.
- It improved the accuracy of the predicted value for the durability data vehicle DF.
- It helped us to reduce the amount of time required to generate other management reports.
- It substantially reduced the amount of overtime required to update the Part II.
- It has eliminated the need to manually prepare a separate additional test log, DF data sheet, and Official Test Result Sheet for submission to CARB. Instead, these documents are generated by the computer. These separate sheets result from CARB's unique rounding, outlier and non-methane regulations.
- It has avoided the extra expenses associated with preprinting data log and other Part II forms.

IV. Appendix

The three day workshop consisted of four sessions, introductory presentations, and a closing discussion.

The Agenda and the list of attendees follows:

APPENDIX

AGENDA

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION
December 12, 13, and 14

DECEMBER 12

Session I

9:00 - 9:15	Introduction
9:15 - 10:30	Present Certification Program Organization, Informational Requirements EPA - R. E. Harrington
10:30 - 10:45	Break
10:45 - 11:30	Use of Automatic Data Processing EPA - Linda Tucker
11:30 - 1:15	Lunch

Session II

1:15 - 3:00	Standard Indexing and Terminology in the Certification Program Chairperson: G. Dana, EPA Supporting Manufacturers: Ford, GM, Cummins
3:00 - 3:15	Break
3:15 - 5:00	Continue topic from early afternoon session

DECEMBER 13

Session I

9:00 - 10:30	Sequenced Submission of the Standard Application for Certification Chairperson: Virginia Sink, Chrysler EPA Contact: B. Patok
10:30 - 10:45	Break
10:45 - 12:00	Continue topic from morning session
12:00 - 1:15	Lunch

December 13 (continued)

Session II

1:15 - 3:00	Referencing within the Application Co-Chairpersons: W. Kostin, C. Doherty, Ford EPA Contact: J. Thomson
3:00 - 3:15	Break
3:15 - 5:00	Continue topic from early afternoon session

DECEMBER 14

Session I

9:00 - 10:30	Computerization of the Certification Process Chairperson: G. Gruska, GM EPA Contacts: L. Tucker
10:30 - 10:45	Break
10:45 - 12:00	Continue topic from morning session
12:00 - 1:15	Lunch

Session II

1:15 - 3:00	Summary Discussion Streamlining the Certification Process Subject Areas for Future Meetings Discussion Leaders: E. O. Stork R. E. Harrington
3:00 - 3:15	Break
3:15 - 5:00	Continue topic from early afternoon session

APPENDIX

EPA-INDUSTRY WORKSHOP ON CERTIFICATION PAPERWORK REDUCTION
December 12, 1977

Participant List

Topic 1: Standard Indexing and Terminology in the Certification Program

Name	Representing
Greg Dana, Chairperson	Chrysler Corporation
Virginia Sink	EPA
R. C. Smith	EPA
Gene Bolton	General Motors Corporation
Merle Liskey	American Motors
M. Robert Wilson	General Motors Corporation
Bill Kostin	Ford Motor Company
W. Henny	Cummins Engine Company, Inc.
B. Patok	EPA
Gregory Gruska	General Motors Corporation
Mark Wolcott	EPA
R. Nunez	Chrysler Corporation
Karl Weber	Mercedes Benz
Richard Mazur	EPA
Les Ryder	EPA
M. Stasikowski	EPA
R. E. Harrington	EPA

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION
December 13, 1977

Participant List

Topic 2: Sequenced Submission of the Standard Application for Certification

Name	Representing
Virginia Sink, Chairperson	Chrysler Corporation
R. C. Smith	EPA
T. Hiramatsu	Toyota
D. Bonawitz	Toyota
Gene Bolton	General Motors Corporation
Merle Liskey	American Motors
M. R. Wilson	General Motors Corporation
Bill Kostin	Ford Motor Company
B. Patok	EPA
M. Wolcott	EPA
Karl Weber	Mercedes Benz
Richard Mazur	EPA
Les Ryder	EPA
M. Stasikowski	EPA
R. E. Harrington	EPA
John Goodman	Ford Motor Company
J. G. Quick	Ford Motor Company
Fred Maloney	Chrysler Corporation

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION
December 13, 1977

Participant List

Topic 3: Referencing within the Application

Name	Representing
Bill Kostin, Chairperson	Chrysler Corporation
R. C. Smith	EPA
J. Thomson	EPA
T. Hiramatsu	Toyota
D. Bonawitz	Toyota
Gene Bolton	General Motors Corporation
Merle Liskey	American Motors
M. R. Wilson	General Motors Corporation
Virginia Sink	Ford Motor Company
Hugh Daugherty	Cummins Engine Company, Inc.
B. Patok	EPA
M. Wolcott	EPA
Karl Weber	Mercedes Benz
Richard Mazur	EPA
Les Ryder	EPA
M. Stasikowski	EPA
R. E. Harrington	EPA
B. W. Schoner	BMW
Fred Maloney	Chrysler Corporation
Ronald Finney	Ford Motor Company

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION
December 14, 1977

Participant List

Topic 4: Computerization of the Certification Process

Name	Representing
G. Gruska, Chairperson	Chrysler Corporation
R. C. Smith	EPA
A. Gioia	General Motors Corporation
Gene Bolton	General Motors Corporation
S. V. Yumlu	Mack Trucks, Inc.
Bill Kostin	Ford Motor Company
Vito Laudicina	Cummins Engine Company, Inc.
L. M. Tucker	EPA
B. Patok	EPA
Virginia Sink	General Motors Corporation
Mark Wolcott	EPA
Karl Weber	Mercedes Benz
Richard Mazur	EPA
Les Ryder	EPA
M. Stasikowski	EPA
R. E. Harrington	EPA
John Kargul	EPA
H. J. Murawski	Ford Motor Company
D. M. Buck	Ford Motor Company
John Goodman	Ford Motor Company

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION
December 14, 1977

Participant List

Topic 5: Discussion

Name	Representing
E. O. Stork, Discussion Leader	Chrysler Corporation
R. C. Smith	EPA
D. Bonawitz	Toyota
Gene Bolton	General Motors Corporation
M. R. Wilson	General Motors Corporation
S. V. Yumlu	Mack Trucks, Inc.
L. M. Tucker	EPA
B. Patok	EPA
Greg Gruska	General Motors Corporation
Mark Wolcott	EPA
Karl Weber	Mercedes Benz
Richard Mazur	EPA
Les Ryder	EPA
M. Stasikowski	EPA
R. E. Harrington	EPA
Virginia Sink	EPA
Bernard Steinhoff	Mercedes Benz
D. M. Buck	Ford Motor Company

APPENDIX

EPA-INDUSTRY WORKSHOP ON
CERTIFICATION PAPERWORK REDUCTION
December 12, 13, 14, 1977

Final List of Attendees

Name	Representing	Dates Attended
Eni Amito	American Honda	13 - 14
J. F. Beddow	Ford Motor Company	12 - 13 - 14
H. Eugene Bolton	General Motors - EAS	12 - 13 - 14
Victor Bolton	Kawasaki Motors Corporation	12 - 13
Dan Bonawitz	Toyota	12 - 13 - 14
Harold Borne	Ford Motor Company	14
John W. Bozek	Environmental Protection Agency	12 - 13 - 14
DeWayne M. Buck	Ford Motor Company	13
Robert V. Cervenka	Subaru	12 - 13 - 14
Daryl J. Chupa	Ford Motor Company	14
C. Cole	Environmental Protection Agency	14
Gene Crombez	Chrysler Corporation	14
Greg Dana	Environmental Protection Agency	12 - 13
Hugh Daugherty	Cummins Engine Company, Inc.	12 - 13 - 14
D. E. David	Kawasaki Motors Corporation	12 - 13
Roy Dennison	U. S. DOT, NHTSA	12 - 13 - 14
Mike Ellmann	Environmental Protection Agency	12 - 13 - 14
Ronald Finney	Ford Motor Company	13
Anthony J. Gioia	General Motors Corporation	12 - 13 - 14
John Goodman	Ford Motor Company	13 - 14
Gregory Gruska	General Motors Corporation	12 - 13 - 14
R. M. Gulau	Ford Motor Company	14
J. C. Hafele	Caterpillar Tractor Company	12 - 13 - 14
Pawel Hans-H	Volkswagen Wolfsburg	12 - 13 - 14
Richard M. Hardesty	U.S. EPA	12 - 13 - 14
D. Hardin	Environmental Protection Agency	14
R. E. Harrington	Environmental Protection Agency	12 - 13 - 14
Willi Henny	Cummins Engine Company, Inc.	12 - 13 - 14
Takamichi Hiramatsu	Toyota	12 - 13 - 14
Cliff Hirano	Yamaha	12 - 13
Saburo Hori	Checker Motors Corporation	13 - 14
Kenneth Johnston	Environmental Protection Agency	12 - 13 - 14
John Kargul	Environmental Protection Agency	12
Bob Kendall	Mack Trucks	12
James Kerns	Ford Motor Company	13
Peter E. Kohnken	Environmental Protection Agency	13 - 14
W. A. Kostin	Ford Motor Company	12 - 13 - 14
H. Kusano	Mitsubishi Motors Corporation	12 14
Bob Larson	Environmental Protection Agency	14
Vito A. Laudicina	Cummins Engine Company, Inc.	12 - 13 - 14
Merle E. Liskey	American Motors Corporation	12 - 13 - 14
Albert G. Lucas	General Motors Corporation	14

Final List of Attendees (continued)

Name	Representing	Dates Attended
Richard H. Lucki	Peugeot	12 - 13 - 14
Fred Maloney	Chrysler Corporation	13
Frank Maloziec	Fiat R & D	12 14
W. J. Martin	International Harvester	12
Jim Marzen	Environmental Protection Agency	12 - 13 - 14
Richard Mazur	Environmental Protection Agency	12 - 13
Henry J. Murawski	Ford Motor Company	12 - 13 - 14
Lawrence Murray	Environmental Protection Agency	12 - 13
Kaznynki Nakamura	Honda	13
Roy Nelson	Chrysler Corporation	14
Richard R. Nunez	Chrysler Corporation	12
L. Lawrence Nutson	Volkswagen-Audi	12
Daniel C. Pasquantonio	Chrysler Corporation	13 - 14
Bernie Patok	Environmental Protection Agency	12 - 13 - 14
J. G. Quick	Ford Motor Company	13
T. N. Ronayne	American Motors Corporation	14
Les Ryder	Environmental Protection Agency	12 - 13
Dr. Manfred Schlawne	Daimler-Benz	14
John Schmidt	Harley-Davidson	12 - 13 - 14
Mike Schmitt	Yamaha Motor Corporation	12 - 13
B. W. Schoner	BMW of North America	12 - 13 - 14
E. Schubarth	Audi	12 - 13 - 14
Helmutti Schweitzer	Daimler-Benz	14
Donald M. Schwentker	AIA	14
Bert Searing	Motor Vehicle Mfgrs. Assn.	14
M. Virginia Sink	Chrysler Corporation	12 - 13 - 14
Robert C. Smith	MSAPC, EPA	12 - 13 - 14
Margaret Stasikowski	Environmental Protection Agency	12 - 13 - 14
Bernard Steinhoff	Mercedes Benz of North America	12 - 13 - 14
E. O. Stork	Environmental Protection Agency	14
Ken Takahashi	Nissan	12 - 13 - 14
John C. Thomson	Environmental Protection Agency	12 - 13 - 14
Linda M. Tucker	Environmental Protection Agency	12 - 13 - 14
C. D Tyree	Environmental Protection Agency	14
L. D. Verrelli	Environmental Protection Agency	12 - 13 - 14
Karl Weber	Mercedes Benz	12 - 13 - 14
G. D. White	Ford Motor Company	12 14
M. Robert Wilson	General Motors Corporation	12 - 13
Mark Wolcott	Environmental Protection Agency	12 - 13 - 14
S. V. Yumlu	Mack Trucks, Inc.	12
K. N. Ziwich	BMW of North America	14

Total Attendance for 3-day Period: 83

Attendance - Monday, December 12:	56 - 67% of total attendance
Tuesday, December 13:	57 - 69% of total attendance
Wednesday, December 14:	62 - 73% of total attendance

82% of Monday's attendees returned on Tuesday (including 10 new registrations)
72% of Tuesday's attendees returned on Wednesday (including 16 new registrations)